

2003 Sensitive Plant Survey Results

for the

Isola and Ventura Homestead Sites Los Angeles County, California

Prepared for:

The Newhall Land and Farming Company

23823 Valencia Boulevard

Valencia, CA 91355

Contact: Glenn Adamick

Prepared by:



605 Third Street

Encinitas, CA 92024

Contact: Sherri Miller

(760) 479-4244

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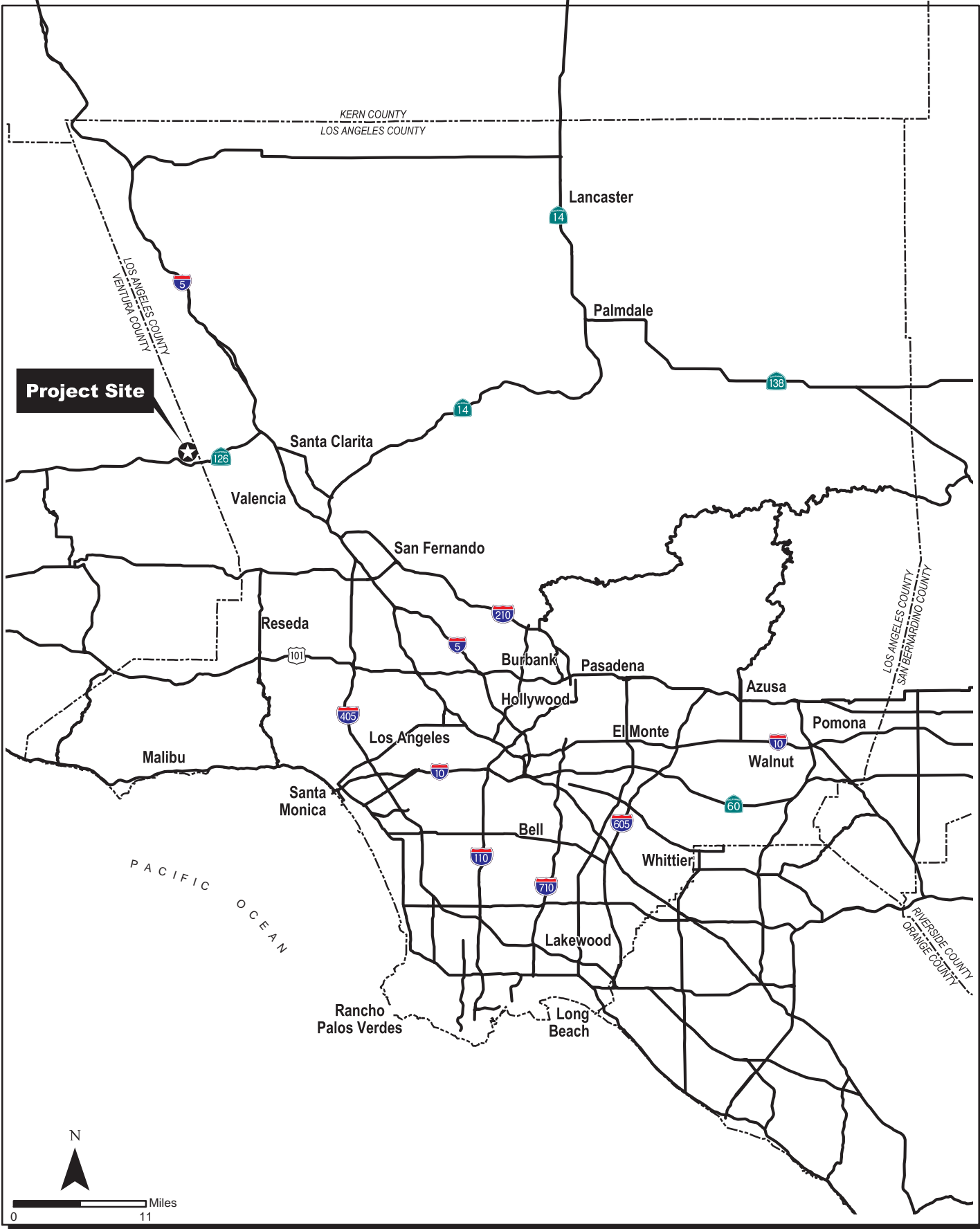
1.0 INTRODUCTION

The purpose of this report is to document the results of surveys for sensitive plant species within the approximately 252-acre Isola site and the 825-acre Ventura Homestead site for the 2003 field season. Surveys placed an emphasis on the identification of populations of the state-listed endangered San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*; SFVS) and to document all other sensitive plant species observed while conducting the SFVS surveys.

2.0 SITE DESCRIPTION

The Isola and Ventura Homestead sites are located in an unincorporated portion of the Santa Clara River Valley in northeastern Ventura County (*Figure 1*). The project sites lie six to eight miles west of Interstate 5 and north of State Route 126, within the Val Verde U.S. Geological Survey 7.5 minute quadrangle. The 252-acre Isola site is mapped in Township 4 North, Range 18 West, Section 23 (*Figure 2*). The center of the Isola site is 34° 26' 18" N. latitude and 118° 36' 20" W. longitude. The 825-acre Ventura Homestead site is mapped in Township 4 North, Range 17 West, Sections 19 and 30, and Township 4 North, Range 18 West, Sections 24 and 25 (see *Figure 2*). The center of the Ventura Homestead site is 34° 24' 36" N. latitude and 118° 42' 36" W. longitude.

Both of the sites contain steep, rugged terrain. The lowest elevations are at the southwestern corner of each site, near the Santa Clara River, at approximately 800 feet above mean sea level (AMSL). The Isola site is composed of slopes that rise to approximately 1,240 feet AMSL on the ridges in the northeastern portion of the site. On the eastern half of the Isola site the ridges run east-west and on the western half of the site the ridges run north-south. The Ventura Homestead site is composed of a series of north-south ridges that rise from 800 to 900 feet AMSL, then converge at about 1600 feet AMSL and continue to rise to a maximum elevation of 1800 feet AMSL at the northern edge of the central part of the site (see *Figure 2*).



Isola/Ventura Homestead
Regional Map

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Isola and Ventura Homestead Sites

2.1 Plant Communities and Land Covers

Portions of the Isola site previously used for agriculture are now covered with non-native grasslands or sparse coastal sage scrub (*Figure 3*). Utility poles and their associated access roads are also present throughout the site.

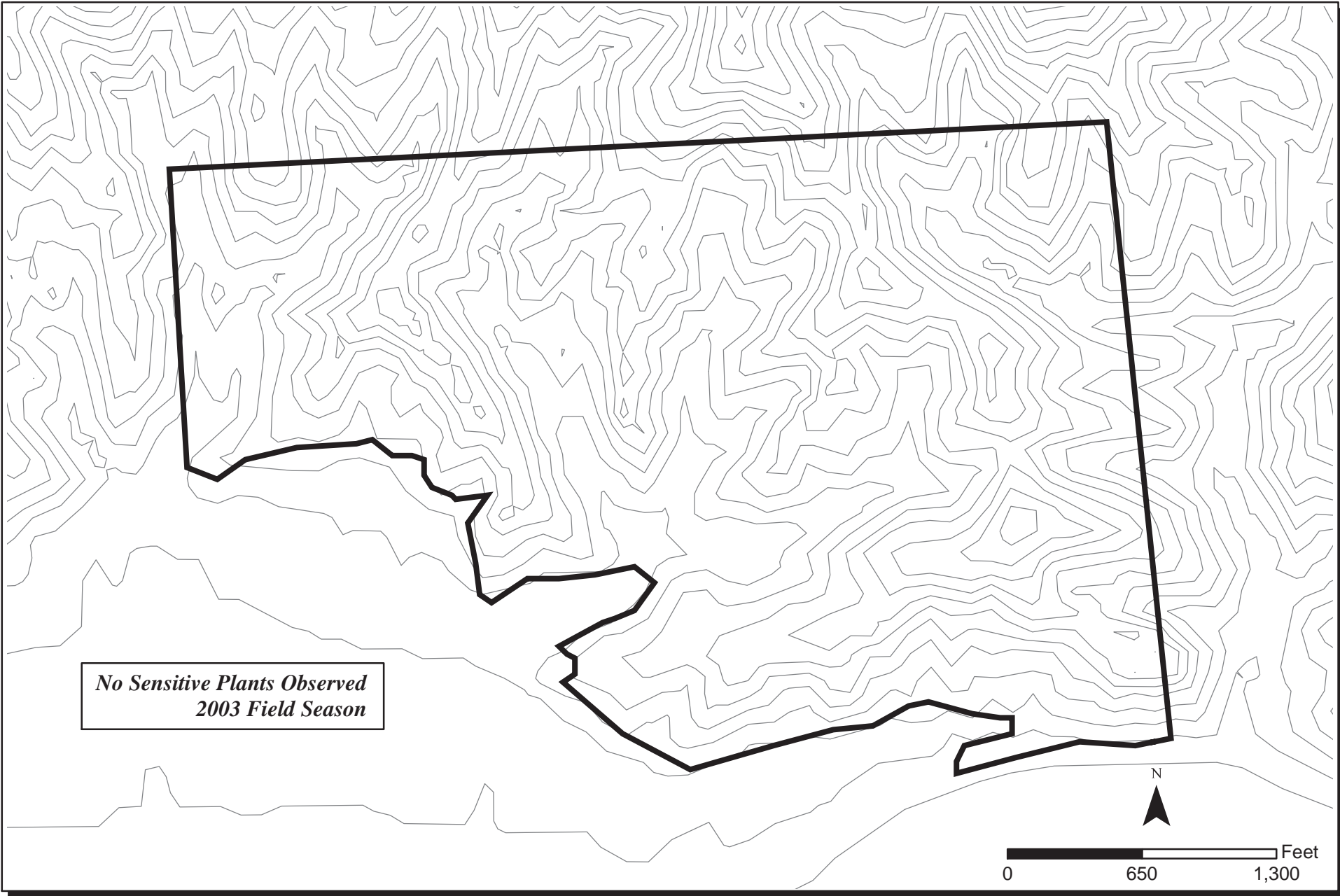
The Ventura Homestead site generally supports coastal sage scrub on northwest-facing slopes and annual (non-native) grasslands on southeast-facing slopes. The dominant shrubs in coastal sage scrub are California sagebrush (*Artemisia californica*), flat-top buckwheat (*Eriogonum fasciculatum*), purple sage (*Salvia leucophylla*), and mesa bushmallow (*Malacothamnus fasciculatus*). Dominant plants in the annual grassland are wild oat (*Avena* spp.), bromes (*Bromus* spp.), tocalote (*Centaurea melitensis*), and Italian thistle (*Carduus pycnocephalus*). Some of the flat areas have been converted to agriculture and agave was being cultivated in two of these fields.

2.2 Geology and Soils

Geologically, the site is located within the Transverse Range geomorphic province of southern California in the eastern portion of the Ventura depositional basin. This basin was produced by tectonic downwarping in the geologic past to produce a large-scale synclinal structure in which a thick sequence of Cenozoic sediments has accumulated. These sediments have been lithified into a sequence of sedimentary rock that has subsequently been uplifted, tilted, and tectonically deformed (Allan E. Seward 2002).

Almost the entire Isola site was mapped as Castaic and Saugus soils, 30 to 75 percent slopes, eroded. Castaic soils are silty clay loams, 20 to 30 inches deep, well-drained, and moderately fertile. Saugus soils are loams, 25 to 42 inches deep, well-drained, with low fertility. Small areas of Sorrento silty clay loam, 2 to 9 percent slopes; and sandy alluvial land are also present (Natural Resources Conservation Service [NRCS] 1969).

The majority of the Ventura Homestead site was mapped as Castaic and Saugus soils, 30 to 75 percent slopes, eroded. Castaic-Balcom complex soils (30 to 50 percent, eroded, and 50 to 65 percent, eroded) are also common. Balcom soils, like Castaic soils, are silty clay loams, 20 to 30 inches deep, well-drained,



Isola/Ventura Homestead
Isola Project Boundary

**FIGURE
3**

2003 Sensitive Plant Survey Results Isola and Ventura Homestead Sites

and moderately fertile. Balcom soils are mildly alkaline while Castaic soils are neutral. Small areas of San Benito clay loam, 9 to 15 percent slopes, eroded; Zamora loam, 2 to 9 percent slopes; Sorrento silty clay loam and Sorrento loam, 2 to 9 percent slopes; and sandy alluvial land also occur on the site (NRCS 1969).

3.0 METHODS AND SURVEY LIMITATIONS

Data regarding botanical resources present on the project site were obtained through a review of the pertinent literature; field reconnaissance; and focused surveys for sensitive species, all of which are described below.

3.1 Literature Review

General floristic and sensitive botanical resources present or potentially present on the Isola and Ventura Homestead sites were identified through a literature search using the following sources: the California Natural Diversity Database (CNDDB) for the Newhall, Santa Susana, Simi Valley East, Oat Mountain, Warm Springs Mountain, Whitaker Peak, Cobblestone Mountain, Piru, Simi, Simi Valley West and Val Verde quadrangle maps (CNDDB, March 2002); *Biological Resource Assessment of the Proposed Santa Susana Mountains/Simi Hills Significant Ecological Area* (PCR, November 2000); CalFlora (University of California, Berkeley, May 2002); U.S. Fish and Wildlife Service (USFWS 1999); California Department of Fish and Game (CDFG 2002); *Inventory of Rare and Endangered Plants of California* (CNPS 2001); *Vascular Flora of the Liebre Mountains, Western Transverse Ranges, California* (Boyd 1999); *Checklist of Rare Ventura County Plant Species* (Magney 2002); *A Flora of the Santa Barbara Region, California* (Smith 1976); *A Flora of the Santa Monica Mountains* (Raven *et al.* 1986); *Biology of the San Fernando Valley Spineflower, Ahmanson Ranch, Ventura County, California* (Glenn Lukos Associates, Inc. and Sapphos Environmental, Inc. 2000); *Report to the Fish and Game Commission on the Status of San Fernando Valley Spineflower* (CDFG 2001); *Biota Report, Newhall Ranch Specific Plan* (RECON and Impact Sciences, Inc. 1996); and herbarium specimens from Rancho Santa Ana Botanic Garden and the University of California, Riverside Herbarium. General information regarding vegetation communities was obtained from

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Holland (1986) and Sawyer and Keeler-Wolf (1995). Plant species nomenclature follows Hickman (1993).

3.2 Field Reconnaissance Methods

Botanical surveys for sensitive plant species were conducted by Dudek and Associates, Inc. (Dudek) biologists Michelle L. Balk, Scott M. Boczkiewicz, Mark A. Elvin, David W. Flietner, Kim L. Marsden, and Tricia L. Wotipka and FLx biologists Anuja Parikh and Nathan Gale. All surveys were conducted on foot. Resumes for survey personnel are provided in *Appendix A*.

Botanical surveys of the Isola and Ventura Homestead sites were conducted in late May and June of 2003 as shown in *Table 1*. Approximately 40 person-hours (four person-days) were spent conducting botanical surveys in the Isola study area, and approximately 270 person-hours (27 person-days) were spent conducting botanical surveys in the Ventura Homestead study area. Surveys were conducted in teams of two or more biologists, with at least one senior-level biologist included with each team. Biologists were able to observe reference populations of SFVS and other sensitive species in order to develop a search-image prior to conducting surveys of the project site. Surveys focused the identification and location of populations of SFVS; incidental observations of other state- and federally-listed and California Native Plant Society (CNPS) Lists 1A, 1B, and 2 species would be noted (see the list of target species in *Table 2*).

TABLE 1
SURVEY SCHEDULE AND PERSONNEL
ISOLA AND VENTURA HOMESTEAD SITES

Date	Biologists	Purpose
5-30-03	A. Parikh and N. Gale	Focused survey for SFVS and other sensitive plant species at Ventura Homestead.
5-31-03	M. Balk and K. Marsden	Focused survey for SFVS and other sensitive plant species at Isola.
6-1-03	M. Balk and K. Marsden	Focused survey for SFVS and other sensitive plant species at Isola.
6-9-03	S. Boczkiewicz, M. Elvin, D. Flietner, T. Wotipka, A. Parikh, and N. Gale	Focused survey for SFVS and other sensitive plant species at Ventura Homestead.

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TABLE 1
SURVEY SCHEDULE AND PERSONNEL
ISOLA AND VENTURA HOMESTEAD SITES

Date	Biologists	Purpose
6-10-03	S. Boczkiewicz, M. Elvin, D. Flietner, T. Wotipka, A. Parikh, and N. Gale	Focused survey for SFVS and other sensitive plant species at Ventura Homestead.
6-11-03	A. Parikh and N. Gale	Focused survey for SFVS and other sensitive plant species at Ventura Homestead.
6-12-03	S. Boczkiewicz, D. Flietner, T. Wotipka, A. Parikh, and N. Gale	Focused survey for SFVS and other sensitive plant species at Ventura Homestead.
6-24-03	A. Parikh and N. Gale	Focused survey for SFVS and other sensitive plant species at Ventura Homestead.

TABLE 2
SENSITIVE PLANT SPECIES SUBJECT OF FIELD SURVEYS

Scientific Name	Common Name
<i>Arenaria paludicola</i>	marsh sandwort
<i>Astragalus brauntonii</i>	Braunton's milk-vetch
<i>Atriplex coulteri</i>	Coulter's saltbush
<i>Atriplex serenana</i> var. <i>davidsonii</i>	Davidson's saltscale
<i>Baccharis malibuensis</i>	Malibu baccharis
<i>Berberis nevinii</i>	Nevin's barberry
<i>Brodiaea filifolia</i>	thread-leaved brodiaea
<i>Calochortus clavatus</i> var. <i>gracilis</i>	slender mariposa lily
<i>Calochortus plummerae</i>	Plummer's mariposa lily
<i>Calochortus weedii</i> var. <i>vestus</i>	late-flowered mariposa lily
<i>Calystegia peirsonii</i>	Peirson's morning-glory
<i>Calystegia sepium</i> ssp. <i>binghamiae</i>	Santa Barbara morning-glory
<i>Centromadia</i> [= <i>Hemizonia</i>] <i>parryi</i> ssp. <i>australis</i>	southern tarplant
<i>Chorizanthe parryi</i> var. <i>fernandina</i>	San Fernando Valley spineflower
<i>Deinandra</i> [= <i>Hemizonia</i>] <i>minthornii</i>	Santa Susana tarplant
<i>Dodecahema leptocerus</i>	slender-horned spineflower
<i>Dudleya blochmaniae</i> var. <i>blochmaniae</i>	Blochman's dudleya
<i>Dudleya cymosa</i> ssp. <i>marcescens</i>	marcescent dudleya
<i>Dudleya cymosa</i> ssp. <i>ovatifolia</i>	Santa Monica Mountains dudleya
<i>Dudleya multicaulis</i>	many-stemmed dudleya
<i>Dudleya parva</i>	Conejo dudleya
<i>Erodium macrophyllum</i>	round-leaved filaree

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TABLE 2
SENSITIVE PLANT SPECIES SUBJECT OF FIELD SURVEYS

Scientific Name	Common Name
<i>Helianthus nuttallii</i> ssp. <i>parishii</i>	Los Angeles sunflower
<i>Horkelia cuneata</i> var. <i>puberula</i>	mesa horkelia
<i>Malacothamnus davidsonii</i>	Davidson's bush mallow
<i>Nama stenocarpum</i>	mud nama
<i>Navarretia fossalis</i>	Spreading navarretia
<i>Nolina cismontane</i>	chaparral nolina
<i>Orcuttia californica</i>	California Orcutt grass
<i>Opuntia basilaris</i> var. <i>brachyclada</i>	short-joint beavertail
<i>Pentachaeta lyonii</i>	Lyon's pentachaeta
<i>Rorippa gambellii</i>	Gambel's water cress
<i>Senecio aphanactis</i>	rayless ragwort
<i>Sidalcea neomexicana</i>	salt spring checkerbloom
<i>Thelypteris puberula</i> var. <i>sonorensis</i>	Sonoran maiden fern

All plant species encountered during the field surveys were identified and recorded for inclusion in *Appendix B*. The majority of these were vouchered and will be repositied at the herbarium at the University of California, Riverside. Latin and common names of plants follow *The Jepson Manual* (Hickman 1993) or other recent published taxonomic treatments. Where not listed in Hickman (1993), common names were taken from Abrams (1923). Where not found in this reference, a variety of sources were used (*e.g.*, Abrams 1923, Dale 1986, or Roberts 1998).

Surveys on the Isola and Ventura Homestead sites during the 2003 field season focused on the observation of current year SFVS plants with incidental observations of any other sensitive plants being recorded. Surveys for SFVS were focused in open areas of California sagebrush and California annual grassland series (Sawyer and Keeler-Wolf 1995) on ridgelines, slopes, and escarpments with a southern, southwestern, or southeastern exposure based on information gathered during surveys by Dudek for SFVS populations on the Newhall Ranch project site during 2002; information contained in the report prepared by Glenn Lukos Associates, Inc. (2000); the status report prepared for the Fish and Game Commission (CDFG 2000); and conversations with Rick Reifner, the botanist who re-discovered SFVS at Ahmanson Ranch in 1999.

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Information regarding co-occurring plant species, general soils observations, and population estimates (based on counts of small areas and extrapolating an estimate for the polygon as a whole) were noted at those locations where sensitive species were found.

Polygons for sensitive species were mapped with the GPS unit, by drawing polygons on maps with aerial photography and topographic lines, or by a combination of the two. Professional judgment and experience were used to delineate these polygons based on the detectability of the species, topography, and vegetation. Perennial sensitive plants were mapped at a 10 to 20 m scale due to their population dynamics (including seed dispersal and pollination range), observability, habit, habitat limitations, and mapping accuracy. Information regarding the mapping for each sensitive species is included in the sections below (*Sections 4.2.1 through 4.2.2*).

3.2.1 Sensitive Plant Species

Sensitive plant species are those species that have been given special recognition by federal, state, or local conservation agencies and organizations due to limited, declining, or threatened population sizes. This includes those species listed by the state and federal government as threatened or endangered, those species proposed for state and/or federal listing or candidates, those plant species found on Lists 1A, 1B or 2 of the CNPS *Inventory of Rare and Endangered Plants of California* (CNPS 2001; *Inventory*), and those plant species which are found on the list of “Threatened and Endangered Species and Species of Concern, Los Angeles County” ([http://www.losangelesalmanac.com/topics/ Environment/evl4b.htm](http://www.losangelesalmanac.com/topics/Environment/evl4b.htm)). CNPS List 3 or List 4 species were included in discussions only when encountered during the field surveys.

3.2.2 Survey Limitations

Surveys were conducted in the late spring of 2003. Surveys were conducted during a year with a “normal” amount of rainfall providing ideal conditions to determine the diversity of species (including sensitive plants) onsite and to map their presence, abundance, and distributions more accurately (when necessary). The timing of the surveys was coincident with the blooming or

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fruiting period for SFVS and other spring-blooming annual species. This maximized the potential for detection of SFVS during the survey effort.

Surveys for SFVS were concentrated in areas of suitable habitat, which was generally on south-facing slopes. Other sensitive species (particularly those identified in Table 2) were only recorded when incidentally observed.

The focused surveys for SFVS were conducted during daylight hours under weather conditions that did not preclude observation of sensitive plant species (*e.g.*, surveys were not conducted during heavy fog or rain).

4.0 RESULTS OF SURVEYS

4.1 Botany - Floral Diversity

The site is situated at the nexus of the Transverse, Coast, and Sierra Nevada ranges; the Mojave Desert; and coastal plains (Hickman 1993). Ecotone areas such as this are often characterized by higher biological diversity than similar-sized areas within the core of a physiographic region (Boyd 1999). As such, a high diversity of plant species is expected during a year of at least average rainfall amounts for the area. Because the diversity of vegetation communities on the Isola site is fairly limited, the diversity of plant species is not expected to be high. The Ventura Homestead site is larger, more topographically varied, and contained relatively intact habitat; the flora is consequently more diverse.

A total of 205 plant species was identified at the Isola and Ventura Homestead sites. Of these, 153 species (75 percent) are native to the region and 52 species (25 percent) are non-native. The list of plant species identified on these sites in 2003 is provided as *Appendix B*.

4.2 Sensitive Plant Species

No sensitive plant species were observed within the Isola study area. Two sensitive plant species were observed within the Ventura Homestead study area: slender mariposa lily and an unidentified taxon of *Navarretia*. These and other sensitive species that have the potential to occur within the Isola and Ventura Homestead project areas, based on the presence of suitable

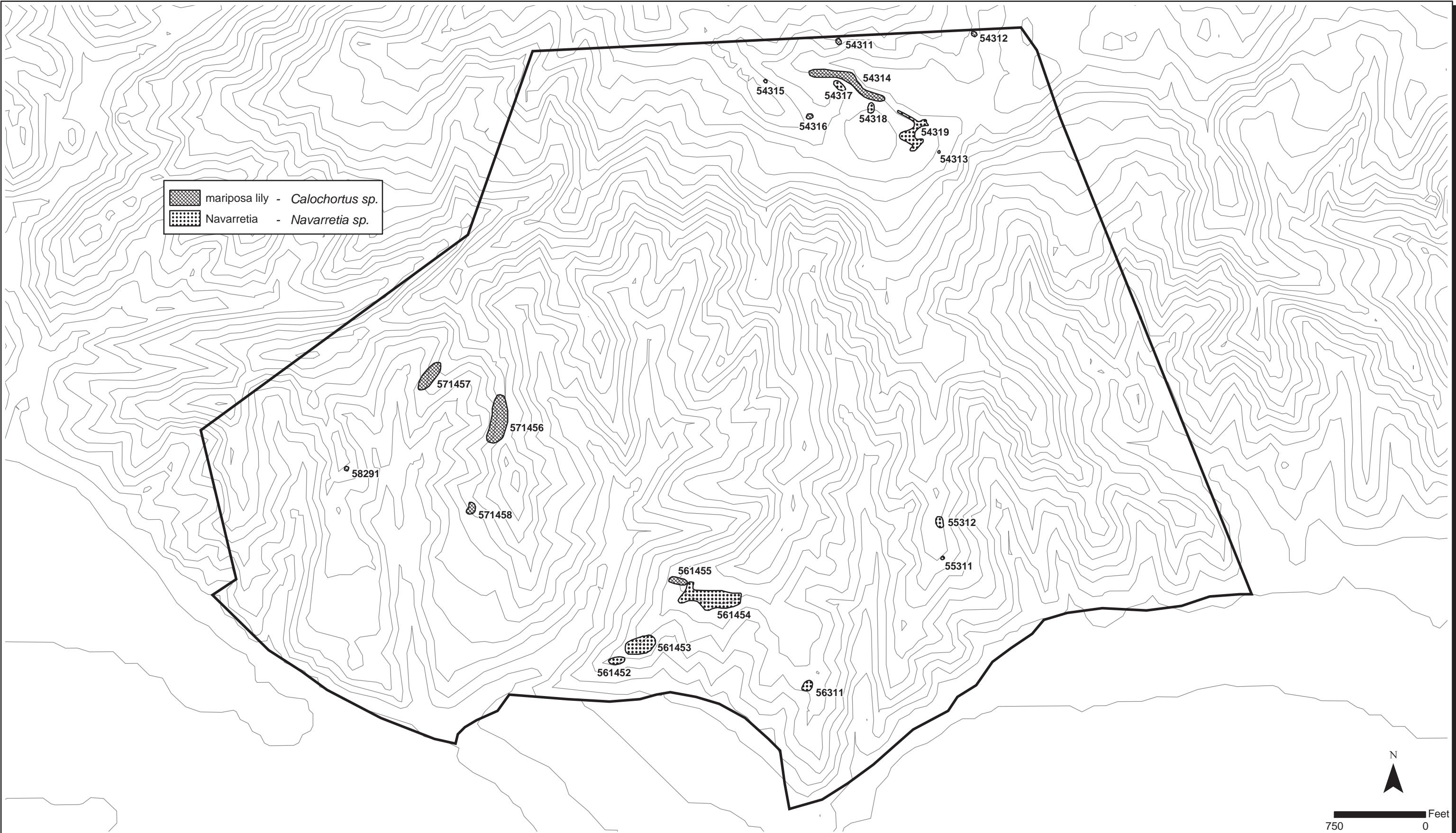
2003 Sensitive Plant Survey Results Isola and Ventura Homestead Sites

habitat and soils, are listed in *Table 3*. This list is confined primarily to those species listed by the state and federal government as threatened or endangered, those species proposed for state and/or federal listing or candidates, those plant species found on Lists 1A, 1B, or 2 of the CNPS *Inventory of Rare and Endangered Plants of California* (CNPS 2001). Those sensitive species that were observed during the 2003 field surveys are discussed in greater detail.

Figure 4 depicts the locations of sensitive species observed on the Ventura Homestead site. Labels for each of the polygons in the figures correlate with those in *Tables 4* and *5*, which contain estimates for the numbers of individuals within each polygon. Any additional information regarding the mapping for each sensitive species is included in the sections below (*Sections 4.2.1* through *4.2.2*).

4.2.1 *Calochortus clavatus* var. *gracilis* (Slender mariposa lily)

Slender mariposa lily has no state or federal status but is a CNPS List 1B plant. It is typically found in chaparral, coastal sage scrub, and grasslands, often on clay, and/or rocky soils. It has been documented to occur at the mouth of Pico Canyon and other canyons in the vicinity (Newhall Quad; CNDDDB 2002). Other varieties of this species are documented from southern California, including Plummer's mariposa lily (*Calochortus plummerae*), club-haired mariposa lily (*C. clavatus* var. *clavatus*) and pale mariposa lily (*C. clavatus* var. *pallidus*). The club-haired mariposa lily differs in that it is virtually a serpentine endemic (restricted to serpentine soils) and a very robust species, generally attaining a height of one meter. Pale mariposa lily differs in that the petals are a paler yellow, the anthers are paler (yellow to pale purple), and the hairs on the petals are not as knobby or club shaped. Neither the club-haired mariposa lily nor pale mariposa lily are known to have a red line above the nectary on the petal as is the case with the slender mariposa lily.



Isola/Ventura Homestead
Ventura Homestead 2003 Rare Plant Survey Results

FIGURE
4

2003 Sensitive Plant Survey Results Isola and Ventura Homestead Sites

TABLE 3
SENSITIVE PLANT SPECIES POTENTIALLY OCCURRING
AT THE ISOLA AND VENTURA HOMESTEAD SITES

Scientific Name	Common Name	Status Federal/St ate	CNPS List	Primary Habitat Associations/ Life Form/Blooming Period	Presence or Likelihood of Occurrence Onsite
<i>Arenaria paludicola</i>	marsh sandwort	FE/SE	1B	dense freshwater marsh/perennial herb/May-August	Not observed during 2003 field season. No CNDDDB records exist for the Newhall or Val Verde quads; nearest occurrences are in the Santa Ana River and in Santa Barbara. No suitable habitat onsite; no likelihood of occurrence.
<i>Astragalus brauntonii</i>	Braunton's milk-vetch	FE/None	1B	chaparral, coastal sage scrub, grasslands; often on carbonate substrates/perennial herb/March-July	Not observed during 2003 field season. No CNDDDB records for the Newhall or Val Verde quads; nearest occurrence is in the Simi Hills. Suitable soils not present; low likelihood of occurrence.
<i>Atriplex coulteri</i>	Coulter's saltbush	None/None	1B	coastal sage scrub and grasslands on alkaline or clay substrate/perennial herb/March-October	Not observed during 2003 field season. No CNDDDB records for the Newhall or Val Verde quads. Suitable habitat present onsite; low likelihood of occurrence.
<i>Atriplex serenana</i> var. <i>davidsonii</i>	Davidson's saltscale	None/None	1B	coastal bluff scrub and coastal sage scrub on alkaline substrate/annual herb/May-October	Not observed during 2003 field season. No CNDDDB records for the Newhall or Val Verde quads. Marginally suitable soils present ; low likelihood of occurrence.
<i>Baccharis malibuensis</i>	Malibu baccharis	None/None	1B	chaparral, coastal sage scrub, cismontane woodland/deciduous shrub/August	Not observed during 2003 field season. No CNDDDB records for the Newhall or Val Verde quads; closest known populations are in the western Santa Monica Mountains near Malibu. Very low likelihood of occurrence.
<i>Berberis nevadensis</i>	Nevin's barberry	FE/SE	1B	chaparral, coastal sage scrub, riparian scrub, cismontane woodland on sandy or gravelly substrate/evergreen shrub/March-April	Not observed during 2003 field season. CNDDDB records exist for San Francisquito Canyon at confluence with Santa Clara River. Conspicuous shrub likely to be observed if present. Low likelihood of occurrence.

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TABLE 3
SENSITIVE PLANT SPECIES POTENTIALLY OCCURRING
AT THE ISOLA AND VENTURA HOMESTEAD SITES

Scientific Name	Common Name	Status Federal/St ate	CNPS List	Primary Habitat Associations/ Life Form/Blooming Period	Presence or Likelihood of Occurrence Onsite
<i>Brodiaea filifolia</i>	Thread-leaved brodiaea	FT/SE	1B	clay substrate openings in chaparral, sage scrub, and grasslands/perennial herb (geophyte)/March-June	Not observed during 2003 field season. No CNDDDB records for the Newhall or Val Verde quads; nearest occurrence is in San Dimas. Low likelihood of occurrence in annual grasslands on limited clay lenses.
<i>Calochortus clavatus</i> var. <i>gracilis</i>	slender mariposa lily	None/None	1B	chaparral and coastal sage scrub/perennial herb (geophyte)/March-May	Not observed during 2003 field season at Isola. Moderate likelihood of occurrence at Isola: suitable habitat present and species has been observed east of site (within 100 m). Observed at Ventura Homestead.
<i>Calochortus plummerae</i>	Plummer's mariposa lily	None/None	1B	chaparral, coastal sage scrub, cismontane woodland, grasslands on rocky granitic substrate/perennial herb (geophyte)/May-July	Not observed during 2003 field season. No suitable soils present onsite; low likelihood of occurrence.
<i>Calochortus weedii</i> var. <i>vestus</i>	late-flowered mariposa lily	None/None	1B	chaparral, cismontane & riparian woodland/perennial herb (geophyte)/ June- August	Not observed during 2003 field season. Observed in Salt Creek during 2003 surveys. Low likelihood of occurrence at Ventura Homestead and Isola.
<i>Calystegia sepium</i> ssp. <i>Binghamiae</i>	Santa Barbara morning-glory	None/None	1A	marshes and swamps/perennial herb/ April-May	Not observed during 2003 field season. No CNDDDB records for the Newhall or Val Verde quads. No suitable habitat present onsite. No likelihood of occurrence.
<i>Centromadia</i> [= <i>Hemizonia</i>] <i>parryi</i> ssp. <i>Australis</i>	southern tarplant	None/None	1B	mesic edges of marshes in grasslands/annual herb/May- November	Not observed during 2003 field season. No CNDDDB records for the Newhall or Val Verde quads. Low likelihood of occurrence onsite.
<i>Chorizanthe parryi</i> var. <i>fernandina</i>	San Fernando Valley spineflower	FC/SE	1B	coastal sage scrub, sandy soils/annual herb/April-June	Not observed during the 2003 field season. Observed nearby in San Martinez Grande Canyon. Suitable habitat and soils exist onsite; low likelihood of occurrence.

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TABLE 3
SENSITIVE PLANT SPECIES POTENTIALLY OCCURRING
AT THE ISOLA AND VENTURA HOMESTEAD SITES

Scientific Name	Common Name	Status Federal/State	CNPS List	Primary Habitat Associations/ Life Form/Blooming Period	Presence or Likelihood of Occurrence Onsite
<i>Deinandra</i> [= <i>Hemizonia</i>] <i>minthornii</i>	Santa Susana tarplant	None/SR	1B	chaparral and coastal sage scrub on rocky substrate/deciduous shrub/July-November	Not observed during 2003 field season. No CNDDDB records for the Newhall or Val Verde quads; however, records exist for the Simi Hills and Oat Mountain quads. Suitable soils not present; no likelihood of occurrence.
<i>Delphinium parryi</i> ssp. <i>Blochmaniae</i>	dune larkspur	None/None	1B	maritime chaparral, coastal dunes/ perennial herb/ April- may	Not observed during 2003 field season.. No likelihood of occurrence.
<i>Dodecahema</i> <i>leptoceras</i>	slender-horned spineflower	FE/SE	1B	alluvial scrub on sandy substrate/ annual herb/April- June	Not observed during 2003 field season. Historic CNDDDB records exist for the Newhall quad. Very small areas of suitable habitat present; low likelihood of occurrence.
<i>Dudleya</i> <i>blochmaniae</i> var. <i>blochmaniae</i>	Blochman's dudleya	None/None	1B	clay openings in chaparral and coastal sage scrub, grasslands/perennial herb/April-June	Not observed during 2003 field season. No CNDDDB records for the Newhall or Val Verde quads. Limited clay soils observed. No likelihood of occurrence.
<i>Dudleya cymosa</i> ssp. <i>Marcescens</i>	marcescent dudleya	FT/CR	1B	chaparral, often on volcanic substrate/perennial herb (geophyte)/ April-June	Not observed during 2003 field season. No CNDDDB records for Newhall or Val Verde quads. No suitable habitat present. No likelihood of occurrence.
<i>Dudleya cymosa</i> ssp. <i>Ovatifolia</i>	Santa Monica Mountains dudleya	FT/None	1B	chaparral and coastal sage scrub, often on volcanic substrate/perennial herb (geophyte)/April-June	Not observed during 2003 field season. No CNDDDB records for Newhall or Val Verde quads. No suitable soil substrate present. No likelihood of occurrence.
<i>Dudleya</i> <i>multicaulis</i>	many-stemmed dudleya	None/None	1B	coastal bluff scrub, coastal sage scrub, valley and foothill grassland, rocky, often clay substrate/perennial herb/ April-June	Not observed during 2003 field season. No CNDDDB records for the Newhall or Val Verde quads; closest known occurrences are in Calabasas and San Dimas. Suitable habitat present, but little suitable soil. Low likelihood of occurrence.

2003 Sensitive Plant Survey Results Isola and Ventura Homestead Sites

TABLE 3
SENSITIVE PLANT SPECIES POTENTIALLY OCCURRING
AT THE ISOLA AND VENTURA HOMESTEAD SITES

Scientific Name	Common Name	Status Federal/St ate	CNPS List	Primary Habitat Associations/ Life Form/Blooming Period	Presence or Likelihood of Occurrence Onsite
<i>Dudleya parva</i>	Conejo dudleya	FT/None	1B	coastal sage scrub and grassland on rocky, gravelly clays/perennial herb/May-June	Not observed during 2003 field season. No CNDDDB records for the Newhall or Val Verde quads. Little suitable soil present; low likelihood of occurrence.
<i>Erodium macrophyllum</i>	round-leaved filaree	None/None	2	cismontane woodland and grasslands on clay substrate/annual herb/March-May	Not observed during 2003 field season. No CNDDDB records for the Newhall or Val Verde quads; however, records exist for Simi Valley. Observed near Castaic Lake . Limited clay soils observed; low likelihood of occurrence.
<i>Helianthus nuttallii</i> ssp. <i>Parishii</i>	Los Angeles sunflower	None/None	1A	marshes and swamps/perennial herb/August-October	Not observed during 2003 field season. A <i>Helianthus</i> population was discovered in 2002 by Elvin and Sanders at Castaic Spring, on the south side of the Santa Clara River between Middle Canyon and San Jose Flats, was determined to be this species by some experts. The final determination of the identity of this species is still being worked on. Very low likelihood of occurrence.
<i>Horkelia cuneata</i> var. <i>puberula</i>	Mesa horkelia	None/None	1B	chaparral, cismontane woodland, coastal sage scrub on sandy or gravelly substrate/perennial herb/February-December	Not observed during 2003 field season. No CNDDDB records for the Newhall or Val Verde quads. Very little suitable soils present. Low likelihood of occurrence.
<i>Lasthenia glabrata</i> ssp. <i>Coulteri</i>	Coulter's goldfields	None/None	1B	marshes, swamps, plays, vernal pools/ annual herb/ February-June	Not observed during 2003 field season. Limited alkali soils onsite. Very low likelihood of occurrence .
<i>Malacothamnus davidsonii</i>	Davidson's bush mallow	None/None	1B	chaparral, coastal sage scrub, riparian woodland/ deciduous scrub/June-January	Not observed during 2003 field season. Nearest occurrences are in Van Nuys and Sunland quads. Suitable habitat present onsite; but this is a conspicuous plant, likely to be observed. Low likelihood of occurrence.

2003 Sensitive Plant Survey Results Isola and Ventura Homestead Sites

TABLE 3
SENSITIVE PLANT SPECIES POTENTIALLY OCCURRING
AT THE ISOLA AND VENTURA HOMESTEAD SITES

Scientific Name	Common Name	Status Federal/St ate	CNPS List	Primary Habitat Associations/ Life Form/Blooming Period	Presence or Likelihood of Occurrence Onsite
<i>Nama stenocarpum</i>	mud nama	None/None	2	edges of lakes, rivers, ponds, vernal pools/annual/January-July	Not observed during 2003 field season. No CNDDDB records for the Newhall or Val Verde quads. No suitable habitat present. No likelihood of occurrence.
<i>Nolina cismontana</i>	chaparral nolina	None/None	1B	chaparral, coastal sage scrub on sandstone or gabbro substrate/ perennial shrub/May-July	Not observed during 2003 field season. No CNDDDB records for the Newhall or Val Verde quads. No suitable soils present. No likelihood of occurrence.
<i>Opuntia basilaris</i> var. <i>brachyclada</i>	short-joint beavertail	None/None	1B	chaparral, Joshua tree woodland, Mojavean desert scrub/succulent shrub/ April-June	Not observed during 2003 field season. No suitable habitat present onsite. Out of known range. This plant was identified on a nearby site by DUDEK in 2002; however, recent investigations indicate that the <i>Opuntia basilaris</i> plants on Newhall Ranch are not <i>O. basilaris</i> var. <i>brachyclada</i> , but are <i>O. basilaris</i> var. <i>ramosa</i> .
<i>Pentachaeta lyonii</i>	Lyon's pentachaeta	FE/SE	1B	openings in chaparral and coastal sage scrub, grasslands/annual herb/March-August	Not observed during 2003 field season. No CNDDDB records for the Newhall or Val Verde quads; nearest occurrences are in the Simi Valley quad. Suitable habitat present onsite; low likelihood of occurrence at Isola; moderate likelihood at Ventura Homestead.
<i>Rorippa gambellii</i>	Gambel's watercress	FE/ST	1B	marsh and swamps (freshwater and brackish)/ perennial herb/April-June	Not observed during 2003 field season. No suitable habitat present. No likelihood of occurrence.
<i>Senecio aphanactis</i>	rayless ragwort	None/None	2	chaparral, coastal sage scrub, cismontane woodland on alkaline substrate/annual herb/January-April	Not observed during 2003 field season. Historic CNDDDB record for Saugus, south of Santa Clara River. Suitable habitat present onsite; moderate likelihood of occurrence at either site .

2003 Sensitive Plant Survey Results Isola and Ventura Homestead Sites

TABLE 3
SENSITIVE PLANT SPECIES POTENTIALLY OCCURRING
AT THE ISOLA AND VENTURA HOMESTEAD SITES

Scientific Name	Common Name	Status Federal/St ate	CNPS List	Primary Habitat Associations/ Life Form/Blooming Period	Presence or Likelihood of Occurrence Onsite
<i>Sidalcea neomexicana</i>	salt spring checkerbloom	None/None	2	chaparral, coastal sage scrub, and playas on alkaline substrate/perennial herb/March-June	Not observed during 2003 field season. Limited suitable soils present onsite; low likelihood of occurrence.
<i>Thelypteris puberula</i> var. <i>sonorensis</i>	Sonoran maiden fern	None/None	2	meadows and seeps/perennial herb/ fertile January-September	Not observed during 2003 field season. No CNDDDB records for the Newhall or Val Verde quads; nearest occurrence at Point Dume. No suitable habitat present. No likelihood of occurrence.

Legend

FE: Federally-listed as endangered

FT: Federally-listed as threatened

FC: Federal candidate for listing

SC: State candidate for listing

SE: State-listed as endangered

SR: State-listed as rare

ST: State-listed as threatened

CNPS List 1A: Plants presumed extinct in California

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

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

CNPS List 3: Plants about which we need more information – a review list

CNPS List 4: Plants of limited distribution – a watch list

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TABLE 4
SLENDER MARIPOSA LILY SUMMARY OF OCCURRENCE DATA
FOR THE VENTURA HOMESTEAD SITE

Polygon Name	Polygon Size (Square Feet)	Estimated Number of Individuals
54311	1,788	2
54312	1,490	12
54313	334	3
54314	39,841	25
54315	615	4
54316	1874	3
58291	1009	10
561455	7077	12
571456	46,745	50
571457	21,899	10
571458	5,208	3
TOTAL	127,880	134

TABLE 5
NAVARRETIA - SUMMARY OF OCCURRENCE DATA
FOR THE VENTURA HOMESTEAD SITE

Polygon Name	Polygon Size (Square Feet)	Estimated Number of Individuals
54317	4,922	5,000
54318	3,688	5,000
54319	26,576	20,000
55311	613	100
55312	4,614	2,000
56311	5,554	2,000
561452	6,345	100
561453	29,117	5,000
561454	62,590	100,000
TOTAL	144,019	139,200

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Eleven polygons of mariposa lily were mapped within the study area by drawing boundaries on aerial photograph field maps around the areas that contained the mariposa lily. Surveys within the study area were conducted after the blooming season for the slender mariposa lily. Surveys on the site were conducted while slender mariposa lily plants were in fruit; estimates of the number of fruiting individuals (not flowering or vegetative) were made based on visual estimations. The fruiting individuals were much more cryptic than the flowering plants; therefore, it is expected that only a portion of the plants that were in flower earlier were observed. It is not possible to estimate what portion was observed. Moreover, geophytes like *Calochortus* generally only have a percentage of the plants flower in any given year and the non-flowering individuals are not as visible.

Most slender mariposa lilies were found on northeast-facing slopes, but plants were found on all aspects and on slopes from 0 to 60 degrees. Most plants were found in California sagebrush, but one group was identified in annual grassland. The plants were generally mapped in areas of high vegetative cover (70 to 90%) and a variety of soil types (*e.g.*, rocky clay, clay, sandstone and sandy clay loam soils). A total of 11 polygons were mapped with a polygon size ranging from 334 to 46,745 square feet. The estimated number of individuals within each polygon ranges from two to 50, with a total of approximately 134 individuals observed within the project site during the 2003 field season (see *Table 4*). CNDDDB forms were completed for each occurrence and are included in *Appendix C*.

4.2.2 *Navarretia sp. nova* (navarretia)

An undescribed species of *Navarretia* was documented within the study area during the 2003 field season. This plant is undoubtedly closely related to *Navarretia jaredii*, *N. pubescens*, and *N. setiloba*; but is also distinct from each of these taxa. Several previous collections of this unnamed navarretia have been made in the Santa Clara River Valley between the Los Angeles County line and Ojai. Plants of the unnamed *Navarretia* differ from *N. jaredii* in that it has a purple spot on the edge of the corolla tube, there are papillae in the tube, and the stems are not white hairy. It differs from *N. pubescens* in the presence of the purple spot and papillae in the tube, the bracts are slightly wider, and the

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flowers are smaller and whitish as opposed to larger and purple. It differs from *N. setiloba* by the presence of the purple spot, having narrower bracts, and a smaller flower.

Seven polygons of navarretia were mapped in and adjacent to the Ventura Homestead site. Polygons were clustered in the south-central part of the site at 900 to 1000 feet and in the northern portions of the site, in the highest part of the site. Navarretia polygons were noted in grasslands and in openings in California sagebrush. This species was found on all but east-facing slopes and generally on relatively flat soil, but can occur on slopes up to 40 degrees. Soils where it occurs were all noted as clay. A total of nine polygons were mapped with a polygon size ranging from 613 to 62,590 square feet. The estimated number of individuals within each polygon ranges from 100 to 100,000, with a total of approximately 139,200 individuals observed within the project site during the 2003 field season (see *Table 5*). CNDDB forms were completed for each occurrence and are included in *Appendix C*.

5.0 ACKNOWLEDGMENTS

Paul M. Lemons and David W. Flietner prepared this report, with review by Mark A. Elvin, Sherri L. Miller, Michelle Balk and staff at The Newhall Land and Farming Company. Mark McGinnis provided graphics and GIS mapping analyses. Tonette Foster provided word processing.

6.0 LITERATURE CITED

- Abrams, L. 1923. *Illustrated Flora of the Pacific States*. Stanford University Press, Stanford, California.
- Allan E. Seward Engineering, Inc. 2002. Geological Evaluation, San Fernando Valley Spineflower Occurrences. Letter report prepared for Gatzke, Dillon and Balance, LLP, October 2002.
- Boyd, S. 1999. Vascular Flora of the Liebre Mountains, Western Transverse Ranges, California. *Aliso* 18(2): 93-129.

2003 Sensitive Plant Survey Results Isola and Ventura Homestead Sites

CalFlora (www.CalFlora.org)

California Department of Fish and Game (CDFG). 2001. *Report to the Fish and Game Commission on the Status of San Fernando Valley Spineflower (Chorizanthe parryi var. fernandina)*. Prepared by Mary Meyer, Plant Ecologist and Melanie Gogol-Prokurat, Assistant Botanist. Habitat Conservation Planning Branch, Status Report 2001-1

California Natural Diversity Data Base (CNDDB). California Department of Fish and Game. 2002. *Special Plants*. Sacramento, California. January.

California Natural Diversity Data Base (CDFG). California Department of Fish and Game. 2002. Rarefind survey results for the Newhall Santa Susana, Oat Mountain, Mint Canyon, San Fernando, Green Valley, Warm Springs Mountain, Whitaker Peak, Cobblestone Mountain, Piru, Simi, Thousand Oaks, and Val Verde Quadrangles. March.

CNPS. 2001. *Inventory of Rare and Endangered Vascular Plants of California (sixth edition)*. Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. California Native Plant Society. Sacramento, California. 388pp.

Dale, N. 1985. *Flowering Plants: The Santa Monica Mountains, Coastal & Chaparral Regions of Southern California*. Capra Press, Santa Barbara. 239 pp.

Glenn Lukos Associates, Inc. and Sapphos Environmental, Inc. 2000. *Revised Report: Biology of the San Fernando Valley Spineflower, Ahmanson Ranch, Ventura County, California*. Unpublished report prepared for the Ahmanson Land Company by Glenn Lukos Associates, Inc. and revised by Sapphos Environmental, Inc.

Hickman, J. C. 1993. *The Jepson Manual: Higher plants of California*. University of California Press, Berkeley. 1400 pp.

2003 Sensitive Plant Survey Results Isola and Ventura Homestead Sites

- Holland, R.F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Non-game-Heritage Program, California Department of Fish and Game.
- Magney, D. 2002. *Checklist of Ventura County Rare Plant Species*. California Native Plant Society, Channel Islands Chapter. 23 pp.
- National Resource Conservation District (NRCS). 1969. Report and General Soils Map; Los Angeles County. Revised December.
- PCR et al. 2002. Biological Resources Assessment of the Proposed Santa Susana Mountains/Simi Hills Significant Ecological Area, including Existing SEA No. 13, 14, 20, 21, 63, and 64, Los Angeles County, California. November.
- Raven, P., H.J. Thompson, and B.A. Prigge. 1986. *A Flora of the Santa Monica Mountains, California*. Southern California Botanists Special Publication No. 2. 181 pp.
- RECON and Impact Sciences, Inc. 1996. Biota Report, Newhall Ranch Specific Plan, Santa Clara River Valley, California, Tentative Tract Map 44831. Unpublished report prepared for Los Angeles County, Department of Regional Planning. September 7, 1995; revised July, 1996.
- Roberts, F. R. 1998. A Checklist of the Vascular Plants of Orange County, California. Second edition, F.R. Roberts Publications, Encinitas, CA
- Sawyer, J.O. and T. Keeler-Wolf. 1995. *A Manual of California Vegetation*. California Native Plant Society. 471 pp.
- Smith, C.F. 1976. *Flora of the Santa Barbara Region, California*. Santa Barbara Botanic Garden and Capra Press. 391 pp.
- United States Fish and Wildlife Service (USFWS). 1999. Federal Register, Part 8, Endangered and Threatened Wildlife and Plants; *Plant and Animal Taxa*. 50 CFR Part 17. Department of the Interior. December.

APPENDIX A

RESUMES OF SURVEY PERSONNEL

MICHELLE L. BALK

Environmental Specialist

EDUCATION / REGISTRATION

University of Akron

M.S., Biology with emphasis Ecology and Evolution, 1999

Iowa State University

B.S., Zoology, 1997

PROFESSIONAL CERTIFICATIONS

Quino Checkerspot Butterfly 10a Survey Permit

(USFWS Federal Permit)

EXPERIENCE SUMMARY

Ms. Balk has over two years of experience in environmental document preparation and resource conservation planning. Project experience includes biological resource surveys, data collection and analysis, environmental assessments, wetland delineations, permitting, mitigation design and monitoring, and endangered species surveys. Ms. Balk has engaged in interagency coordination and public outreach efforts due to the complexities of each project. Ms. Balk has also participated in the development of habitat conservation plans pursuant to Section 10 of the Federal Endangered Species Act.

PROFESSIONAL ASSIGNMENTS

Residential Development. Irvine, California. Assisted in USFWS protocol surveys for the Coastal California Gnatcatcher.

Conservation Planning. Assisted in the development of the Multiple Species Habitat Conservation Plan (MSHCP) for western Riverside County. Project involvement included reserve design, document preparation, interagency coordination and public outreach.

Residential Development. Riverside County, California. Conducted wetland delineation and prepared permit applications for 51-unit housing development.

Public University Student Housing Project. San Marcos, California. Conducted vegetation mapping and wetland delineation, prepared permit applications, and coordinated with resource agencies for student housing project.

Residential Development. Rancho Santa Fe, California. Performed environmental assessments and prepared encroachment permit applications for open space encroachments.

Creek Maintenance Project. Poway, California. Performed wetlands delineation and vegetation mapping for creek maintenance project.

Sewer Realignment. Carlsbad, California. Assisted in the wetland delineation and vegetation mapping for sewer realignment project.

Residential Developments. Laguna Beach and Oxnard, California. Mapped vegetation, surveyed for sensitive plants, and wrote biological resources reports for residential developments.

Utility Pole Maintenance Project. San Bernardino Mountains, California. Conducted botanical surveys and surveyed for sensitive plants at pole replacement locations.

Salt Marsh Restoration Project. San Diego, California. Performed vegetation mapping and prepared biological resources report for marsh restoration project.

Focused Botanical Survey. Newhall Ranch, Los Angeles County, California. As team botanist, performed focused survey for San Fernando Valley spineflower on a 6,000-acre project site.

PUBLICATIONS

“Phenotypic effects of leptin in an ectotherm: a new tool to study the evolution of life histories and endothermy?”, with P.H. Niewiarowski and R.L. Londrville. *The Journal of Experimental Biology* 203:295-300, 2000.

“Sprint speed variation in hatchling fence lizards as a function of ontogenetic stage and population,” with P.H. Niewiarowski and J.M. Engelhardt. In preparation.

“Phylogenetic Analysis of Reaction Norm Evolution in North American Softshell Turtles,” with F.J. Janzen. In preparation.

RELEVANT EXPERIENCE

Volunteer, Project Wildlife, San Diego, CA. Cared for injured wildlife and reared baby birds at wildlife rescue organization.

“Sunday Birds” field ornithology course with San Dieguito Adult School, Encinitas, CA.

SCOTT BOCZKIEWICZ

Biologist/Habitat Restoration Specialist

EDUCATION

- University of Wisconsin, Madison
B.S. Biological Conservation, 1994

PROFESSIONAL AFFILIATIONS

- The Society for Wetland Scientists (SWS)
- The Society for Conservation Biology (SCB)
- The Society for Ecological Restoration -California Chapter (SERCAL)

EXPERIENCE SUMMARY

Mr. Boczkiewicz has a diverse range of work experience in the biological sciences, with emphasis in conservation biology, wetland science, and restoration ecology. He has progressive experience evaluating impacts to sensitive, rare, threatened and endangered plant and wildlife species in Southern California, and has conducted sensitive species assessments, biological resource inventories, vegetation mapping, wetland delineations, and focused surveys for botanical and wildlife species. Scott has also conducted biological monitoring of construction and infrastructure maintenance projects occurring in environmentally sensitive and/or protected areas throughout San Diego and Orange County. Scott has produced assessments of wetlands and uplands to support management plans and planning studies, designed mitigation plans and habitat restoration and monitoring plans for riparian, wetland, and upland habitats, identified regulatory issues for development and infrastructure projects to guide project designs, and completed permit applications supporting project compliance with federal, state, and local environmental regulations.

PROFESSIONAL ASSIGNMENTS

- **El Cuervo Norte Wetland Mitigation - City of San Diego, CA.** Provided mitigation site analysis including an HGM-based wetland assessment and designed a conceptual wetland creation and enhancement plan to mitigate impacts to jurisdictional wetlands resulting from construction of State Route 56 (SR-56). The 25-acre El Cuervo Norte riparian creation and enhancement project will occur in the west end of the Los Peñasquitos Canyon Preserve beginning in March of 2004.

- **Biological Resource Surveys - Escondido Creek Conservancy, Escondido, CA.** Conducted biological resources surveys and a wetland delineation in 2002 to provide baseline biological site information supporting development of a long-term management plan for a 75-acre preserve property along Escondido Creek in unincorporated San Diego County.
- **As-Needed Biological Consultant - City of San Diego, CA.** Provided pre-construction biological resource surveys, vegetation mapping, biological monitoring, revegetation designs, and Environmentally Sensitive Lands (ESL) compliance documents for multiple projects requiring service of existing sewer mains within urban-canyons throughout the city of San Diego during 2001 through 2003.
- **Adobe Falls Supplemental Environmental Project - City of San Diego, CA.** Provided a biological resources assessment and designed a restoration plan and site specific erosion control for a 4-acre riparian wetland site along Alvarado Creek in San Diego, and providing monitoring during implementation of the project in 2003.
- **Newhall Ranch Biological Resource Surveys - Newhall, California.** Assisted with focused surveys for the San Fernando Valley spineflower and other sensitive plant surveys on Newhall Ranch and adjacent land-holdings during 2002 and 2003.
- **NCTD Oceanside to Escondido Railway - Oceanside, CA.** Assisted with daily monitoring of brown-headed cowbird traps on the project alignment during 2003.
- **Rim of The World Herptological Surveys - San Bernardino, CA.** Conducted surveys during 2003 for three threatened and endangered frog species within US Forest Service lands with planned trail improvements.
- **Laborde Canyon Herptological Surveys - CA.** Designed, installed, and monitored a herptological pit-fall trap array during 2002 to support development of a land management plan and establishment of an Off-Highway Motorized Vehicle Recreation Area.
- **Camelot Sensitive Plant Surveys - Escondido, CA.** Conducted sensitive biological resource surveys on a 50-acre site to support development plans and a reserve design for the property.

CURRICULUM VITAE

MARK A. ELVIN

EDUCATION:

M.S. Ecology and Evolutionary Biology. 1992. University of California, Irvine.

B.A. Biology and Philosophy. 1986. University of North Carolina, Chapel Hill.

PROFESSIONAL EXPERIENCE:

Senior Botanist/Biologist

Dudek & Associates, Inc. February 2001-Present.

- ***Responsibilities:*** head botanist for Dudek; task leader/lead botanist (direct, coordinate, and supervise field work and schedules) for numerous projects; manage, supervise, direct, plan and coordinate activities of junior biologists; track work progress and assign schedules; monitor budgets for projects; ensure completion of projects on schedule; communicate effectively with staff in office, project proponents, and regulatory agencies; provide guidance and direction to junior/subordinate staff; knowledge of plants (especially rare plants) throughout southern California; knowledge of fish and wildlife laws and regulations; plan, direct, and perform ecological and biological investigations of complex development proposals to determine their effects on flora and fauna; analyze data and evaluate impacts of proposed projects; write objective reports of investigations; plan, direct, and perform field investigations of wildlife and ecosystem resources; design, conduct, and analyze monitoring studies; conduct literature reviews; write reports; participate in complex negotiation sessions with project proponents and regulatory agency staff; provide technical assistance and guidance to other staff in the office; write project proposals.
- ***Field work:*** Conduct ecological and biological investigations and surveys of flora and fauna throughout southern California including San Diego, San Bernardino, Los Angeles, Orange, and Riverside counties; conducted focused surveys for *Chorizanthe parryi* var *fernandina* on 15,000 acres in Los Angeles County; conduct focused surveys for *Phacelia stellaris* for the MSHCP.
- ***Accomplishments:*** Discovered new occurrences of *Chorizanthe parryi* var. *fernandina* (a State listed species and Federal candidate), *Phacelia stellaris* (a plant that was thought to be extinct); discovered a plant that may be *Helianthus nuttallii* ssp. *parishii* (a plant that was thought to be extinct); discovered new populations of an undescribed species of *Gnaphalium*.

Museum Scientist

University of California, Irvine. February 1999-Present.

- ***Responsibilities:*** Manage UCI Arboretum scientific plant collections; manage UCI Herbarium (IRVC) with approximately 27,000 specimens; provide guidance and direction to subordinate staff; plan and conduct field work for germplasm collections; maintain and updated all plant bases; document collections/accessions with voucher specimens to be stored in the UCI Herbarium (IRVC); coordinate pest management of collections; coordinate research projects; write grants; coordinate and conduct public education at the Arboretum pertaining to ecology, conservation, evolution, and adaptations to arid environments.
- ***Field work:*** Conduct ecological and biological investigations, surveys, and collections for plant species throughout Orange, San Diego, Riverside, San Bernardino, and Los Angeles counties and Baja California, Mexico.
- ***Accomplishments:*** Participated in floristic surveys of the San Joaquin Fresh water Marsh, UCI Open Space Preserve, Burn's Reserve with objective of publishing a species lists for each site; lead multi-organization floristic survey of the San Ysidro Mountains; designed, coordinated, and began implementation of a southern California sensitive habitats garden; coordinated the design and implementation of a southern African Bulb Bed; initiated propagation program for California natives to be placed in garden sections.

Fish and Wildlife Biologist

United States Department of the Interior, Fish and Wildlife Service.

August 1998-February 2001.

- ***Responsibilities:*** Conducted scientific reviews and analyses of species statuses for proposing and designating critical habitat within court ordered deadlines for listed fauna and flora; conducted scientific reviews and analyses of species statuses and develop recovery plans for listed species; planned, directed, and performed ecological and biological investigations of complex development proposals to determine their effects on flora and fauna; analyzed data and evaluated impacts of proposed projects; wrote objective reports of investigations; planned, directed, and performed field investigations of wildlife and ecosystem resources; designed, conducted, and analyzed monitoring studies; conducted literature reviews; wrote reports; participated in complex negotiation sessions with project proponents; provided technical assistance

and guidance to other staff in the office; implemented City of San Diego Multiple Species Conservation Plan (MSCP) for the USFWS; operated as the main contact for the Quino checkerspot butterfly; operated as the staff biologist for Miramar Marine Corps Air Station, City of El Cajon, Bureau of Land management-San Diego District, Immigration and Naturalization Service, Border Patrol-San Diego Sector.

- **Field work:** Conducted onsite ecological and biological investigations and surveys of complex development proposals to determine their effects on flora and fauna throughout San Diego County; conducted surveys for *Deinandra conjugens* and *Ambrosia pumila*, rare plants on the Sweetwater Marsh National Wildlife Refuge, Quino checkerspot butterfly in numerous locations in San Diego County.
- **Accomplishments:** Developed, negotiated, and completed the complex and contentious Habitat Conservation Plan for Evergreen Nursery in Oceanside, CA; persuaded the Border Patrol to initiate consultation for their ongoing program of activities throughout southern California; as a staff biologist for the San Diego branch, I was recognized for maintaining a high level of performance throughout my tenure, while managing a large workload that involved many controversial and contentious issues, and for being the primary contact for San Diego County for the Quino checkerspot butterfly and its flora; recognized for developing a slide show of the sensitive flora and habitats within the Carlsbad Field Office; received three awards: one for completing the Proposed Designation of Critical Habitat for *Deinandra conjugens* and working to complete surveys for it on the San Diego National Wildlife Refuge, one for my contributions to the Quino checkerspot butterfly survey areas and recovery map, and one for assisting in a complex consultation with a short deadline with San Diego Gas and Electric; was personally requested to conduct a rare plant survey of the Sweetwater Marsh National Wildlife Refuge.

Owner/Biologist

Elvin Environmental. March 1997-December 1999.

- **Responsibilities:** Conducted general and specific biological/botanical surveys of project sites (with emphasis on sensitive species); analyzed and assessed biological and ecological data; prepared reports on environmental analysis of development proposals; conducted biological and ecological consultations; conducted ecological and conservation research and data collection; prepared

research reports and publications; produced biological/botanical documentation and voucher specimens.

- ***Field work:*** Conducted onsite ecological and biological investigations and surveys of complex development proposals to determine their effects on flora throughout Los Angeles, Orange, San Diego, San Bernardino, and Riverside counties.
- ***Accomplishments:*** Conducted a multiyear botanical survey of the 600,000-acre Marine Corps Air Ground Combat Center Twentynine Palms (MCAGCC), California in the Mojave Desert; conducted a multiyear study at MCAGCC of approximately 100 disturbance plots/transects which included developing protocols, collecting and assessing data for the monitoring program to analyze the effects of disturbance on fragile desert ecosystems for the development of an Integrated Natural Resource Management Plan.

Seed and Conservation Program Coordinator

Rancho Santa Ana Botanic Garden. April 1996-May 1997.

- ***Responsibilities:*** Managed, supervised, planned, directed, and coordinated the operational activities of the Seed and Conservation Program; supervised and provided guidance to subordinate staff; managed, coordinated, and conducted all California native flora conservation activities: planned, coordinated, and conducted field work for general and specific surveys, status reports, ecological investigations, germplasm collections, research projects, and Garden contract work; determined germplasm collection priorities; planned, coordinated, and conducted surveys for threatened or endangered species and prepared reports for Federal, State, and private agencies; developed species management protocols; acquired and administered all Garden collecting permits with Federal, State, and private agencies including permits for State and Federally listed species; interfaced with Federal, State, and private agencies regarding endangered species as the Garden representative; coordinated Garden activities with Federal, State, and private agencies; directed the Center for Plant Conservation program at Rancho Santa Ana Botanic Garden as the Garden representative; managed the Seed Program at Rancho Santa Ana Botanic Garden: developed and tracked program goals, objectives, and budget; supervised staff and volunteers; managed all garden seed collections and associated databases.

- ***Field work:*** Conducted onsite ecological and biological investigations and surveys for threatened and endangered plant species throughout Los Angeles, Orange, San Diego, San Bernardino, Riverside, Imperial, Baja California (Mexico), Ventura, Monterey, San Benito, and San Luis Obispo counties.
- ***Accomplishments:*** Established the Seed Program unifying all Garden seed collections; developed and wrote the Seed Management Guidelines for the Seed Program at Rancho Santa Ana Botanic Garden which included policies and procedures for seed collecting and cleaning, germplasm collection strategies, and the storage of that material in cooperation/consultation with the U.S. Fish and Wildlife Service, U.S. Department of Agriculture, and the California Department of Fish and Game; tripled number of sensitive species in Long Term Storage through ambitious field schedule; updated seed storage guidelines and protocols for seed storage; established page on the Garden's web site for the Seed Program's electronic inventory.

Seed Technologist

Rancho Santa Ana Botanic Garden. January 1994-April 1996.

- ***Responsibilities:*** Managed and coordinated all aspects related to Garden seed collections (especially pertinent to sensitive species); planned, directed, and conducted field work (general and specific surveys and collections); determined target species for field work and germplasm collections; developed databases, curated, and documented seed collections with voucher specimens and germination/viability test results; conducted seed related research; produced publications/reports for the Garden as well as various Federal, State, and private agencies; administered Garden collecting permits and completed associated reports; interfaced with public and private entities/agencies on behalf of the Garden; managed volunteers; managed seed storage and growth chamber facilities.
- ***Field work:*** Conducted onsite ecological and biological investigations and surveys for threatened and endangered plant species throughout Los Angeles, Orange, San Diego, San Bernardino, Riverside, Imperial, Baja California (Mexico), Ventura, Monterey, San Benito, and San Luis Obispo counties.
- ***Accomplishments:*** Expanded Long Term Storage Collection by 50% first year and 25% second year, established new protocols for storage of Long Term Collection, initiated documentation of all seed accessions (viability/germination

testing and specimen vouchers), initiated volunteer program, developed long term goals on unification of seed collections under a Seed Program/Department.

Conservation Collections Manager

University of California, Irvine. September 1992-May 1996.

- ***Responsibilities:*** Managed UCI Arboretum living plant and cryogenic seed collections; planned and conducted field work for germplasm collections; maintained and updated all plant and seed data bases; coordinated pest management of collections; coordinated research projects; wrote grants; coordinated and conducted public education at the Arboretum pertaining to ecology, conservation, evolution, and adaptations to arid environments.
- ***Field work:*** Conducted ecological and biological investigations and surveys for threatened and endangered plant species throughout Orange, San Diego, and Riverside counties.
- ***Accomplishments:*** Modified the Arboretum's collections' policies; expanded the Arboretum's mission to include the conservation of native California monocots through the initiation of a California Native Monocot Gene Bank; revised Petaloid Monocot collection catalogue; built two shade houses for bulb collections at Arboretum; initiated field collections of California Natives; managed and trained team of nine undergraduate researchers.

Teaching Assistant

University of California, Irvine. September 1990-May 1993.

- ***Responsibilities:*** Taught introductory and upper division biology classes and laboratories for undergraduate students and assisted professors with courses.

FIELD EXPERIENCE:

September 1988-Present.

MEXICO: Baja California (Mexico).

CALIFORNIA:

- ***Counties:*** Los Angeles, Orange, San Diego, San Bernardino, Riverside, Imperial, Ventura, Monterey, San Benito, San Luis Obispo.

- **Areas:** Central Coastal Ranges (Diablo Range, Gabilan Range, Temblor Range, Santa Lucia Mountains); Transverse Range (San Bernardino Mountains, San Gabriel Mountains, Liebre Mountains, Santa Susana Mountains); Mojave Desert (western, eastern, and southern); Sonoran Desert (northern, eastern, western, and southern); Peninsular Range (Gavilan Plateau, Laguna Mountains, Cuyamaca Mountains, San Jacinto Valley, San Jacinto Mountains, Santa Rosa Mountains, Santa Ana Mountains, Santa Rosa Plateau, Sierra Juarez, Palomar Mountains, San Ysidro Mountains); Coastal southern and central California and associated foothills (including Otay Mesa, Mira Mesa, Del Mar Mesa, Palos Verdes Peninsula, San Clemente Island, Santa Catalina Island).
- **Habitats:** coastal strand, dune, coastal marsh, estuarine, coastal bluff scrub, coastal sage scrub, maritime succulent scrub, southern maritime chaparral, chaparral, valley grass lands, vernal pools, riparian scrub, riparian woodland, southern oak woodlands, alluvial fan sage scrub, montane coniferous forest, pebble plains, montane meadows, pinyon-juniper woodland, joshua tree woodland, sagebrush scrub, creosote bush scrub, alkali flats, desert mountains, creosote bush scrub, Mojavean desert scrub, Sonoran desert scrub.

- Sensitive species:

Plants: *Abies bracteata*, *Abronia maritima*, *A. villosa* var. *aurita*, *Acanthomintha ilicifolia*, *A. obovata* ssp. *cordata*, *A. obovata* ssp. *obovata*, *Achnatherum diegoensis*, *Adolphia californica*, *Agave shawii*, *A. utahensis*, *Allium munzii*, *A. parishii*, *Ambrosia chenopodifolia*, *A. pumila*, *Arabis johnstonii*, *A. parishii*, *Arctomecon merriamii*, *Arctostaphylos gabrielensis*, *A. glandulosa* ssp. *crassifolia*, *A. montereyensis*, *A. otayensis*, *A. rainbowensis*, *Arenaria macradenia* var. *kuschei*, *A. ursina*, *Artemisia nesiotica*, *A. palmeri*, *Asclepias asperula* ssp. *asperula*, *Astragalus albens*, *A. ertterae*, *A. jaegerianus*, *A. lentiginosus* var. *sierrae*, *A. leucolobus*, *A. miguelensis*, *A. nevinii*, *A. tener* var. *titi*, *Atriplex coronata* var. *notatior*, *A. coulteri*, *A. pacifica*, *Azolla mexicana*, *Baccharis vanessae*, *Berberis fremontii*, *B. nevinii*, *Bergerocactus emoryi*, *Boykinia rotundifolia*, *Brodiaea filifolia*, *B. kinkiensis*, *B. orcuttii*, *Calandrinia breweri*, *Calochortus catalinae*, *C. clavatus* var. *gracilis*, *C. clavatus* var. *recurvifolius*, *C. concolor*, *C. dunnii*, *C. palmeri* var. *munzii*, *C. palmeri* var. *palmeri*, *C. plummerae*, *C. striatus*, *C. weedii* var. *intermedius*, *C. weedii* var. *vestus*, *Calystegia macrostegia* ssp. *amplissima*, *C. peirsonii*, *Camissonia boothii* ssp. *boothii*, *C. boothii* ssp. *intermedia*, *C. guadalupensis* ssp. *clementina*, *C. lewisii*, *Canbya candida*, *Carnegiea gigantea*, *Castela emoryi*, *Castilleja cinerea*, *C. gleasonii*, *C. grisea*, *C. lasiorhyncha*, *C. plagiotoma*,

Caulanthus simulans, *Ceanothus cyaneus*, *C. megacarpus* var. *insularis*, *C. ophiophilus*, *C. otayensis*, *C. verrucosus*, *Centromadia parryi* ssp. *australis*, *C. pungens* ssp. *laevis*, *Cercidium microphyllum*, *Cercocarpus minutiflorus*, *Chaenactis glabriuscula* var. *orcuttiana*, *Chamaebatia australis*, *Chlorogalum purpureum* var. *purpureum*, *C. purpureum* var. *reductum*, *Chorizanthe leptotheca*, *C. orcuttiana*, *C. parryi* var. *fernandina*, *C. parryi* var. *parryi*, *C. polygonoides* var. *longispina*, *C. procumbens*, *Cirsium occidentale* var. *compactum*, *Clarkia delicata*, *Comarostaphylis diversifolia* ssp. *diversifolia*, *Convolvulus simulans*, *Cordylanthus maritimus* ssp. *maritimus*, *C. orcuttianus*, *Coreopsis gigantea*, *C. maritima*, *Corethrogyne filaginifolia* var. *linifolia*, *Crossosoma californicum*, *Cryptantha holoptera*, *C. traskiae*, *Cupressus forbesii*, *C. macrocarpus*, *C. stephensonii*, *Cynanchum utahense*, *Deinandra clementina*, *D. conjugens*, *D. floribunda*, *D. paniculata*, *Delphinium hesperium* ssp. *cuyamaca*, *D. variegatum* ssp. *kinkiense*, *D. variegatum* ssp. *thornei*, *Dicentra chrysantha*, *Dichondra occidentalis*, *Downingia concolor* var. *brevior*, *Draba douglasii* var. *crockeri*, *Dudleya attenuata* ssp. *orcuttii*, *D. abramsii* ssp. *affinis*, *D. blochmaniae* ssp. *blochmaniae*, *D. brevifolia*, *D. cymosa* ssp. *ovatifolia*, *D. densiflora*, *D. multicaulis*, *D. saxosa* ssp. *saxosa*, *D. variegata*, *D. virens* ssp. *hassei*, *D. virens* ssp. *virens*, *D. viscida*, *Echinocactus polycephalus* var. *polycephalus*, *Echinocereus engelmannii* var. *munzii*, *Eriastrum densifolium* ssp. *sanctorum*, *Ericameria palmeri* ssp. *palmeri*, *Eriodictyon traskiae* ssp. *traskiae*, *Eriogonum davidsonii*, *E. foliosum*, *E. giganteum* var. *formosum*, *E. grande* var. *grande*, *E. kennedyi* var. *austromontanum*, *E. microthecum* var. *johnstonii*, *E. ovalifolium* var. *vineum*, *E. umbellatum* var. *minus*, *Eriophyllum lanatum* var. *obovatum*, *E. nevinii*, *Erodium macrophyllum*, *Eryngium aristulatum* var. *parishii*, *Erysimum capitatum* ssp. *angustatum*, *Eschscholzia ramosa*, *Escobaria vivipara* var. *alversonii*, *Euphorbia misera*, *Ferocactus cylindraceus*, *F. viridescens*, *Frankenia plameri*, *Fremontodendron mexicanum*, *Fritillaria biflora*, *Galium angustifolium* ssp. *gabrielense*, *G. angustifolium* ssp. *gracillimum*, *G. angustifolium* ssp. *jacinticum*, *G. californicum* ssp. *primum*, *G. catalinense* ssp. *acrispum*, *G. grande*, *G. johnstonii*, *G. nuttallii* ssp. *insulare*, *Galvesia speciosa*, *Gilia caruifolia*, *G. nevinii*, *Gnaphalium* sp. *nova*, *Grindelia hirsutula* var. *hallii*, *Harpagonella palmeri*, *Hazardia cana*, *H. orcuttii*, *Helianthus nuttallii* ssp. *parishii*, *Heuchera abramsii*, *H. elegans*, *Holocarpa virgata* ssp. *elongata*, *Hordeum intercedens*, *Horkelia cuneata* ssp. *puberula*, *H. truncata*, *Hulsea californica*, *H. mexicana*, *H. vestita* ssp. *callicarpa*, *H. vestita* ssp. *gabrielensis*, *Ipomopsis polycladon*, *Isocoma menziesii* var. *decumbens*, *Iva hayesiana*, *Ivesia argyrocoma*, *Jepsonia malvifolia*, *J. parryi*, *Juglans californica*, *Juncus acutus* ssp. *leopoldii*, *J. duranii*, *Lasthenia burkei*, *L. glabrata* ssp. *coulteri*, *Lathyrus*

splendes, *Lavatera assurgentiflora* ssp. *glabra*, *Layia carnosa*, *Lepechinia fragrans*, *L. ganderi*, *Lepidium virginicum* var. *robinsonii*, *Lesquerella kingii* ssp. *bernardina*, *Lilium humboltii* ssp. *ocellatum*, *L. parryi*, *Limnanthes gracilis* ssp. *parishii*, *L. vinculans*, *Linanthus arenicola*, *L. bellus*, *L. killipii*. *L. pygmaeus* ssp. *pygmaeus*, *Lithophragma maximum*, *Lomatium insulare*, *Lotus argophyllus* var. *adsurgens*, *L. argophyllus* var. *argenteus*, *L. dendroideus* var. *traskiae*, *L. nuttallianus*, *L. otayensis*, *Lupinus excubitus* var. *johnstonii*, *L. guadalupensis*, *Lycium brevipes* var. *hassei*, *Lycium californicum*, *Lyonothamnus floribundus* ssp. *asplenifolius*, *L. floribundus* ssp. *floribundus*, *Madia radiata*, *Malacothamnus abbottii*, *M. aboriginum*, *M. clementinus*, *M. davidsonii*, *M. jonesii*, *M. palmeri* var. *involucratus*, *Microseris douglasii* var. *platycarpha*, *Mimulus clevelandii*, *M. exiguus*, *M. flemengii*, *M. purpureus*, *M. shevockii*, *Monardella beneolens*, *M. cinerea*, *M. douglasii* ssp. *venosa*, *M. hypoleuca* ssp. *lanata*, *M. linoides* ssp. *viminea*, *M. macrantha* ssp. *hallii*, *M. nana* ssp. *leptosiphon*, *M. robinsonii*, *M. stoneana*, *Mucronea californica*, *Muhlenbergia californica*, *Muilla clevelandii*, *M. coronata*, *M. transmontana*, *Myosurus minimus* ssp. *apus*, *Navarettia fossalis*, *N. sp. nova*, *Nemacaulis denudata* var. *denudata*, *Oenothera deltoides* ssp. *howellii*, *Opuntia basilaris* var. *brachyclada*, *O. californica* var. *californica*, *O. wigginsii*, *Orcuttia californica*, *Ornithostaphylos oppositifolia*, *Parnassia cirrata*, *Penstemon albomarginatus*, *P. californicus*, *Pentachaeta aurea*, *Perideridia parishii* ssp. *parishii*, *P. pringlei*, *Phacelia stellaris*, *P. suaveolens* ssp. *kecki*, *Phlox dolichantha*, *Pholisma arenarium*, *Pinus edulis*, *P. radiata*, *P. torreyana* ssp. *torreyana*, *Poa atropurpurea*, *Pogogyne abramsii*, *P. nudiuscula*, *Potentilla hickmanii*, *Psoralea arborescens* var. *arborescens*, *P. arborescens* var. *simplicifolius*, *Quercus cedrosensis*, *Q. dumosa*, *Q. engelmannii*, *Q. lobata*, *Q. pacifica*, *Q. tomentella*, *Q. turbinella*, *Ribes viburnifolium*, *Romneya coulteri*, *R. trichocalyx*, *Rosa minutifolia*, *Salvia clevelandii*, *S. munzii*, *Satureja chandleri*, *Sclerocactus polyancistrus*, *Scrophularia villosa*, *Selaginella asprella*, *S. cinerascens*, *S. eremophila*, *S. leucobryoides*, *Senecio aphanactis*, *S. bernardinus*, *S. blochmanneae*, *S. lyonii*, *Sibara filifolia*, *Sibaropsis hammittii*, *Sidalcea neomexicana*, *S. pedata*, *Solanum tenuilobatum*, *S. wallacei*, *Spaeralcea rusbyi* var. *eremicola*, *Stemodia durantifolia*, *Stephanomaria blairii*, *Streptanthus bernardinus*, *Stylomecon heterophylla*, *Suaeda esteroa*, *S. taxifolia*, *Syntrichopappus lemmonii*, *Taraxacum californicum*, *Tetracoccus dioicus*, *Thelypodium stenopetalum*, *Trifolium gracilentum* var. *palmeri*, *T. polyodon*, *Triteleia clementina*, *Verbesina dissita*, *Viguiera laciniata*, *Washingtonia filifera*, *Wislizenia refracta* var. *refracta*.

Animals: vernal pool fairy shrimp (*Branchinecta lynchi*), San Diego fairy shrimp (*Branchinecta sandiegoensis*), Riverside fairy shrimp (*Streptocephalus woottoni*), Quino checkerspot butterfly (*Euphydryas editha quino*), Augusta's checkerspot butterfly (*Euphydryas editha augustina*), Harbison's dun skipper (*Euphyes vestris harbisoni*), Hermes copper butterfly (*Lycaena hermes*), desert pupfish (*Cyprinodon macularius*), unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*), southwestern arroyo toad (*Bufo californicus*), western spadefoot toad (*Scaphiopus hammondi*), southwestern pond turtle (*Clemmys marmorata pallida*), orange-throated whiptail (*Cnemidophorus hyperythrus*), coastal whiptail (*Cnemidophorus tigris multiscutatus*), northern red diamond rattlesnake (*Crotalus ruber ruber*), desert tortoise (*Gopherus agassizii*), rosy boa (*Lichanura trivirgata*), San Diego horned lizard (*Phrynosoma coronatum blainvillii*), chuckwalla (*Sauromalus obesus*), two-striped garter snake (*Thamnophis hammondi*), Mojave fringe-toed lizard (*Uma scoparia*), island night lizard (*Xantusia riversiana*), burrowing owl (*Athene cunicularia*), red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), coastal cactus wren (*Campylorhynchus brunneicapillus sandiegoense*), western snowy plover (*Charadrius alexandrinus nivosus*), southwestern willow flycatcher (*Epidonax traillii extimus*), peregrine falcon (*Falco peregrinus*), California condor (*Gymnogyps californicus*), bald eagle (*Haliaeetus leucocephalus*), San Clemente loggerhead shrike (*Lanius ludovicianus mearnsi*), Belding's savannah sparrow (*Passerculus sandwichensis beldingi*), California brown pelican (*Pelecanus occidentalis californicus*), coastal California gnatcatcher (*Polioptila californica californica*), light footed clapper rail (*Rallus longirostris levipes*), California least tern (*Sterna antillarum brownii*), least Bell's vireo (*Vireo bellii pusillus*), southern sea otter (*Enhydra lutris nereis*), San Diego black-tailed jackrabbit (*Lepus californicus bennettii*), San Diego desert woodrat (*Neotoma lepida intermedia*), California bighorn sheep (*Ovis canadensis californiana*), peninsular bighorn sheep (*Ovis canadensis cremnobates*), island fox (*Urocyon littoralis*).

NORTH CAROLINA, VIRGINIA, and WEST VIRGINIA: January 1980-October 1986.

INVITED TALKS:

- California Native Plant Society, Orange County and San Diego Chapters. 03-04 May 2003. A botanical exploration and collecting expedition in the International Border region of southern California, USA, and Baja California,

Mexico (with Andrew C. Sanders, Jon Rebman, Fred Roberts, Thomas Oberbauer, and Michael Simpson).

- California Native Plant Society, Orange County Chapter. 16 January 2003. Botanical exploration in southern California (with Andrew C. Sanders).
- Southern California Botanists Society. 19 October 2002. Botanical exploration in southern California continues to yield new (and usually rare) species (with Andrew C. Sanders).
- California Native Plant Society, Orange County and San Diego Chapters. April 2001. Ecology and flora of the San Ysidro Mountains.
- California Native Plant Society, Orange County and San Diego Chapters. 21 April 2000. Ecology and flora of the San Ysidro Mountains.
- California Native Plant Society, Orange County Chapter. April 2000. Ecology and flora of the Elsinore Peak, Santa Ana Mountains.
- California Native Plant Society, San Diego County Chapter. 15 June 1999. Threatened and endangered plants of southern California. (with Scott Eliason).
- U.S. Fish and Wildlife Service, Carlsbad Field Office. 06 June 1999. Threatened and endangered plants of southern California. (with Scott Eliason).
- North Carolina Botanical Garden. 20 October 1997. Conservation efforts in southern California.
- Conejo Valley Garden Club. 22 January 1997. Rare Plants of the Santa Monica Mountains.
- Center for Plant Conservation, annual meeting, Denver, CO. 02 October 1996. Conservation efforts at Rancho Santa Ana Botanic Garden-*Hemizonia mohavensis* and *Sibara filifolia*.
- Rancho Santa Ana Botanic Garden. 14 May 1996. Rare Plants in the Peninsular Ranges.

- California Native Plant Society, Orange County Chapter. 20 April 1995. Effects of population size on fitness in *Calochortus weedii* Alph. Wood var. *weedii* (Liliaceae).
- Center for Plant Conservation, California Task Force Meeting, University of California, Berkeley. 15 August 1995. The germination of California orcutt grass, *Orcuttia californica* (Poaceae).

CONTRACTS AND GRANTS AWARDED:

- US Department of Fish and Wildlife. May 2000. \$10,000. Recovery efforts for Orcutt's spineflower (*Chorizanthe orcuttii*).
- US Department of Fish and Wildlife. July 1999. \$9,000. Recovery efforts for willow monardella (*Monardella linoides* ssp. *viminea*).
- California Department of Fish and Game. May 1997. \$1,000. Process and store seed of *Holocarpha macradenia* from the last population.
- US Department of Agriculture, National Forest Service, Angeles National Forest. March 1997. \$1,865. Collect and store seeds of *Arenaria macradenia* var. *kuschei* (Kusch's sandwort).
- Bureau of Reclamation. January 1997. \$25,000. The use of reclaimed water for restoring threatened and endangered wetland plants.
- US Department of Fish and Wildlife. August 1996. \$5,000. Survey for *Malacothamnus abbottii*.
- California Native Plant Society, Orange County Chapter. January 1995. \$500. Effects of population size on reproductive characters as they relate to fitness in *Calochortus weedii* Alph. Wood var. *weedii* (Calochortaceae).
- National Science Foundation Young Scholars Program. November 1994. \$500. Francis Gonzalez (invited to present in the national symposium)--Effects of population size in the germination and growth of *Calochortus*.
- Institute of Museum Services-Conservation Project. October 1993. \$25,000. Assessment of the petaloid monocot collection at the UCI Arboretum.

PUBLICATIONS:

ARTICLES:

- Elvin, M. A. and A. C. Sanders. (2003). A New Species of *Monardella* (Lamiaceae) from Baja California, Mexico, and Southern California, United States. *Novon* 13(4).
- Elvin, M. (2001). *Astragalus ertterae*. In: Species accounts for special status plants and animals in the western Mojave Desert. Bureau of Land Management.
- Elvin, M. (2001). *Mimulus shevockii*. In: Species accounts for special status plants and animals in the western Mojave Desert. Bureau of Land Management.
- Elvin, M. (2001). *Monardella beneolens*. In: Species accounts for special status plants and animals in the western Mojave Desert. Bureau of Land Management.
- Koopowitz, H., M. Elvin, and L. Keenan. (1996). *In vivo* visualization of living flatworm neurons using Lucifer Yellow intracellular injections. *J. Neurosci. Meth.* 69: 83-89.
- Koopowitz, H., M. Elvin, and T. Bae. (1995). Comparison of the nervous system of the rhabdocoel, *Mesostoma ehrenbergii*, with that of the polyclad, *Notoplana acticola*. *Hydrobiologia*. 305: 127-133.
- Elvin, M. (1994). *Gethyllis*. UCI Arboretum Quarterly. 3(2): 10-11.
- Elvin, M. (1994). The UCI Arboretum and Gene Bank Petaloid Monocot Conservation Collection.
- Elvin, M., H. Koopowitz (1994). Neuroanatomy of the rhabdocoel flatworm *Mesostoma ehrenbergii* (Focke, 1836) I: Neuronal diversity in the brain. *J. Comp. Neurol.* 343: 319-331.

OTHER DOCUMENTS:

- Elvin, M. and J. Vanderwier. 2002. Rare plant surveys and focused surveys for *Chorizanthe parryi* var. *fernandina* on Newhall Ranch. Report prepared for Newhall Land and Farming Company.

- Elvin, M. 2001. Endangered and Threatened Wildlife and Plants; Proposed Designation of Critical Habitat for *Deinandra conjugens* (Otay tarplant). 66 FR 32052.
- Elvin, M. and Tierra Data Systems. 2000. Rare Plant Survey and Floristic Inventory: 1999 Year-end Report:Year three of three. Report prepared for Southwest Division naval Facilities Engineering command. Delivery Order: N68711-95-D-7605/0015.
- Elvin, M. 1999. Rare Plant Survey and Floristic Inventory: 1998 Year-end Report. Report prepared for Southwest Division naval Facilities Engineering command. Delivery Order: N68711-95-D-7605/0015.
- Elvin, M. 1997. Seed Management Guidelines for the Seed Program at Rancho Santa Ana Botanic Garden.
- Elvin, M. and V. Yadon. 1996. Current Knowledge and Conservation Status of *Malacothamnus abbotii* (Eastwood) Kearney (Malvaceae), Abbott's bushmallow. Status report prepared for: Connie Rutherford; US Fish and Wildlife Service; 2493 Portola Road, Suite B; Ventura CA 93003; (805) 644-1766 X306 Order #: 11440-6-5118.

PHOTOGRAPHS:

- Endangered Species Bulletin. 2001. *Downingia concolor* var. *brevior*. 26:7.
- Bulletin of the California Lichen Society. 1996. V.3 #2. Cover. San Clemente Island habitat and *Calystegia macrostegia* ssp. *amplissima*.
- A field guide to the rare plants of the Angeles National Forest. 1995. USDA. *Arctostaphylos gabrielensis*, *Calochortus catalinae*, *C. clavatus* var. *gracilis*, *C. palmeri* var. *palmeri*, *C. plummerae*, *C. striatus*, *Canbya candida*.
- International Bulb Society. <http://www.bulbsociety.com>
Allium fimbriatum var. *fimbriatum*, *A. haematochiton*, *A. munzii*, *A. praecox*, *Bloomeria crocea*, *Brodiaea filifolia*, *B. kinkiensis*, *Calochortus amabilis*, *C. catalinae*, *C. clavatus* var. *gracilis*, *C. concolor*, *C. dunnii*, *C. invenustus*, *C. kennedyi* var. *kennedyi*, *C. luteus*, *C. palmeri* var. *munzii*, *C. palmeri* var. *palmeri*, *C. plummerae*, *C. splendens*, *C. striatus*, *C. superbus*, *C. tolmiei*, *C. umbellatus*, *C. uniflorus*, *C. venustus*, *C. vestae*, *C. weedii* var. *intermedius*, *C. weedii* var. *weedii*, *Chlorogalum purpureum* ssp. *purpureum*, *C. purpureum* ssp. *reductum*, *Dichelostemma capitatum*, *D. ida-maia*, *Dodecatheon clevelandii* ssp. *clevelandii*, *Dudleya brevifolia*, *D. multicaulis*, *D. nesotica*, *D. variegata*, *Fritillaria affinis*, *F. biflora*, *Lilium humboltii* ssp. *ocellatum*, *Muilla maritima*, *Scutellaria tuberosa*, *Sisyrinchium bellum*, *Triteleia clementina*, *T. hyacinthina*, *Zigadenus venenosus*, *Z. freemontii* var. *fremontii*.
- Catalina Island Conservancy Intranet. <http://www.catalinas.net/seer/>
Sibara filifolia.
- Center for Plant Conservation. <http://www.mobot.org/CPC/>
Allium munzii.
- Rancho Santa Ana Botanic Garden Seed Program. <http://www.cgu.edu/inst/rsa/seedbank.htm>
Brodiaea filifolia (titled "Conservation") and reproductive biology experiment (titled "Research").

TRAINING COURSES:

- Recovery training course (3 units), U.S. Fish and Wildlife Service; Charleston, SC. December 2000.

- Grants and Agreements training course (1 units), U.S. Fish and Wildlife Service; Carlsbad, CA. November 2000.
- Habitat Conservation Plan training course (5 units), U.S. Fish and Wildlife Service; Carlsbad, CA. March 2000.
- Interagency consultation training course (5 units), U.S. Fish and Wildlife Service; Carlsbad, CA. February 2000.
- Aviation safety (1 unit), U.S. Fish and Wildlife Service; Carlsbad, CA. October 1999.
- Wetland delineation (2 units), U.S. Fish and Wildlife Service; Carlsbad, CA. July 1999.
- Recovery permits and recovery plans (0.5 units), U.S. Fish and Wildlife Service; Carlsbad, CA. June 1999.
- Quino checkerspot butterfly life history and identification (1 unit), UC Riverside; Chula Vista, CA. January 1999.
- Freedom of information act (FOIA) course (1 unit), U.S. Fish and Wildlife Service; Carlsbad, CA. December 1999.
- Ecological Services Basic training course (5 units), U.S. Fish and Wildlife Service Training Center; Sheperdstown, WV. 1998.
- Habitat Conservation Plan training course (2 units), U.S. Fish and Wildlife Service; Carlsbad, CA. 1998.
- International Symposium on Permits and Collecting, San Diego Museum of Natural History. 1997.
- Conservation Genetics (1 unit), Rancho Santa Ana Botanic Garden. 1996.
- Plant Families Dicots (1 unit), Rancho Santa Ana Botanic Garden. 1996.
- Southwestern Botanical Systematics Symposium: The Linnaean Hierarchy: Past, Present and Future, Rancho Santa Ana Botanic Garden. 1996.

- Plant Families, Monocots (1 unit), Rancho Santa Ana Botanic Garden. 1995.
- California Regional Task Force Meeting, Center for Plant Conservation. University of California, Berkeley. 1995.
- Southwestern Botanical Systematics Symposium: The New Morphology: Integrative Approaches, Rancho Santa Ana Botanic Garden. 1995.

OTHER ACHIEVEMENTS:

Awards

- STAR Award: Special Thanks for Achieving Results, August 2001, for completing the Proposed Designation of Critical Habitat for *Deinandra conjugens* and working to complete surveys for it on the San Diego National Wildlife Refuge.
- On the Spot Award, April 2000, for contributions to the Quino checkerspot butterfly survey and recovery map.
- On the Spot Award, March 2000, for assisting in a complex consultation with a short deadline.

Fencing

1991 US Olympic Sports Festival – Los Angeles, California.
 1989 World University Games – Duisberg, Germany.
 1989 US Olympic Sports Festival, Silver Medalist – Oklahoma City, Oklahoma.
 1989 World Cup- Budapest, Hungary.
 1989 US National Championships, Finalist, Bronze Medalist – Orlando, Florida.
 1986 NCAA Championships – South Bend, Indiana.
 1985 NCAA Championships – Princeton, New Jersey.

DAVID FLIETNER

Biologist

Education	Master of Science, Botany, University of Florida, 1987 Bachelor of Science, Plant Science, University of California, Davis, 1983
Permits/ Certificates/ Trainings	U.S. Fish and Wildlife Service Permit #TE-008031 for Quino Checkerspot Butterfly U.S. Fish and Wildlife Service Permit #TE-797665 for Riverside Fairy Shrimp, Conservancy Fairy Shrimp, Longhorn Fairy Shrimp, Vernal Pool Fairy Shrimp, San Diego Fairy Shrimp, Vernal Pool Tadpole Shrimp, etc. CDFG Scientific Collecting Permit #003625 for Insects, Rodents/Small Mammals, Reptiles/Amphibians GIS Certificate, UC Riverside Extension, 1996 Licensed Agricultural Pest Control Adviser, #4577 (weed control) Qualified Applicator License #31356 (landscape, agriculture, and aquatic) Wetland Delineation Training, June 2000 Certified for Flat-Tailed Horned Lizard Surveys, Bureau of Land Management, 2001 Certified Biologist, County of San Diego California Society for Ecological Restoration, certificate of educational Achievement in Revegetation/Restoration Planning: The Basics, 2001 Certificate of Completion, Invasive Plant School, UC Cooperative Extension, September 2002 Certificate of Completion, Desert Tortoise Council Surveying, Monitoring, & Handling Techniques Workshop, November 2002
Responsibilities	Conducts biological resource surveys, endangered species presence/absence surveys, wetland delineations, and restoration monitoring. Biological resource surveys include vegetation mapping; species inventories; focused surveys for sensitive plant species, arroyo toad, and flat-tailed horned lizard. Conducts surveys for quino checkerspot butterfly, San Diego fairy shrimp, and Riverside fairy shrimp. Delineates wetlands according to USACE guidelines. Performs qualitative and quantitative assessments of revegetation projects. Writes biological technical reports, wetland delineation reports, habitat restoration plans and annual reports. Writes applications for Clean Water Act Section 401 and 404 permits and California Department of Fish and Game Streambed Alteration agreements. Conducts annual pesticide training for field applicators and nursery workers in Spanish.

Writes pest control recommendations.

**Work
Experience**

Dudek and Associates

2003 – present, Biologist

RECON

2000 – 2003, Biologist

Independent Consultant

1997 - 1998

Riverside Land Conservancy

1997, Executive Director

Foster Wheeler Environmental

1995 – 1996, Associate Biologist

California State Parks

1995, Environmental Services Intern

**Selected
Projects**

Habitat Restoration

Coastal Sage Scrub, Riparian, and Wart-stemmed Ceanothus Mitigation Implementation Monitoring, San Diego Jewish Academy, San Diego

Biotechnical Report and Mitigation Plan for the Gavilan Hills/Smith Road Channel and Sediment Basin, Riverside County

Coastal Sage Scrub and Riparian Restoration Plan for the Oceanside Country Club Site, Oceanside

Coastal Sage Scrub Restoration Implementation, San Onofre State Park, Orange County

Coastal Sage Scrub and Riparian Revegetation Project Monitoring for Eastern Transportation Corridor, Santa Ana Mountains, Orange County

Riparian Restoration Monitoring, Temecula Creek for the Riverside County Transportation Department

Endangered Species Surveys

Quino Checkerspot Butterfly Surveys, Southern Portion, Los Angeles to San Diego Fiber-Optic Line, San Diego County

San Diego Fairy Shrimp and Riverside Fairy Shrimp Monitoring, Dennery Canyon Restoration Site, San Diego County

Quino Checkerspot Butterfly Surveys of Potential Reservoir Sites, San Diego

Thread-leaved Brodiaea Survey and Census, San Jacinto River

Desert Tortoise Surveys, Mojave Desert

Santa Ana Woolly Star Survey and Monitoring, Lytle Creek, CA

Coachella Valley Milk Vetch Survey and Salvage at the Cimarron Golf Course, Whitewater River, CA

Biology Studies

Ysabel Creek Road Crossing of Santa Ysabel Creek and Santa Maria Creek, San Diego County

Winterhaven Drive Bridge, Imperial County

Wilson Creek Crossing, San Diego County

County Line Channel, San Bernardino and Riverside County

Wetland and Riparian Projects

Wetland Delineation for Cloverdale Leasehold, Escondido

Wetland Delineation for Wilson Creek Crossing, San Diego County

Santa Ana River Pipeline Placement Monitoring for the Western Riverside County Wastewater Treatment Authority, Riverside

Agua Hedionda Lagoon Tower Construction Monitoring in Sensitive Wetlands for San Diego Gas & Electric, San Diego

Environmental Assessments and Other Reports

Biological Assessment of SDG&E Access Road, Camp Pendleton

Report of Events Leading To Desert Tortoise Mortality and Subsequent Construction Monitoring for Reopening of Section 7 Consultation

Draft Habitat Conservation Plan for Southern California Edison CalNev Substation and Transmission Line, Colton, CA

Inventory of Biological Resources and Mitigation Recommendations for Proposed 8,000-acre Development in Riverside County Agricultural Reserve

NATHAN GALE
Principal Scientist, FLx

EDUCATION AND CERTIFICATIONS

Ph.D., Geography, University of California, Santa Barbara, 1985.

M.A., Geography, University of California, Santa Barbara, 1980.

PWS, Certified Professional Wetland Scientist #1216, Society of Wetland Scientists, 1999.

SUMMARY OF QUALIFICATIONS

Dr. Gale has 23 years of experience managing and conducting multidisciplinary projects ranging from methodology development to applied environmental impact assessments, planning studies, and restoration programs. His management experience includes proposal preparation; contract negotiation and client relations; cost control and schedule monitoring; document production supervision; and quality assurance review. His specific technical work has involved experimental and sampling design; photographic documentation; and mapping of natural vegetation, sensitive species, environmental constraints, and land use. He also has field experience in quantitative vegetation sampling, environmental data collection, and wetland delineation. Dr. Gale is skilled in qualitative and quantitative data analysis for numerous applications including ecological and environmental impact assessment as well as mitigation and monitoring planning. He has been responsible for the preparation of NEPA/CEQA environmental documents, planning studies, and technical reports for the Department of Defense (DOD), the Department of Energy (DOE), the Department of Interior (DOI), and for state and local agencies. In addition, he has published extensively in the fields of geography, ecology, planning, and environmental studies.

EXPERIENCE

Rare Plant and Vegetation Surveys and Mapping, Newhall Ranch/Valencia Company Project Sites, Los Angeles and Ventura Counties, CA. Newhall Land and Farming Company, URS Corporation, Impact Sciences, Inc., and Dudek and Associates, Inc. General rare plant surveys and concentrated surveys for *Chorizanthe parryi* var. *fernandina* (San Fernando Valley spineflower) and *Helianthus* sp. (sunflower), vegetation surveys and mapping of plant communities, and report preparation for various sites. Surveys were carried out during four field seasons in the years 2000,

2001, 2002, and 2003. Participation in the development of a spineflower management plan, preserve design, and associated research activities.

Rare Plant and Vegetation Surveys and Mapping, Los Angeles County, CA. Natural Resource Consultants. General rare plant surveys and concentrated surveys for *Chorizanthe parryi* var. *fernandina* (San Fernando Valley spineflower), *Dodecahema leptoceras* (slender-horned spineflower), *Orcuttia californica* (California Orcutt grass), and *Navarretia fossalis* (spreading navarretia), vegetation surveys, and report preparation for three sites in the year 2003.

Restoration Planning and Implementation, Former Guadalupe Oil Field, San Luis Obispo County, CA. Unocal Corporation and Jordan Environmental Services. Preparation and implementation of site-specific restoration plans, including the development of revegetation specifications, monitoring methods, performance criteria, and performance evaluation. Development of general mitigation and restoration success criteria, including sampling design, data collection, statistical data analysis, and reporting for selected reference wetlands for future comparison with wetland mitigation and restoration sites. Participation in activities related to uplands and wetlands habitat restoration with the Restoration Working Group, comprising regulatory agency representatives and Unocal consultants, for the long-term Guadalupe Restoration Project.

Vegetation and Rare Plant Surveys and Wetlands Delineations, Ventura and Los Angeles Counties, CA. Impact Sciences, Inc. Vegetation surveys and mapping of plant communities, rare plant surveys, field wetland surveys, delineation of jurisdictional wetlands, and report preparation for more than 30 sites in various locations in Ventura and Los Angeles counties.

Ventura River Estuary Enhancement Project, Ventura County, CA. California Department of Parks and Recreation. Design and implementation of a five-year vegetation monitoring program for restoration efforts at Emma Wood State Beach. The project involved monitoring four vegetation types: willow-cottonwood forest, saltbush scrub, dune scrub, and foredune vegetation. Activities included botanical surveys, survival and growth surveys, photodocumentation, data collection and comparative analysis of natural and revegetated areas, evaluation of exotics eradication, and recommendations for ongoing restoration.

Peacekeeper Rail Garrison Mitigation Program, San Antonio Terrace, Vandenberg AFB. U.S. Air Force and The Earth Technology Corporation. Technical advisor and senior data analyst for wetland creation, upland dune scrub habitat restoration, coast

live oak revegetation, and vegetation monitoring for a five-year biological mitigation and monitoring program. Activities included initial planning, budgeting, methodology development, sampling design, vegetation sampling, data analysis, preparation and review of annual monitoring reports.

Guadalupe Oil Field Restoration. California Department of Fish and Game and Hagler Bailly Consulting, Inc. Initial restoration planning, including background research, historical air photo assessment, and analysis of restoration alternatives at the Guadalupe Oil Field. Results from these tasks were used in the evaluation of potential restoration options, and to anticipate biological, hydrological, ecological, logistical, economic, and other issues associated with each restoration option.

Restoration of Coastal Dunes and Associated Wetlands in California. California Department of Fish and Game and Hagler Bailly Consulting, Inc. Principal scientist responsible for compiling and annotating a comprehensive bibliography of restoration and revegetation projects in coastal California, with an emphasis on coastal dune habitats and coastal wetlands.

Recovery Plan for Two Federally Endangered Plant Species. U.S. Fish and Wildlife Service. Technical advisor responsible for developing strategy and task recommendations for the recovery plan for marsh sandwort (*Arenaria paludicola*) and Gambel's watercress (*Rorippa gambelii*). Key aspects of the plan included an outline of steps for habitat protection, species and habitat monitoring, biological and ecological research, and the establishment of new populations.

Implementation of Recovery Activities for Two Federally Endangered Plant Species. California Department of Fish and Game and University of California. Research on species biology and ecology, plant propagation, experimental establishment of new populations, and monitoring of existing and new populations of marsh sandwort (*Arenaria paludicola*) and Gambel's watercress (*Rorippa gambelii*). Reporting of species and habitat status and progress of recovery activities.

Rare Plant Census. All American Pipeline, L.P. Rare plant monitoring census for Gaviota tarplant (*Hemizonia increscens* ssp. *villosa*) in permanent plots established at Gaviota, CA.

UCSB Campus Lagoon Wetland Restoration. The Herbarium, Museum of Systematics and Ecology, University of California, Santa Barbara. Design and implementation of a five-year vegetation monitoring program for wetland plant communities restored at the UCSB Campus Lagoon, Santa Barbara County, CA, as required by the Streambed Alteration Agreement of the California Department of Fish and Game. The project

included plant species identification, vegetation sampling, data analysis, photodocumentation, and report preparation.

Vernal Pool Restoration Monitoring, Isla Vista, CA. Isla Vista Recreation and Park District. Vegetation monitoring, data analysis, and publication preparation for a 10-year assessment of restored and created vernal pools at the Del Sol Open Space and Vernal Pool Reserve.

Plant Surveys and Wetland Delineations for Five Land Parcels, Isla Vista, CA. County of Santa Barbara Planning and Development. Field surveys and report preparation for botanical and wetland resources, including jurisdictional wetland delineations and mapping, in coastal mesa vernal pool habitat along Del Playa Drive, Isla Vista.

Santa Barbara County Oak Restoration Program. University of California, Santa Barbara. Vegetation monitoring in savanna and woodland habitats of blue oak, valley oak, and coast live oak, for the long-term assessment of cattle grazing impacts on oak seedling recruitment at Sedgwick Ranch, Santa Barbara County.

Restoration Plan, Naval Base Ventura County, Port Hueneme Site, CA. Naval Base Ventura County and The Environmental Company. Field visits and preparation of a habitat protection and restoration plan for four special interest natural areas.

Biological Surveys and Wetlands Delineation for the National Reconnaissance Office (NRO) Campus, Vandenberg AFB. U.S. Air Force and Titan Corporation. Field biological surveys, jurisdictional wetlands delineation, and preparation of an addendum to the environmental assessment for The General Plan for the Cantonment Area of the base.

Controlled Burn Monitoring, Vandenberg AFB. U.S. Air Force and Museum of Systematics and Ecology, University of California, Santa Barbara. Pre-burn monitoring of vegetation and plant species in coastal sage scrub and chaparral at two prescribed burn sites, South Vandenberg AFB.

Restoration Plans for Installation of VTS Fiber-Optic Cable System, Honda Ridge Road Repair, and El Rancho Road Bridge Project, Vandenberg AFB. U.S. Air Force and Tetra Tech, Inc. Preparation of restoration plans including sections on ecological background, revegetation measures, monitoring and maintenance methods, performance criteria for assessing success, and restoration schedule for sites at North and South Vandenberg AFB.

Implementation of Restoration Plans, South Base and VTS Fiber-Optic Cable Systems, Vandenberg AFB. U.S. Air Force and Foster Wheeler Environmental Corp. Native plant species restoration, long-term monitoring, and restoration evaluation at four sites at Vandenberg AFB, CA.

Natural Resources Surveys and Environmental Assessments, Vandenberg AFB. U.S. Air Force and Tetra Tech, Inc. Principal environmental scientist responsible for conducting field surveys and preparing report sections for vegetation, wildlife, and wetland resources for 17 environmental assessments of facility and infrastructure development projects, and for an EIS on San Antonio Creek.

Integrated Natural Resources Management Plan, Vandenberg AFB. U.S. Air Force and Tetra Tech, Inc. Principal scientist responsible for preparing sections on existing conditions, issues of concern, and management objectives for vegetation, wildlife, and wetland resources for a basewide five-year plan.

EIS and Environmental Assessments. U.S. Air Force. Program manager and contract administrator, under a contract with the Strategic Air Command (SAC), for eight environmental assessments and one EIS for proposed USAF real estate, facility construction, and training actions. Impact analyses were conducted for the full range of environmental and socioeconomic issues; major areas of focus involved endangered species' habitats, cultural and historical resources, and hazardous waste sites.

Goleta Revitalization EIR/EIS. County of Santa Barbara Planning and Development. Wetland delineations at sixteen creek crossings and plant surveys for street extensions, bikepaths and a multipurpose trail.

Oil and Gas Exploration and Facilities Development EIRs/EISs. Santa Barbara County and California State Lands Commission. Environmental analyst for EIRs/EISs of oil and gas development projects located offshore California.

Supplemental Environmental Impact Report for the 1990 Long Range Development Plan. University of California, Santa Barbara. Program manager for a supplemental EIR focussed on growth-related impacts to local school districts, and potential secondary environmental impacts to sensitive wetland habitats that could be caused by needed school facility expansion.

Biological Monitoring for Installation of CITS, VTS, South Base, and Tranquillon Mountain Fiber-Optic Cable Systems, Vandenberg AFB. U.S. Air Force, Tetra Tech, Inc., and Foster Wheeler Environmental Corporation. Onsite biological monitoring

for cable installation activities to ensure avoidance of adverse impacts to sensitive biological and wetland resources.

Biological Surveys and Monitoring for Installation of Building 3000 Fiber-Optic Cable System, Vandenberg AFB. U.S. Air Force and System Technology Associates. Field surveys and onsite biological monitoring for cable installation activities to ensure avoidance of adverse impacts to sensitive biological and wetland resources.

Biological Monitoring for Honda Ridge Road Repair and Point Sal Road Repair, Vandenberg AFB. U.S. Air Force, Tetra Tech, Inc., and Ace Engineering, Inc. Onsite biological monitoring for road repair activities to ensure avoidance of adverse impacts to sensitive biological and wetland resources.

Biological Monitoring, Environmental Quality Assurance Program (EQAP), Santa Barbara County, CA. Storrer Environmental Services. Biological monitoring for the Level (3) fiber-optic cable installation project, the stabilization of oil wells for the Venoco State Lease 421 piers, and the AERA/Molino flowlines abandonment project.

MEMBERSHIPS

California Botanical Society; California Exotic Pest Plant Council; Society of Wetland Scientists; Society of Ecological Restoration; The International Mountain Society.

SELECTED PUBLICATIONS

Dr. Gale has been an author and collaborator on numerous academic publications, government research grant reports, and presentations at national and international professional conferences. In addition, he has contributed to environmental and planning documents. A summarized count of his work includes: Refereed Journal Articles - 28; Book Chapters - 5; Papers in Conference Proceedings - 3; Government Research Reports - 13; Contributions to Planning Studies - 44; Contributions to Environmental Documents - 55.

Journal Articles

"Coast Live Oak Revegetation on the Central Coast of California," (with A. Parikh), *Madroño*, 45(4), 1998, 301-309.

"Vegetation Monitoring of Created Dune Swale Wetlands, Vandenberg Air Force Base, California," (with A. Parikh), *Restoration Ecology*, 6(1), 1998, 83-93.

"The Analysis of Class Dispersion Patterns Using Matrix Comparisons," (with L.E. Harvey and F.W. Davis), *Ecology*, 69(2), 1988, 537-542.

"Tests of Randomness: Unidimensional and Multidimensional," (with L.J. Hubert, R.G. Golledge, and C.M. Costanzo), *Environment and Planning A*, 17, 1985, 373-385.

"Measuring Association Between Spatially Defined Variables: An Alternative Procedure," (with L.J. Hubert, R.G. Golledge, and C.M. Costanzo), *Geographical Analysis*, 17, 1985, 36-46.

"Unclassed Matrix Shading and Optimal Ordering in Hierarchical Cluster Analysis," (with W.C. Halperin and C.M. Costanzo), *Journal of Classification*, 1, 1984, 775-92.

Conference Proceedings

"Review of Ten Years of Vernal Pool Restoration and Creation in Santa Barbara, California," (with W.R. Ferren Jr., D.M. Hubbard, S. Wiseman, and A. Parikh), in C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) *Ecology, Conservation, and Management of Vernal Pool Ecosystems, Proceedings from a 1996 Conference*, California Native Plant Society, Sacramento, CA, 1998, 206-216.

"Vegetation Monitoring of Created Wetland Sites on the San Antonio Terrace, Vandenberg Air Force Base, California," (with A. Parikh), in M.C. Landin (Ed.) *Proceedings of the National Interagency Workshop on Wetlands: Technology Advances for Wetlands Science*, Technical Report, Wetlands Research and Technology Center, U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS, 1995, 153-55.

"Wetland Creation and Vegetation Monitoring in a Stabilized Sand Dune Ecosystem, San Antonio Terrace, Vandenberg Air Force Base, California," (with A. Parikh and T. Waddell), in M.C. Landin (Ed.) *Proceedings of the 13th Annual Meeting of the Society of Wetland Scientists (SWS)*, New Orleans, LA, 1993, 368-76.

"First-Year Vegetation Monitoring of Created Wetlands on the San Antonio Terrace, Vandenberg Air Force Base, California," (with A. Parikh and T. Waddell), in A.E. Leviton and M.L. Aldrich (Eds.) *Proceedings of the Pacific Division of the AAAS*, University of California, Santa Barbara, June 1992, p. 46.

Kim L. Marsden

Botanist/Biologist

As a biologist with more than ten years of experience, Ms. Marsden has successfully conducted a diverse range of botanical and zoological surveys, including focused searches for rare and endangered species in coastal, mountain and desert plant communities. She has developed excellent botanical skills from not only a broad range of field identification experiences throughout the southwestern United States and northwestern Mexico, but training in botanical laboratory techniques used for plant identification, as well. Ms. Marsden has extensive experience in the analyses of potential impacts to species and habitats from proposed development projects. She prepares and reviews technical reports, which provide alternatives recommendations to mitigate these impacts. She has a thorough working knowledge of regulatory issues and applicable laws including the California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), Federal Endangered Species Act (FESA), California Endangered Species Act (CESA), and the Clean Water Act as part of her resource agency experience working as a Botanist/Biologist for the California Department of Fish and Game, U.S. Fish and Wildlife Service, and through her project manager experience in the regulatory branch of the U. S. Army Corps of Engineers. Ms. Marsden has reviewed and commented on numerous proposed mitigation and monitoring plans for sensitive species. She is knowledgeable of, and skilled in, vegetation mapping, mitigation monitoring, and the design of habitat restoration plans. She also has extensive experience in conducting rare, threatened, and endangered animal surveys.

EDUCATION

Completed all required coursework for the Master's Program in Systematic Botany, San Diego State University, 1992-1994. Master's Research Topic: Systematics, ecology and natural history of Northwest American *Eryngium* species (Apiaceae).

Bachelor of Science, Biology, San Diego State University, 1992.

Associate of Science, Medical Laboratory Technology, San Diego Mesa College, 1988.

PUBLICATIONS

Marsden, Kim L. and Michael G. Simpson. 1999. *Eryngium pendletonensis* (Apiaceae), A New Species from Southern California. *Madroño*, 46:1, 61-64.

EXPERIENCE

- 1/01-present Associate Resource Ecologist, California Department of Parks and Recreation, Southern Service Center, San Diego.
Design long-term monitoring studies to assess the status and condition of vegetation communities, exotic species infestations, and rare plant populations. Conduct vegetation and rare plant inventories within State Parks in southern California. Assess the impacts of maintenance and development projects on biological resources within state park units. Provide technical botanical expertise to Service Center staff when requested. Assist in project environmental clearance under CEQA, ESA, and CESA. Assist other resources section staff in biological survey work and data analysis when necessary.
- 1/00 –1/01 Associate Biologist in Botany, California Department of Fish and Game, Region 5, San Diego Office.
Provided technical assistance in developing Habitat Conservation Plans to applicants/jurisdictions seeking take authorization under Section 2835 of the Fish and Game Code (Natural Community Conservation Program). Coordinated with the U.S. Fish and Wildlife Service Habitat Conservation Program staff to ensure HCP conformity with the Federal Endangered Species Act and the California Fish and Game code and other state and federal laws.
- 9/97-1/00 Fish and Wildlife Biologist/Botanist-U.S. Fish and Wildlife Service, Branch of Habitat Conservation Planning, Ecological Services, Carlsbad Field Office.
Provided technical assistance in developing Habitat Conservation Plans to applicants/jurisdictions seeking take authorization under section 10 of the Endangered Species Act. Coordinated with California Department of Fish and Game Natural Community Conservation Program (NCCP) staff to ensure HCP conformity with the Endangered Species Act and the Fish and Game code.

Evaluated and commented on projects impacting U.S. Army Corps of Engineers' jurisdictional Waters of the United States pursuant to the Fish and Wildlife Coordination Act. Consulted and conferred with other federal agencies under section 7 of the Endangered Species Act (Act) to analyze effects of federal actions

on species proposed for listing or listed as endangered, threatened under the Act.

Provided technical expertise to Field Office staff in evaluation of revegetation, restoration and enhancement projects of upland, riparian, and wetland habitats. Provided general botanical expertise to Field Office staff biologists when needed.

7/96-9/97

Botanist-U.S. Fish and Wildlife Service-Branch of Federal Projects, Ecological Services, Carlsbad Field Office.

Conducted complete biological surveys for plants and wildlife for impact assessments of proposed land and water development projects. Prepared biological technical reports, including analyses of project alternatives developed from the results of directed sensitive species and community surveys. Developed sampling protocols for vegetation communities; provided botanical expertise to staff biologists and made recommendations for resource protection and enhancement. Surveyed for, and monitored the status of, federal candidate, proposed, and listed plant and animal taxa. Assisted in amphibian and reptile pit-fall trapping survey efforts. Provided technical expertise to Field Office staff biologists for evaluation of revegetation, restoration and enhancement efforts of upland, riparian, and wetland habitats.

11/95-7/96

Biologist/Project Manager, U. S. Army Corps of Engineers, Regulatory Branch, San Diego Field Office.

Project management, including evaluation of impacts to jurisdictional Waters of the United States, including wetlands, associated with permit requests pursuant to section 404 of the Clean Water Act, section 10 of the Rivers and Harbors Act, and section 103 of the Marine Sanctuaries Act. Processed permit applications, composed letters to applicants, evaluated compliance with permit conditions and coordinated with other agencies regarding proposed permit activities affecting biological, historical and water resources.

3/95-10/97

Botanist (Seasonal), Lake Cuyamaca Recreation and Park District, Julian, CA.

Project Manager of the Lake Cuyamaca downingia, Lake Cuyamaca larkspur, and Parish's meadowfoam monitoring program.

Developed sampling and monitoring protocols for sensitive plant species. Coordinated rare plant monitoring activities in accordance with interagency Memorandum of Understanding guidelines, including mapping of rare plant populations using Geographic Information System (GIS) technology to assess annual boundary changes of plant subpopulations; prepared annual biological technical reports. Supervised and trained field personnel in established survey methodology; ensured thorough documentation of survey and monitoring activities through complete field notes.

ANUJA K. PARIKH

Principal Ecologist, FLx

EDUCATION AND CERTIFICATIONS

Ph.D., Plant Geography, University of California, Santa Barbara, 1989.

M.S., Geography, University of Bombay, India, 1981.

B.S., Zoology and Geology, University of Bombay, India, 1979.

PWS, Certified Professional Wetland Scientist #841, Society of Wetland Scientists, 1995.

SUMMARY OF QUALIFICATIONS

Dr. Parikh has 19 years of field and research experience in the areas of botany, plant ecology, wetlands, biogeography, and earth resources. Her work has included environmental baseline inventories and impact assessments, rare and endangered plant species surveys, revegetation and mitigation plans, restoration and monitoring of native upland and wetland habitats, and coast live oak revegetation studies. She has expertise in field vegetation sampling, plant species identification, wetland delineation, and the collection of physical environmental data. Using aerial photography and field surveys, she has prepared vegetation maps based on classification and quantification of plant communities in a variety of habitats; she also has mapped environmental constraints, incorporating data on sensitive species, natural habitats, and physiographic and man-made features. Dr. Parikh is experienced with experimental design as well as processing and analyzing ecological data using statistical and graphics software.

EXPERIENCE

Rare Plant and Vegetation Surveys and Mapping, Newhall Ranch/Valencia Company Project Sites, Los Angeles and Ventura Counties, CA. Newhall Land and Farming Company, URS Corporation, Impact Sciences, Inc., and Dudek and Associates, Inc. General rare plant surveys and concentrated surveys for *Chorizanthe parryi* var. *fernandina* (San Fernando Valley spineflower) and *Helianthus* sp. (sunflower), vegetation surveys and mapping of plant communities, and report preparation for various sites. Surveys were carried out during four field seasons in the years 2000, 2001, 2002, and 2003. Participation in the development of a spineflower management plan, preserve design, and associated research activities.

Rare Plant and Vegetation Surveys and Mapping, Los Angeles County, CA. Natural Resource Consultants. General rare plant surveys and concentrated surveys for *Chorizanthe parryi* var. *fernandina* (San Fernando Valley spineflower), *Dodecahema leptoceras* (slender-horned spineflower), *Orcuttia californica* (California Orcutt grass), and *Navarretia fossalis* (spreading navarretia), vegetation surveys, and report preparation for three sites in the year 2003.

Restoration Planning and Implementation, Former Guadalupe Oil Field, San Luis Obispo County, CA. Unocal Corporation and Jordan Environmental Services. Preparation and implementation of site-specific restoration plans, including the development of revegetation specifications, monitoring methods, performance criteria, and performance evaluation. Development of general mitigation and restoration success criteria, including sampling design, data collection, statistical data analysis, and reporting for selected reference wetlands for future comparison with wetland mitigation and restoration sites. Participation in activities related to uplands and wetlands habitat restoration with the Restoration Working Group, comprising regulatory agency representatives and Unocal consultants, for the long-term Guadalupe Restoration Project.

Vegetation and Rare Plant Surveys and Wetlands Delineations, Ventura and Los Angeles Counties, CA. Impact Sciences, Inc. Vegetation surveys and mapping of plant communities, rare plant surveys, field wetland surveys, delineation of jurisdictional wetlands, and report preparation for more than 30 sites in various locations in Ventura and Los Angeles counties.

Peacekeeper Rail Garrison Mitigation Program, San Antonio Terrace, Vandenberg AFB, CA. U.S. Air Force and The Earth Technology Corporation. Project biologist responsible for directing, planning, and implementing biological field activities related to wetlands creation, upland habitat restoration, coast live oak revegetation, and vegetation monitoring for all mitigation and restoration sites.

Recovery Plan for Two Federally Endangered Plant Species. U.S. Fish and Wildlife Service. Ecologist and principal author responsible for background research and all botanical elements of the recovery plan for marsh sandwort (*Arenaria paludicola*) and Gambel's watercress (*Rorippa gambelii*).

Implementation of Recovery Activities for Two Federally Endangered Plant Species. California Department of Fish and Game and University of California. Research on species biology and ecology, plant propagation, experimental

establishment of new populations, and monitoring of existing and new populations of marsh sandwort (*Arenaria paludicola*) and Gambel's watercress (*Rorippa gambelii*). Reporting of species and habitat status and progress of recovery activities.

Rare Plant Census. All American Pipeline, L.P. Rare plant monitoring census for Gaviota tarplant (*Hemizonia increscens* ssp. *villosa*) in permanent plots established at Gaviota, CA.

Ventura River Estuary Enhancement Project, Ventura County, CA. California Department of Parks and Recreation. Design and implementation of a five-year vegetation monitoring program for restoration efforts at Emma Wood State Beach. The project involved monitoring four vegetation types: willow-cottonwood forest, saltbush scrub, dune scrub, and foredune vegetation. Activities included botanical surveys, survival and growth surveys, photodocumentation, data collection and comparative analysis of natural and revegetated areas, evaluation of exotics eradication, and recommendations for ongoing restoration.

Santa Barbara County Oak Restoration Program. University of California, Santa Barbara. Plant identification and vegetation monitoring in savanna and woodland habitats of blue oak, valley oak, and coast live oak, for the long-term assessment of cattle grazing impacts on oak seedling recruitment at Sedgwick Ranch, Santa Barbara County, CA.

Vernal Pool Restoration Monitoring, Isla Vista, CA. Isla Vista Recreation and Park District. Vegetation monitoring, data analysis, and publication preparation for a 10-year assessment of restored and created vernal pools at the Del Sol Open Space and Vernal Pool Reserve.

Plant Surveys and Wetland Delineations for Five Land Parcels, Isla Vista, CA. County of Santa Barbara Planning and Development. Field surveys and report preparation for botanical and wetland resources, including jurisdictional wetland delineations and mapping, in coastal mesa vernal pool habitat along Del Playa Drive, Isla Vista.

Rare and Endangered Plant Species Surveys. Metropolitan Water District and ERC Environmental and Energy Services Co. Plant species identification and sensitive plant species surveys at proposed reservoir and mitigation sites (Potrero Creek, Harford Springs, Crown/Rawson Valleys, Motte Rimrock Reserve, Domenigoni Valley, Santa Rosa Plateau Preserve, Lake Skinner, and

Vail Lake) for the Metropolitan Water District's Eastside Reservoir Project, Riverside County, CA.

Vegetation Mapping and Plant Species Surveys. Santa Barbara County, CA.

Vegetation mapping using aerial photographs of riparian communities along the Santa Ynez River, Santa Barbara County; field vegetation and topographical data collection from transects, species identification, rare and endangered plant species surveys, and report preparation for the County Flood Control District.

Rare and Endangered Plant Species Surveys. California Department of Water Resources. Rare and endangered plant species identification and mapping along a proposed aqueduct route in the Lompoc and Lake Cachuma areas in Santa Barbara County, and near Santa Margarita, San Luis Obispo County; field verification, ground truthing and mapping of vegetation communities along the Santa Ynez River, CA.

Floristic and Vegetation Surveys. U.S. Department of Agriculture, Forest Service. Preparation of floras and vegetation surveys in the Los Padres National Forest at Mt. Pinos, a lower subalpine community in Ventura and Kern counties, and at Alder Creek Botanical Area, Monterey County, CA. Identification of plant species and collection of vegetation and site data in permanent plots established in blue oak woodland in San Luis Obispo County, CA, as part of a Forest Service project on vegetation and habitat inventory and classification.

Wetland Vegetation Surveys, Mapping, and Monitoring. Dames & Moore. Vegetation mapping using aerial photographs, calculations of riparian habitat acreages, and field botanical surveys for a land development project along the Santa Clara River, Los Angeles County, CA. Biological construction monitoring for an archaeological site investigation in the Los Carneros wetlands, Goleta, CA. Field surveys and mapping of wetlands and vernal pools at Beale AFB, CA.

Rare and Endangered Plant Species Surveys and Vegetation Mapping. Jones and Stokes Associates, Inc. Field surveys for rare and endangered plant species at the proposed Los Vaqueros Reservoir site near Livermore, Contra Costa and Alameda counties, CA, and along ephemeral drainages near Taft in the Central Valley, Kern County, CA, for a project involving clean-up of oil and brea deposits. Habitat mapping and field surveys of riparian vegetation and plant species on transects along the Lower Ventura River, for an aquatic biology survey.

Ecological Survey Reports for Candidate Research Natural Areas. U.S. Department of Agriculture, Forest Service. Field work, literature reviews, and document preparation for the San Emigdio Mesa and Sawmill Mountain Candidate Research Natural Areas, Los Padres National Forest, Ventura County, CA.

Restoration Plan, Naval Base Ventura County, Port Hueneme Site, CA. Naval Base Ventura County and The Environmental Company. Field visits and preparation of a habitat protection and restoration plan for four special interest natural areas.

Biological Surveys and Wetlands Delineation for the National Reconnaissance Office (NRO) Campus, Vandenberg AFB. U.S. Air Force and Titan Corporation. Field biological surveys, jurisdictional wetlands delineation, and preparation of an addendum to the environmental assessment for The General Plan for the Cantonment Area of the base.

Controlled Burn Monitoring, Vandenberg AFB. U.S. Air Force and Museum of Systematics and Ecology, University of California, Santa Barbara. Pre-burn monitoring of vegetation and plant species in coastal sage scrub and chaparral at two prescribed burn sites, South Vandenberg AFB.

Restoration Plans for Installation of VTS Fiber-Optic Cable System, Honda Ridge Road Repair, and El Rancho Road Bridge Project, Vandenberg AFB. U.S. Air Force and Tetra Tech, Inc. Preparation of restoration plans including sections on ecological background, revegetation measures, monitoring and maintenance methods, performance criteria for assessing success, and restoration schedule for sites at North and South Vandenberg AFB.

Implementation of Restoration Plans, South Base and VTS Fiber-Optic Cable Systems, Vandenberg AFB. U.S. Air Force and Foster Wheeler Environmental Corp. Native plant species restoration, long-term monitoring, and restoration evaluation at four sites at Vandenberg AFB, CA.

Integrated Natural Resources Management Plan, Vandenberg AFB. U.S. Air Force and Tetra Tech, Inc. Principal ecologist responsible for preparing sections on existing conditions, issues of concern, and management objectives for vegetation, wildlife, and wetland resources for a basewide five-year plan.

Natural Resources Surveys and Environmental Assessments, Vandenberg AFB. U.S. Air Force and Tetra Tech, Inc. Principal environmental scientist responsible

for conducting field surveys and preparing report sections for vegetation, wildlife, and wetland resources for 17 environmental assessments of facility and infrastructure development projects, and for an EIS on San Antonio Creek.

Natural Resources Management Plans. U.S. Air Force and Higginbotham/Briggs & Associates. Participation in data collection, field visits, agency coordination, document preparation and review for Natural Resources Management Plans prepared for Kaena Point Satellite Tracking Station, HI, and Onizuka AFB, CA.

Biological Monitoring, Environmental Quality Assurance Program (EQAP), Santa Barbara County, CA. Storrer Environmental Services. Biological monitoring for the Level (3) fiber-optic cable installation project, the All-American Pipeline relocation at Gaviota Creek, and the stabilization of oil wells for the Venoco State Lease 421 piers.

Goleta Revitalization EIR/EIS. County of Santa Barbara Planning and Development. Wetland delineations at sixteen creek crossings and plant surveys for street extensions, bikepaths and a multipurpose trail.

UCSB Campus Lagoon Wetland Restoration. The Herbarium, Museum of Systematics and Ecology, University of California, Santa Barbara. Design of a five-year vegetation monitoring program for wetland plant communities restored at the UCSB Campus Lagoon, Santa Barbara County, CA, as required by the Streambed Alteration Agreement of the California Department of Fish and Game. The monitoring project included plant species identification, vegetation sampling, data analysis, photo-documentation, and report preparation.

Vegetation Surveys and Analysis. The Herbarium, Department of Biological Sciences, University of California, Santa Barbara. Plant species identification and vegetation sampling in upland and wetland areas for baseline data inventory of botanical resources and rare plants at Fish Slough, Inyo and Mono counties, CA. Project design and field surveys of topography, riparian vegetation, and plant species in the Ventura River estuary, Ventura County, CA; computer graphics, analysis, and document preparation of environmental relationships and distribution of species and vegetation communities. Computer analysis for a project on the botanical wetland resources of the Carpinteria salt marsh, Santa Barbara County, CA.

Wetlands Management Plan. Department of Geography and Campus Wetlands Committee, University of California, Santa Barbara. Field and literature

surveys of hydrology and sedimentation of the campus-owned wetland resources in Devereux Slough and the Storke Campus wetlands.

Watershed Surveys. U.S. Department of Agriculture, Forest Service. Geomorphological, botanical, and hydrological field work in preliminary watershed surveys in Santa Barbara and Ventura counties, CA.

Research Activities. Department of Geography, University of California, Santa Barbara. Sampling and monitoring regeneration of tree and herbaceous species in the riparian zone of a chaparral watershed recovering from wildfire (N. Fork Matilija Creek, Ventura County); topographic channel surveys, computer plotting, ecological and botanical field, laboratory and greenhouse experiments, literature review, and data analysis. Vegetation sampling, inventory and analysis, and topographical surveys in chaparral ecosystems and oak woodlands in Burton Mesa chaparral, Santa Barbara County. Field sampling in coniferous forests of the Mendocino National Forest Reserve, CA.

MEMBERSHIPS

California Native Plant Society; Society of Wetland Scientists; Society of Ecological Restoration; California Botanical Society.

SELECTED PUBLICATIONS AND REPORTS

"Coast Live Oak Revegetation on the Central Coast of California," (with N. Gale), *Madroño*, 45(4), 1998, 301-309.

"Vegetation Monitoring of Created Dune Swale Wetlands, Vandenberg Air Force Base, California," (with N. Gale), *Restoration Ecology*, 6(1), 1998, 83-93.

"Review of Ten Years of Vernal Pool Restoration and Creation in Santa Barbara, California," (with W.R. Ferren Jr., D.M. Hubbard, S. Wiseman, and N. Gale), in C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) *Ecology, Conservation, and Management of Vernal Pool Ecosystems, Proceedings from a 1996 Conference*, California Native Plant Society, Sacramento, CA, 1998, 206-216.

"Peacekeeper Rail Garrison and Small ICBM Mitigation Program, San Antonio Terrace, Vandenberg AFB, California Annual Wetlands Monitoring Report, Annual Upland Monitoring Report, Year 5," Prepared for the U.S. Department of the Air

Force, Detachment 10, Space and Missile Systems Center, San Bernardino, CA, February 1996.

"Vegetation Monitoring of Created Wetland Sites on the San Antonio Terrace, Vandenberg Air Force Base, California," (with N. Gale), in M.C. Landin (Ed.) Proceedings of the National Interagency Workshop on Wetlands: Technology Advances for Wetlands Science, Technical Report, Wetlands Research and Technology Center, U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS, 1995, 153-55.

"Recovery Plan for Marsh Sandwort (*Arenaria paludicola*) and Gambel's Watercress (*Rorippa gambelii*)," (with N. Gale), U.S. Fish and Wildlife Service, Ventura, CA, August 1994.

"Wetland Creation and Vegetation Monitoring in a Stabilized Sand Dune Ecosystem, San Antonio Terrace, Vandenberg Air Force Base, California," (with N. Gale and T. Waddell), in M.C. Landin (Ed.) Proceedings of the 13th Annual Meeting of the Society of Wetland Scientists (SWS), New Orleans, LA, 1993, 368-76.

"First-Year Vegetation Monitoring of Created Wetlands on the San Antonio Terrace, Vandenberg Air Force Base, California," (with N. Gale and T. Waddell), in A.E. Leviton and M.L. Aldrich (Eds.) Proceedings of the Pacific Division, American Association for the Advancement of Science, University of California, Santa Barbara, June 1992, p. 46.

"Biotic Inventory and Ecosystem Characterization for Fish Slough, Inyo and Mono Counties, California," (with the Fish Slough Research Team), Report to State of California, The Resources Agency, Department of Fish and Game, by the Departments of Biological Sciences, Geography, and Geological Sciences, University of California, Santa Barbara, June 1991.

"Ecology of a Mediterranean-Climate Estuarine Wetland at Carpinteria, California: Plant Distributions and Soil Salinity in the Upper Marsh," (with R. Callaway, S. Jones, W. Ferren), *Canadian Journal of Botany*, 68, 1990, 1139-1146.

"Botanical Resources at Emma Wood State Beach and the Ventura River Estuary, California: Inventory and Management," (with W. Ferren, M. Capelli, D. Magney, K. Clark, and J. Haller), Report to the State of California Department of Parks and Recreation, Environmental Report No. 15, The Herbarium,

Department of Biological Sciences, University of California, Santa Barbara,
August 1990.

"UCSB Campus Wetlands Management Plan, Part II Technical Report Hydrology, Water Quality, and Sedimentation of West and Storke Campus Wetlands," (with F. Davis, D. Theobald, and R. Harrington), Report to the California Coastal Conservancy and Campus Wetlands Committee, University of California, Santa Barbara, CA, 1990.

"Recovery of the Chaparral Riparian Zone After Wildfire," (with F. Davis, E. Keller, and J. Florsheim), Proceedings of the California Riparian Systems Conference, September 22-24, 1988, Davis, CA, Protection, Management, and Restoration for the 1990s, Gen. Tech. Rep. PSW-110, U.S. Department of Agriculture, Forest Service, Pacific Southwest Forest and Range Experiment Station, 1989, 194-203.

"Plant Communities and Flora of the Proposed Botanical Reserve on Mt. Pinos, Ventura and Kern counties, CA," (with D. Capralis), Survey Report, U.S. Department of Agriculture, Forest Service, Los Padres National Forest Headquarters, Goleta, CA, August 1988.

"Terrestrial Vegetation of Rattlesnake Canyon," (with F. Davis), Proceedings of the Chaparral Ecosystems Research Conference, Santa Barbara, CA, Report No. 62, California Water Resources Center, University of California, Davis, CA, 1986, 13-17.

TRICIA L. WOTIPKA

Environmental Specialist

EDUCATION

Pennsylvania State University

B.S. Wildlife and Fisheries Science (2000)

(Dean's Honor List, Fall 1998 - Spring 2000)

PROFESSIONAL AFFILIATIONS

- Audobon Society, 2000
- Women's Environmental Council, past Secretary, 2001 and Newsletter Chair, 2002

EXPERIENCE SUMMARY

Ms. Wotipka has over two years experience in environmental document preparation and resource conservation planning. Project experience includes rare plant surveys, biological resource surveys, data collection and analysis, environmental assessments, wetlands delineations, permitting, mitigation design and monitoring, and endangered species surveys. Projects include issues relative to the California Fish and Game Code, the federal Clean Water Act (Sections 401 and 404), the National Environmental Policy Act (NEPA), the Migratory Bird Treaty Act, and the Endangered Species Act (ESA). Ms. Wotipka has also trained with the Wetlands Training Institute, Inc. and has successfully completed a course in basic wetlands delineation.

PROFESSIONAL ASSIGNMENTS

- **Sewer Line Relocation and Park Improvements.** Aliso Creek Emergency Sewer and Park Improvements Project, Orange County, California. Assisted in focused rare plant surveys for the federally-listed threatened and state-listed endangered thread-leaved brodiaea (*Brodiaea filifolia*). Prepared a Section 404 and 401 permit application in accordance with the federal Clean Water Act and a 1603 Streambed Alteration Agreement in accordance with California Fish and Game Code. Prepared and processed a Section 404 and 401 permit application in accordance with the federal Clean Water Act and a 1603 Streambed Alteration Agreement in accordance with California Fish and Game Code. Negotiated with resource agencies to identify appropriate mitigation measures, including the creation and enhancement of southern willow scrub and mule fat scrub wetlands within the reserve.

- **Railway Expansion Project.** Sorrento-Miramar Curve Realignment and Second Main Track Project. City of San Diego, California. Conducted field surveys for sensitive, state- and federally-listed plant species on approximately 190 acres.
- **Church Development Project.** St. Jerome=s Catholic Church Project. City of San Diego, California. Conducted field surveys for state- and federally-listed species on approximately 18 acres.
- **Residential Subdivision and Roadway Improvements Project.** University Commons Development Project, City of San Marcos, California. Performed a delineation of Awaters of the United States@ and wetlands under the jurisdiction of the U.S. Army Corps of Engineers and California Department of Fish and Game. Prepared and processed a Section 404 and 401 permit application in accordance with the federal Clean Water Act and a 1603 Streambed Alteration Agreement in accordance with California Fish and Game Code.
- **Residential Subdivision.** Goodwin Drive Residential Development, City of Vista, California. Conducted a delineation of Awaters of the United States@ and wetlands under the jurisdiction of the U. S. Army Corps of Engineers (ACOE) and California Department of Fish and Game (CDFG). Obtained a Section 401 permit application in accordance with the federal Clean Water Act and a 1603 Streambed Alteration Agreement in accordance with California Fish and Game Code. Negotiated with resource agencies to identify appropriate mitigation measures, including the creation of southern willow scrub wetlands.
- **Conservation Planning.** Assisted in the development of the Multiple Species Habitat Conservation Plan (MSHCP) for western Riverside County. Project involvement included research on potentially covered plant species followed by syntheses of ecological information and the preparation of sensitive species conservation analysis.

RELEVANT EXPERIENCE

- Restoration/Maintenance volunteer - Habitat West, Vista, California. Assisted in the restoration and management of native habitats for the coastal California gnatcatcher.
- Restoration/Maintenance volunteer - Habitat West, Vista, California. Evaluated the health of newly planted vegetation; identified and removed pestilent species when necessary; identified shrubs and native scrub communities.

- Pennsylvania Cooperative Fish & Wildlife Service Unit. Flushed and recorded the location of ruffed grouse to note the effects of timber harvest on grouse management.
- Pennsylvania Wildlife Habitat Evaluation Project. Judged over 60 kids aged 8-18 years old in a multi-county wildlife evaluation competition in Pennsylvania.
- Pennsylvania Wildlife Habitat Evaluation Project. Evaluated students based on their knowledge of PA wildlife habitats, correct identification of wildlife foods, oral presentations, and on-site written management plans.

PUBLICATIONS

- Researched and prepared the introduction of the "Spring Creek Watershed Water Sampling Protocol" for the Clearwater Conservancy - Fall 1999.
- Designed and produced a web page in Spring 2000 (now out of service) entitled "Beaks and Buds". It was located at <http://www.personal.psu.edu/tlw188>.

APPENDIX B
VASCULAR PLANT SPECIES OBSERVED
ISOLA AND
VENTURA HOMESTEAD SITES (2003)

APPENDIX B

VASCULAR PLANT SPECIES – ISOLA (I) AND VENTURA HOMESTEAD (V) SITES

LYCOPODIAE

SELAGINELLACEAE - SPIKE-MOSS FAMILY

Selaginella bigelovii - Bigelow's spike-moss (V)

FILACEAE

PTERIDACEAE - BRAKE FAMILY

Pellaea andromedifolia var. *andromedifolia* - coffee fern (I)

Pentagramma triangularis. – fern (I)

ANGIOSPERMAE (DICOTYLEDONES)

AMARANTHACEAE - AMARANTH FAMILY

* *Amaranthus albus* – tumbleweed (V)

ANACARDIACEAE - SUMAC FAMILY

Rhus ovata - sugar-bush (V)

Rhus trilobata - squaw bush (V)

APIACEAE - CARROT FAMILY

Apiastrum angustifolium - wild celery (I,V)

Daucus pusillus - rattlesnake weed (V)

* *Foeniculum vulgare* - sweet fennel (I)

ASCLEPIADACEAE - MILKWEED FAMILY

Asclepias fascicularis - narrow-leaf milkweed (I,V)

ASTERACEAE - SUNFLOWER FAMILY

Acourtia microcephala – sacapellote (V)

Ambrosia acanthicarpa - annual burweed (V)

Ambrosia psilostachya – ragweed (I)

Artemisia californica - coastal sagebrush (I,V)

Artemisia dracunculus – tarragon (V)

APPENDIX B (Cont.)

	<i>Artemisia tridentata</i> ssp. <i>tridentata</i> - big sagebrush	(V)
	<i>Baccharis pilularis</i> - coyote brush	(I,V)
	<i>Baccharis salicifolia</i> - mule fat	(I,V)
	<i>Brickellia californica</i> - California brickellbush	(I,V)
	<i>Brickellia nevinii</i> - Nevin's brickellbush	(V)
*	<i>Carduus pycnocephalus</i> - Italian thistle	(I,V)
*	<i>Centaurea melitensis</i> – tocalote	(I,V)
	<i>Chaenactis glabriuscula</i> var. <i>glabriuscula</i> - yellow pincushion	(I,V)
	<i>Conyza canadensis</i> – horseweed	(V)
	<i>Coreopsis bigelovii</i> – Bigelow's coreopsis	(V)
	<i>Corythogyne filaginifolia</i> - virgate cudweed aster	(I,V)
	<i>Encelia californica</i> - California bush sunflower	(I,V)
	<i>Ericameria palmeri</i> var. <i>pachylepis</i> - Palmer's goldenbush	(V)
	<i>Eriophyllum confertiflorum</i> var. <i>confertiflorum</i> – long-stem golden yarrow	(I,V)
	<i>Erigeron foliosus</i> var. <i>stenophyllus</i> - leafy daisy	(V)
	<i>Filago californica</i> - California fluffweed	(I,V)
*	<i>Filago gallica</i> - narrow-leaf filago	(V)
*	<i>Gazania linearis</i> - African daisy	(I)
	<i>Gnaphalium californicum</i> - California everlasting	(V)
	<i>Gnaphalium canescens</i> - white everlasting	(V)
	<i>Hazardia squarrosa</i> ssp. <i>grindelioides</i> - saw-toothed goldenbush	(I,V)
	<i>Helianthus annuus</i> - common sunflower	(V)
	<i>Hemizonia fasciculata</i> - fascicled tarweed	(V)
	<i>Heterotheca grandiflora</i> - telegraph weed	(I,V)
	<i>Heterotheca sessiliflora</i> - beach golden-aster	(I,V)
	<i>Isocoma menziesii</i> ssp. <i>veneta</i> - coastal goldenbush	(I,V)
*	<i>Lactuca serriola</i> - prickly lettuce	(I,V)
	<i>Lasthenia californica</i> - coast goldfields	(V)
	<i>Malacothrix saxatilis</i> - cliff malacothrix	(I,V)
	<i>Rafinesquia californica</i> - California chicory	(V)
	<i>Senecio flaccidus</i> var. <i>douglasii</i> - sand-wash butterweed	(V)
*	<i>Senecio vulgaris</i> - common groundsel	(I,V)
*	<i>Silybum marianum</i> - milk thistle	(I,V)
	<i>Solidago</i> sp. – goldenrod	(I)
*	<i>Sonchus asper</i> - prickly sow-thistle	(I,V)
*	<i>Sonchus oleraceus</i> - common sow-thistle	(I,V)
	<i>Stephanomeria exigua</i> - small wreathplant	(V)

APPENDIX B (Cont.)

<i>Stephanomeria virgata</i> - twiggy wreathplant	(I,V)
<i>Stylocline gnaphalioides</i> - everlasting nest-straw	(I,V)
<i>Uropappus lindleyi</i> - silver puffs	(I,V)
<i>Xanthium strumarium</i> – cocklebur	(I,V)
BORAGINACEAE - BORAGE FAMILY	
<i>Amsinckia menziesii</i> - yellow fiddleneck	(I)
<i>Cryptantha intermedia</i> - common forget-me-not	(I,V)
<i>Cryptantha microstachys</i> - Tejon cryptantha	(V)
<i>Cryptantha muricata</i> - prickly cryptantha	(I)
<i>Heliotropium curassavicum</i> - wild heliotrope	(I,V)
<i>Pectocarya penicillata</i> - winged pectocarya	(I,V)
BRASSICACEAE - MUSTARD FAMILY	
* <i>Brassica nigra</i> - black mustard	(I,V)
* <i>Hirschfeldia incana</i> - short-podded mustard	(V)
* <i>Raphanus sativus</i> - wild radish	(I)
* <i>Sisymbrium irio</i> - London rocket	(V)
CACTACEAE - CACTUS FAMILY	
<i>Opuntia basilaris</i> var. <i>ramosa</i> – beavertail	(V)
<i>Opuntia littoralis</i> - coastal prickly-pear	(V)
<i>Opuntia oricola</i> - pancake prickly-pear	(V)
<i>Opuntia phaeacantha</i> - desert prickly-pear	(I)
CAPPARACEAE - CAPER FAMILY	
<i>Isomeris arborea</i> – bladderpod	I,V)
CAPRIFOLIACEAE - HONEYSUCKLE FAMILY	
<i>Sambucus mexicana</i> - Mexican elderberry	(I,V)
CARYOPHYLLACEAE - PINK FAMILY	
* <i>Silene gallica</i> - common catchfly	(I,V)
CHENOPODIACEAE - GOOSEFOOT FAMILY	
<i>Atriplex canescens</i> - four-winged saltbush	(V)
<i>Atriplex lentiformis</i> - big saltbush, quail brush	(I,V)
* <i>Atriplex semibaccata</i> - Australian saltbush	(V)

APPENDIX B (Cont.)

*	<i>Atriplex suberecta</i> – saltbush	(V)
*	<i>Bassia hyssopifolia</i> - five-hooked bassia	(V)
*	<i>Chenopodium album</i> - lamb's-quarters	(V)
	<i>Chenopodium berlandieri</i> - pitseed goosefoot	(V)
*	<i>Chenopodium murale</i> - nettle-leaved goosefoot	(I,V)
*	<i>Salsola tragus</i> - Russian-thistle	(I,V)

CONVOLVULACEAE - MORNING-GLORY FAMILY

	<i>Calystegia macrostegia</i> - western bindweed	(I,V)
	<i>Calystegia peirsonii</i> - Peirson's morning-glory	(I,V)
*	<i>Convolvulus arvensis</i> – bindweed	(I)

CRASSULACEAE - STONECROP FAMILY

	<i>Dudleya lanceolata</i> - lanceleaf dudleya	(I,V)
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CUCURBITACEAE - GOURD FAMILY

	<i>Cucurbita foetidissima</i> - coyote-melon, calabazilla	(I,V)
	<i>Marah macrocarpus</i> - wild cucumber	(V)

CUSCUTACEAE - DODDER FAMILY

	<i>Cuscuta californica</i> - California dodder	(I,V)
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EUPHORBIACEAE - SPURGE FAMILY

	<i>Chamaesyce albomarginata</i> - rattlesnake spurge	(I,V)
	<i>Chamaesyce polycarpa</i> - small-seed sand mat	(V)
	<i>Eremocarpus setigerus</i> – doveweed	(I,V)
*	<i>Ricinus communis</i> - castor-bean	(V)

FABACEAE - PEA FAMILY

	<i>Astragalus didymocarpus</i> - common dwarf locoweed	(V)
	<i>Astragalus trichopodus</i> - Santa Barbara locoweed	(I,V)
	<i>Lathyrus vestitus</i> var. <i>vestitus</i> - wild pea	(I,V)
	<i>Lotus purshianus</i> - Spanish-clover	(V)
	<i>Lotus salsuginosus</i> - coastal lotus	(V)
	<i>Lotus scoparius</i> – deerweed	(I,V)
	<i>Lotus strigosus</i> - strigose deerweed	(I)
	<i>Lotus wrangelianus</i> - calf lotus	(V)
	<i>Lupinus bicolor</i> - Lindley's annual lupine	(V)

APPENDIX B (Cont.)

	<i>Lupinus excubitus</i> - grape soda lupine	(I)
	<i>Lupinus microcarpus</i> var. <i>densiflorus</i> - chick lupine	(V)
	<i>Lupinus succulentis</i> - arroyo lupine	(I,V)
*	<i>Medicago polymorpha</i> - California burclover	(I,V)
*	<i>Melilotus albus</i> - white sweet-clover	(V)
*	<i>Melilotus indica</i> - yellow sweet-clover	(I,V)
	<i>Trifolium albopurpureum</i> - Indian clover	(V)
	<i>Trifolium ciliolatum</i> - tree clover	(V)
	<i>Trifolium fucatum</i> - bull clover	(V)
	<i>Trifolium gracilentum</i> var. <i>gracilentus</i> - pin-point clover	(V)
	<i>Trifolium willdenovii</i> - valley clover	(V)
*	<i>Vicia villosa</i> – hairy vetch	(I)

GERANIACEAE - GERANIUM FAMILY

*	<i>Erodium cicutarium</i> - red-stemmed filaree	(I,V)
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GROSSULARIACEAE - CURRANT FAMILY

	<i>Ribes malvaceum</i> - chaparral currant	(V)
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HYDROPHYLLACEAE - WATERLEAF FAMILY

	<i>Emmenanthe penduliflora</i> - whispering bells	(I,V)
	<i>Eucrypta chrysanthemifolia</i> - common eucrypta	(I,V)
	<i>Nemophila menziesii</i> - baby blue-eyes	(V)
	<i>Nemophila pulchella</i> var. <i>puchella</i> - Eastwood's baby blue eyes	(I)
	<i>Phacelia cicutaria</i> - caterpillar phacelia	(I,V)
	<i>Phacelia viscida</i> var. <i>hispida</i> - sticky phacelia	(I,V)
	<i>Trichostema lanceolatum</i> - vinegar weed	(V)

LAMIACEAE - MINT FAMILY

*	<i>Marrubium vulgare</i> – horehound	(I,V)
	<i>Salvia apiana</i> - white sage	(I,V)
	<i>Salvia columbariae</i> – chia	(I,V)
	<i>Salvia leucophylla</i> - purple sage	(I,V)

MALVACEAE - MALLOW FAMILY

	<i>Malacothamnus fasciculatus</i> - mesa bushmallow	(V)
*	<i>Malva parviflora</i> – cheeseweed	(I,V)

NYCTAGINACEAE - FOUR O'CLOCK FAMILY

APPENDIX B (Cont.)

<i>Mirabilis laevis</i> var. <i>crassifolius</i> - wishbone-bush	(I,V)
ONAGRACEAE - EVENING-PRIMROSE FAMILY	
<i>Camissonia bistorta</i> - California sun cup	(I)
<i>Camissonia boothii</i> - Booth's evening-primrose	(I,V)
<i>Camissonia californica</i> - mustard primrose	(I,V)
<i>Camissonia hirtella</i> - field sun cup	(V)
<i>Clarkia purpurea</i> - winecup clarkia	(V)
<i>Clarkia unguiculata</i> - elegant clarkia	(I,V)
<i>Epilobium canum</i> - California fuchsia	(V)
PAPAVERACEAE - POPPY FAMILY	
<i>Eschscholtzia californica</i> - California poppy	(I,V)
PLANTAGINACEAE - PLANTAIN FAMILY	
<i>Plantago erecta</i> - dot-seed plantain	(V)
POLEMONIACEAE - PHLOX FAMILY	
<i>Eriastrum sapphirinum</i> ssp. <i>sapphirinum</i> - sapphire eriastrum	(V)
<i>Gilia angelensis</i> - angel gilia	(I,V)
<i>Gilia capitata</i> ssp. <i>abrotanifolia</i> - ball gilia	(V)
<i>Navarretia</i> sp. <i>nova</i> - navarretia	(V)
POLYGONACEAE - BUCKWHEAT FAMILY	
<i>Chorizanthe staticoides</i> - turkish rugging	(I,V)
<i>Eriogonum cithariforme</i> – annual buckwheat	(V)
<i>Eriogonum elongatum</i> - long-stemmed buckwheat	(I,V)
<i>Eriogonum fasciculatum</i> - California buckwheat	(I,V)
<i>Eriogonum gracile</i> - slender woolly buckwheat	(I,V)
<i>Eriogonum</i> sp. – buckwheat	(V)
* <i>Polygonum arenastrum</i> - common knotweed	(V)
<i>Pterostegia drymarioides</i> - California threadstem	(I,V)
* <i>Rumex crispus</i> - curly dock	(I)

APPENDIX B (Cont.)

ROSACEAE - ROSE FAMILY

<i>Adenostoma fasciculatum</i> – chamise	(V)
<i>Heteromeles arbutifolia</i> – toyon	(I,V)
<i>Prunus ilicifolia</i> - holly-leaf cherry	(V)

RUBIACEAE - MADDER FAMILY

<i>Galium angustifolium</i> - narrow-leaved bedstraw	(I,V)
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SALICACEAE - WILLOW FAMILY

<i>Populus fremontii</i> - Fremont's cottonwood	(V)
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SCROPHULARIACEAE - FIGWORT FAMILY

<i>Antirrhinum coulterianum</i> - white snapdragon	(I,V)
<i>Castilleja affinis</i> - coast paintbrush	(I,V)
<i>Castilleja exserta</i> - common owl's-clover	(I,V)
<i>Castilleja foliolosa</i> - woolly Indian paintbrush	(V)
<i>Collinsia heterophylla</i> - Chinese houses	(I)
<i>Keckiella cordifolia</i> - heart-leaf penstemon	(I,V)
<i>Mimulus aurantiacus</i> - bush monkeyflower	(I,V)
<i>Verbascum thapsus</i> – mullein	(I)

SOLANACEAE - NIGHTSHADE FAMILY

<i>Datura wrightii</i> - western jimsonweed	(I,V)
* <i>Nicotiana glauca</i> - tree tobacco	(I,V)
<i>Solanum douglasii</i> - white nightshade	(V)
* <i>Solanum eleagnifolium</i> - silver leaf horse-nettle	(I)
<i>Solanum xanti</i> - chaparral nightshade	(I,V)

TAMARICACEAE - TAMARISK FAMILY

* <i>Tamarix ramosissima</i> - Mediterranean tamarisk	(V)
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VERBENACEAE - VERVAIN FAMILY

<i>Verbena lasiostachys</i> - western verbena	(V)
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ZYGOPHYLLACEAE - CALTROP FAMILY

* <i>Tribulus terrestris</i> - puncture vine	(V)
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APPENDIX B (Cont.)

ANGIOSPERMAE (MONOCOTYLEDONES)

LILIACEAE - LILY FAMILY

*	<i>Asphodelus fistulosus</i> - hollow-stem asphodel	(V)
	<i>Bloomeria crocea</i> - common goldenstar	(V)
	<i>Calochortus clavatus</i> var. <i>gracilis</i> - slender mariposa lily	(V)
	<i>Dichelostemma capitata</i> - blue dicks	(I,V)
	<i>Yucca whipplei</i> - our lord's candle	(I,V)

POACEAE - GRASS FAMILY

	<i>Achnatherum coronatum</i> - giant needlegrass	(I)
*	<i>Avena barbata</i> - slender oat	(V)
*	<i>Avena fatua</i> - wild oat	(I,V)
	<i>Bromus carinatus</i> - California brome	(I,V)
*	<i>Bromus diandrus</i> - ripgut grass	(I,V)
*	<i>Bromus hordeaceus</i> - soft chess	(I,V)
*	<i>Bromus madritensis</i> ssp. <i>rubens</i> - foxtail chess	(I,V)
*	<i>Bromus tectorum</i> - cheat grass	(V)
	<i>Distichlis spicata</i> - salt grass	(I,V)
*	<i>Hordeum murinum</i> - glaucous foxtail barley	(V)
*	<i>Lamarckia aurea</i> - goldentop	(V)
	<i>Leymus condensatus</i> - giant ryegrass	(I,V)
	<i>Leymus tritocoides</i> - beardless wild rye	(V)
	<i>Melica imperfecta</i> - California melic	(I,V)
	<i>Muhlenbergia microsperma</i> - littleseed muhly	(I)
	<i>Nassella cernua</i> - nodding needlegrass	(V)
	<i>Nassella lepida</i> - foothill stipa	(I,V)
	<i>Nassella pulchra</i> - purple needlegrass	(V)
*	<i>Piptatherum miliaceum</i> - smilo grass	(I,V)
	<i>Poa secunda</i> - Malpais bluegrass	(V)
*	<i>Polypogon monspeliensis</i> - rabbit's-foot grass	(I)
*	<i>Schismus arabicus</i> - schismus	(V)
*	<i>Schismus barbatus</i> - Mediterranean schismus	(I,V)
	<i>Vulpia microstahys</i> var. <i>pauciflora</i> - Pacific fescue	(V)

APPENDIX B (*Cont.*)

- * *Vulpia myuros* - rattail fescue (V)
- Vulpia octoflora* - six-weeks fescue (V)

TYPHACEAE - CATTAIL FAMILY

- Typha domingensis* - southern cattail (V)
- * *signifies introduced (non-native) species*