1.0 INTRODUCTION

The County of San Diego owns or is in the process of acquiring key lands within the Multiple Species Conservation Program (MSCP) preserve area. The MSCP Biological Monitoring Plan requires monitoring of covered plant species. The County of San Diego was awarded two Natural Communities Conservation Planning (NCCP) Program Local Assistance Grants to accomplish the first phase of the monitoring program, i.e., collecting baseline data for covered plant species. The study area of this grant was amended to include lands in San Vicente (Boys and Girl's Club) Ecological Reserve that were originally included in the statement of work for the NCCP Local Assistance grant No. P0050008. The lands in the total amended study area, from north to south are open space areas in Santa Fe Valley, County-owned portions of Lusardi Creek, open space areas conveyed to the County of San Diego in 4S Ranch, San Vicente Open Space Preserve, McGinty Mountain preserve lands, Hollenbeck Canyon Wildlife Area, and lands north and south of the eastern arm of Otay Lakes. Portions of Rancho Jamul Ecological Reserve were also surveyed.

Subcontractors (Note: "Subcontractors includes Temporary Expert Professionals hired as County of San Diego staff for the duration of the grant period) with expertise in botanical surveying methods were selected by the County of San Diego to complete the tasks. County staff assisted the subcontractors in the field monitoring. Three subcontractors were hired to complete the sensitive plant monitoring and vegetation mapping. The areas they surveyed are outlined in Table 1.0

Table 1.0 Preserve areas and associated field biologists

Preserve Area	Field Biologist
Santa Fe Valley	Fred Roberts
Lusardi Creek	Fred Roberts
4S Ranch	Fred Roberts
San Vicente Open Space Preserve	Fred Sproul
McGinty Mountain	EDAW, Inc. (John Messina)
Hollenbeck Canyon & portions of Rancho Jamul	Fred Sproul
Otay Lakes	Fred Roberts

Baseline plant surveys were carried out on over 12,500 acres of land in the County of San

Diego that are currently within the MSCP Preserve. The surveys included the location and mapping of rare plants and also an update of the vegetation mapping in the preserve areas. The Lake Hodges Segment surveyed included preserve lands in Santa Fe Valley, 4S Ranch, and Lusardi Creek. The Metro-Lakeside-Jamul Segment surveyed included lands in the Hollenbeck Canyon Wildlife Area and portions of Rancho Jamul Ecological Reserve as well as preserve area on McGinty Mountain. The South County Segment was surveyed along the northern and southern portions of the eastern arm of Otay Lakes in areas where the County of San Diego possess Irrevocable Offers of Dedication.

County staff prepared a draft report as well as interim databases that were submitted to the wildlife agencies, along with digital data, that described the findings of the field efforts after the first year of surveying. This final report and associated appendices fulfill the requirements of this two-year grant and provide recommendations for management and future monitoring.

Plate 1.0 San Vicente Open Space Preserve

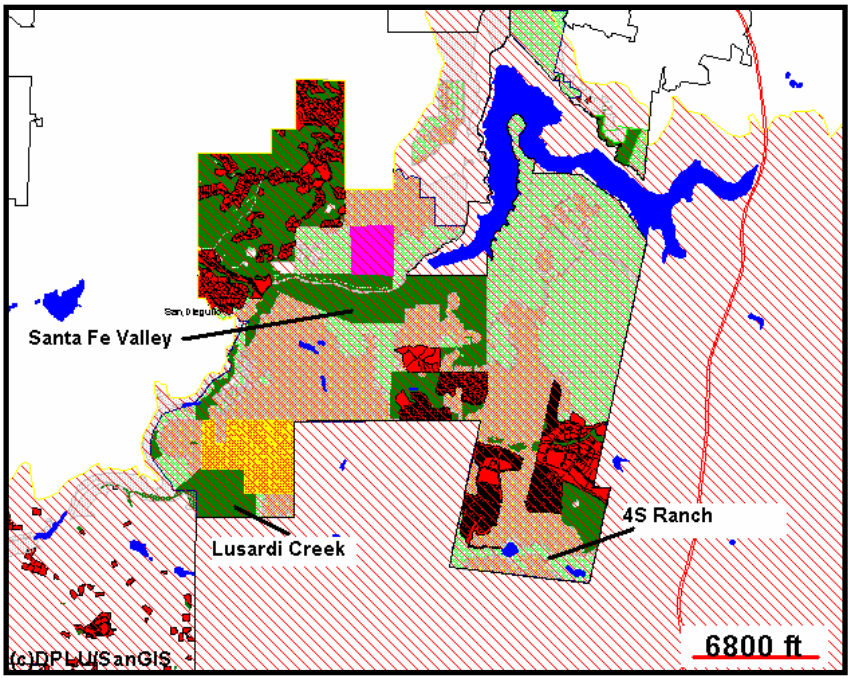
2.0 STUDY AREA

The lands in the total amended study area, from north to south are open space areas in Santa Fe Valley, County-owned portions of Lusardi Creek, open space areas conveyed to the County of San Diego in 4S Ranch, San Vicente Open Space Preserve, McGinty Mountain preserve lands, Hollenbeck Canyon Ecological Reserve and portions of Rancho Jamul, and lands north and south of the eastern arm of Otay Lakes. The following is a brief description of each study area.

Lake Hodges Segment Preserve Areas:

The Lake Hodges Segment surveyed included preserve lands in Santa Fe Valley, 4S Ranch, and Lusardi Creek. The County of San Diego and The Environmental Trust own the Santa Fe Valley preserve areas. The County of San Diego is also in ownership of the four parcels that comprise the approximately 200-acre Lusardi Creek open space preserve. Lands in 4S Ranch that are identified as future open space according to the specific plan maps are being dedicated to the County of San Diego as final maps are recorded in the planning approval process. At the time of the field surveys the County of San Diego had access to the open space areas in the southern portion of 4S Ranch where Lusardi Creek crosses through the preserve.

Fig 2.0 Open space areas surveyed in Lake Hodges Segment of MSCP Subarea



The Santa Fe Valley, Lusardi Creek, and 4S Ranch preserve areas fall on the cusp of two ecoregions (as defined by Thomas Oberbauer, County of San Diego for the Species Distribution Model utilized in the development of the MSCP). These two regions are Central Coast and Central Valley, which lie generally at an elevation of 500-1000 feet above sea level in these areas. These areas are at the northern extent of these ecoregions. The annual rainfall in the area is typically in the range of 12 – 15 inches. An estimated 1,400 acres of permanent open space have been designated in the Santa Fe valley and Lusardi Creek areas, while an estimated 1,870 acres of permanent open space occur on 4S Ranch, approximately 200 acres of which was surveyed.

Santa Fe Valley is situated along Del Dios Highway along the San Dieguito River extending from just east of Calle Ambiente east to near the Lake Hodges Dam and 4S Ranch, south to Camino de Santa Fe. The terrain is rugged, with steep canyon walls along the south side of the San Dieguito River extending east and south into a series of relatively steep hills. The San Dieguito River itself consists of a relatively wide rocky wash. The southeastern most area consists of a relatively gentle hillside. The elevation varies from about 35 to 337 meters (115 feet to 1105 feet). The vegetation along the San Dieguito River is mostly riparian and consists of willow woodland, willow scrub, freshwater marsh, sycamore-oak woodland, oak woodland, and ornamental eucalyptus forests. The slopes above the San Dieguito River are primarily dense chaparral dominated by ceanothus species with scattered pockets of coastal sage scrub, barrens, and native grassland. The eastern portion of the area is mostly a mixture of ceanothus or chamise chaparral and coastal sage scrub on the slopes with annual and southern needlegrass grassland in the valleys.

A smaller, east-west running area of Santa Fe Valley is located north of the Del Dios Highway along an aqueduct. This parcel is dominated by steep south-facing slopes ranging from about 43 to 213 meters (140 feet to 700 feet elevation). The vegetation within this parcel is primarily annual grassland and burned coastal sage scrub with sumac chaparral along ravines. The soils within this parcel primarily belong to the San Miguel-Exchequer rocky silt loams soils series. One additional isolated parcel is located along the west side of a small private road off of Four Gee Road. This parcel is situated along a south-facing ravine and dominated by chaparral and coastal sage scrub.

Lusardi Creek open space preserve consists of a roughly rectangular area east of Solana Beach (See Figure 2.0). Black Mountain Ranch borders it to the south, Rancho Santa Fe and Fairbanks Ranch to the west, and a rural estate development along Artesian Road to the north. Lusardi Creek flows from near the southeastern boundary west through the southwestern portion of the parcel. Three relatively level mesas dominate Lusardi Creek open space preserve with gentle or steep slopes falling toward Lusardi Creek. The eastern most portion of the preserve is dominated by a rugged series of slopes bordering a south-flowing canyon. The elevation of Lusardi Creek varies from about 20 to 113 meters (65 to 370 feet). Lusardi Creek is dominated by riparian vegetation. The two western most mesas are dominated by chamise chaparral. The easternmost mesa is dominated by open grassy coastal sage scrub with weak mima mounds.

The southern portion of 4S Ranch is a relatively narrow parcel with an east to west axis following upper Lusardi Creek (See Figure 2.0). The terrain is generally fairly gentle with the highest slopes in the east and a central lake. The elevation varies from 110 to 308 meters (360 to 1,010 feet). The eastern hills are dominated by coastal sage scrub that has recently burned. The central portion is dominated by annual grassland that has been heavily invaded by wild artichoke thistle following a narrow marshy area with a lake. The western portion consists of low hills dominated by coastal sage scrub and a gentle north-facing slope dominated by southern needlegrass grassland.

San Miguel-Exchequer rocky silt loam was the most widely distributed soil type within the study area. However primarily Olivehain cobbly loams and Huerhuero loams soils dominate portions of Lusardi Creek. Portions of 4S Ranch south were dominated by Olivehain cobbly loams, Diablo Olivehain, Friant rocky fine sandy loam, and Huerhuero loam soils.

Metro–Lakeside-Jamul Segment Preserve Areas:

The Metro-Lakeside-Jamul Segment surveyed included lands in the Hollenbeck Canyon Wildlife Area and portions of Rancho Jamul Ecological Reserve as well as the preserve area on McGinty Mountain and San Vicente Ecological Reserve further to the north.

Fig 2.1.1
Open space areas surveyed in the southern region of the Metro-Lakeside-Jamul Segment of MSCP Subarea

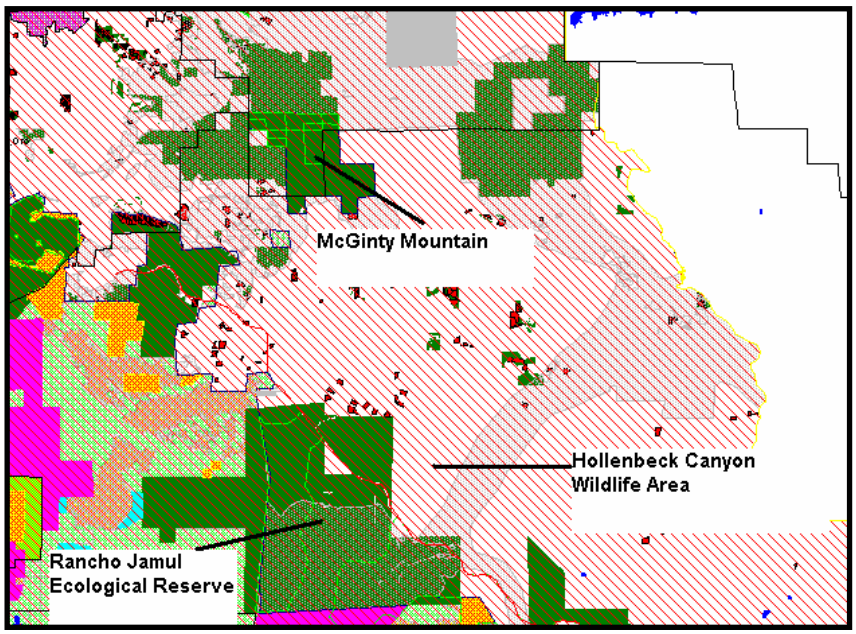
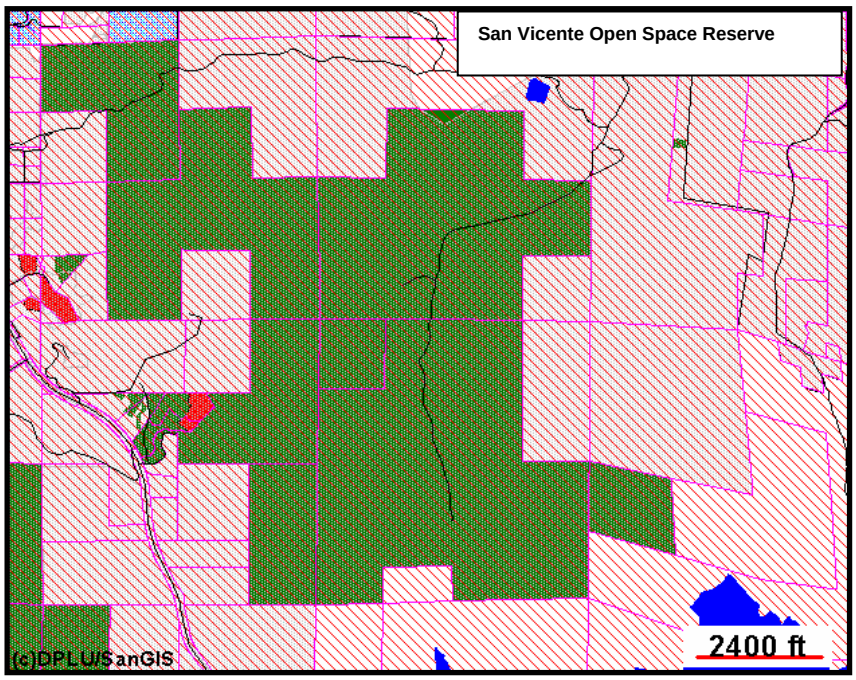


Fig 2.1.2
Open space areas surveyed in the northern region of the Metro-Lakeside-Jamul Segment of MSCP Subarea



The San Vicente Open Space Preserve is located approximately two miles northwest of the San Vicente Reservoir. It consists of very high or high habitat value according to the Habitat Evaluation Model prepared for the MSCP Subarea Plan. The vegetation communities onsite consist of Diegan coastal sage scrub, southern mixed chaparral, and coastal sage-chaparral

scrub. The site covers approximately 1,375 acres. The County of San Diego is in the process of swapping land under their ownership in the Hollenbeck Canyon area of Jamul to the State Department of Fish and Game (CDFG), for the San Vicente property owned by CDFG. The San Vicente property was formerly known as the Boys and Girls Club property and is in the MSCP pre-approved mitigation area of the Metro-Lakeside-Jamul segment of the County's MSCP Subarea plan. The Quino Checkerspot butterfly was recorded in the San Vicente Open Space Preserve in 2001. This butterfly was listed as endangered by the federal U.S. Fish & Wildlife Service in 1997.

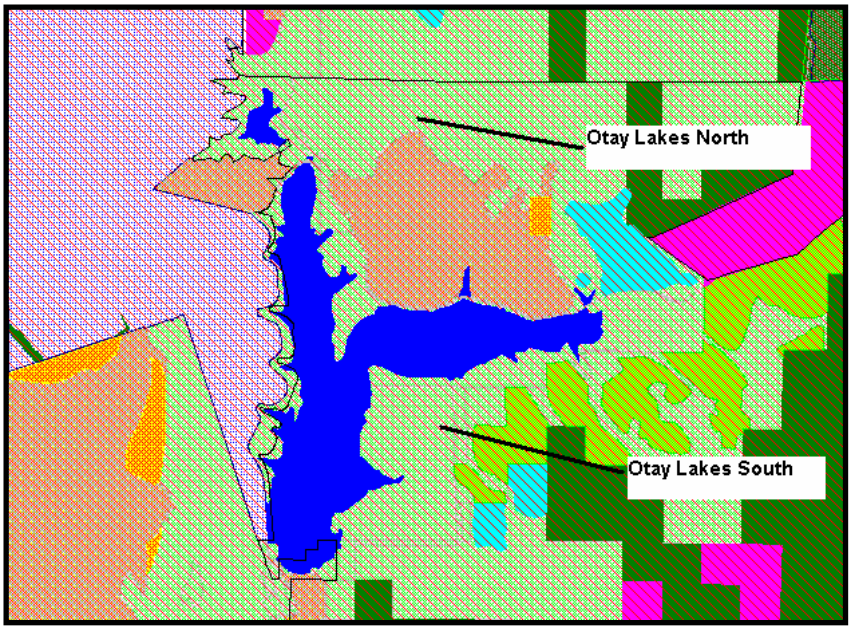
McGinty Mountain is located between Jamacha and Dehesa south of the Sweetwater River in the Metro-Lakeside-Jamul Segment of the MSCP. The preserve is owned by numerous entities including the California State Department of Fish and Game, the County of San Diego, The Environmental Trust, and The Nature Conservancy. These contiguous parcels constitute a preserve system that is approximately 2,000 acres. The area is located in the Southern Foothills ecoregion and receives approximately 12 – 15 inches of precipitation per annum. The peak of the mountain is located at approximately 2,180 feet above sea level.

Hollenbeck Canyon Wildlife Area and Rancho Jamul Ecological Reserve are in the ownership of the California Department of Fish and Game. These properties are located east and west of State Route 94 southeast of the community of Jamul. The Daleys who carried out some agricultural uses on the land formerly owned the properties. Hollenbeck Canyon Wildlife Area and Rancho Jamul Ecological Reserve both consist of approximately 4,000 acres of flat areas rising to foothills of larger mountain ranges. The two preserves occur in the Southern Foothills ecoregions as described by Thomas Oberbauer. The general elevation range for these two preserves is 500 - 1,500 feet above sea level. The annual precipitation in the region is typically 12-25 inches.

South County Segment Preserve Areas:

The South County Segment was surveyed along the northern and southern portions of the eastern arm of Otay Lakes. The County of San Diego possesses Irrevocable Offers of Dedication. These areas are located in the Southern Valley ecoregion and have annual precipitation of 12 – 15 inches.

Fig 2.2
Open space areas surveyed in South County Segment of MSCP Subarea



The northern preserve area is roughly rectangular with the long axis running east along the southwest flanks of Jamul Mountain northeast of Otay Lake (See Figure 2.2). The terrain is relatively rugged and dominated by south-facing slopes and ravines. The elevation ranges from 177 to 494 meters (580 to 1,620 feet). The vegetation is primarily coastal sage scrub with scattered barrens, rocky outcrops and small pockets of chamise and ceanothus chaparral. The coastal sage is dominated by Munz's sage (*Salvia munzii*) and San Diego sunflower (*Viguiera laciniata*).

The southern preserve area is situated on the northwest flanks of Otay Mountain beyond the southeast shore of Otay Lake. This area consists of a mixture of gentle and steep hillsides and mesas bisected by a relatively shallow south to northwest running canyon. The elevation varies from 110 to 433 meters (360 to 1,420 feet). The vegetation is mostly native grassland, coastal

sage scrub, chamise chaparral, and cypress forest. Much of the parcel burned several years ago and grasses dominate nearly all habitats. A narrow rocky wash follows the largest canyon. San Miguel-Exchequer rocky silt loam was the most widely distributed soil type within the study area. The eastern portion of Otay Lakes North consisted of Friant rocky fine loam soils.

3.0 METHODS

Direct surveys for rare plants were conducted through out the study area generally from mid March through July with additional one-day surveys in November 2001, and in the spring of 2002. The weather during the majority of the survey period in 2001 was dry with the exception of rain day on April 9th. Generally the weather was cool and cloudy in March and April in 2001 gradually becoming more clear and hot by late May and June in 2001. The weather in 2002 was extremely dry due to severely below average rainfall amounts. The peak of the bloom on Lusardi Creek occurred in late April 2001 while the peak bloom occurred in May 2001 for the Santa Fe Valley Parcel and 4S Ranch South. By early June 2001 most of the rare plants were concentrated along watercourses in the Lake Hodges Segment. The extremely dry weather in 2002 limited the range of species identified despite field effort.

Surveys were conducted primarily on foot favoring ridge lines and barrens, or in the case of the Otay Mountains parcel, washes. Each colony of rare plants located was given a unique identifier code (see Appendix A). Rare plant sites, when located were delineated specifically or generally. For the majority of rare plants encountered locations were marked by recording a "point" file or "polygon" file using a Tremble GeoExplorer II or III handheld GPS unit. The only exception to this was on McGinty Mountain for which a Sokkia GPS unit was utilized. The point method was employed wherever the rare plant colony or stand was represented by a single individual or a small group of individuals that did not cover an appreciable area. Approximately 20 points were taken for each point file. A "polygon" was created when the rare plants formed a well-defined patch or extended group that could be delineated. Walking the perimeter of the identifiable rare plant population created the polygon. A point was also used occasionally where a second species was noted within the polygon of another species. Colonies were recognized as distinct if they were more than 15 meters apart or easily separated on field maps at a 1:6000 scale. The GPS data was taken to the San Diego County offices on a daily or weekly basis and downloaded into the County GIS system.

The approximate abundance of plants per colony (or stand) was estimated by direct count or through estimation if the numbers exceeded 500 to 1,500 individuals. Notes were taken on the ecological features (exposure, aspect, soils, associated species) for each colony (or stand). In species such as western dichondra (*Dichondra occidentalis*), where number is either

undeterminable or irrelevant, site coverage was estimated.

Field mapping was implemented where either the species was common enough on a parcel that taking GPS data would have taken too much time and effort, rugged terrain restricted accessibility, or for where the GPS unit would not lock on a signal. Typically, GPS records were not made for wart-stemmed ceanothus (*Ceanothus verrucosus*), Munz's sage (*Salvia munzii*), ashy spike moss (*Selaginella cinerascens*), or San Diego sunflower (*Viguiera laciniata*). Locations for these species were noted on a field map. Aspect and vegetation information was recorded where possible. In most cases, general site data does not include estimated numbers of individuals or coverage, or associated species.

Representative vouchers were taken for the majority of rare plant species with at least one representative for each separate parcel. Vouchers are noted under specific colonies (or stands) in Appendix I. Vouchers will be deposited at the San Diego County Natural History Museum (SD).

County vegetation maps or vegetation maps submitted as part of a project application for each of the preserve areas were reviewed. Modifications to these maps were made where errors, corrections, or minor changes were appropriate or needed. The modified vegetation maps were given to County staff where the updated vegetation mapping data was digitized and entered into the County's GIS database.

An appendix (Appendix A) was created using Microsoft Access linked to the GIS database which collated all the data from the entire study area. This lists the data alphabetically by *location*, i.e., study area name, by *date*, i.e., from the earliest to the latest, and subsequently alphabetically by the scientific name of the *plant*, i.e., the Latin binomial. The rover file numbers are also listed on this appendix as it the botanist's name that created the file. There is also a separate column that estimates the number of individuals for each point or polygon file created. This data could be extracted from the notes section of the rover file in some cases.

GIS mapping products for each of the preserve areas were created using Arc GIS 8.1 by County GIS staff.

4.0 DISCUSSION AND RESULTS

43 species of rare plants were recorded as present of the preserve areas during the survey period. A list of these including the locations at which they occurred can be seen in Table 2.0.

Table 2.0 List of rare plants and ranking reported in the study area over the two-year period

Scientific Name	Common Name	Rank	4	L	F	V	M	H	N	S
Acanthomintha illicifolia	San Diego thorn-mint	CE, CNPS 1					X	X		
Aldolphia californica	California adolphia	CNPS 2	X	X	X					X
Artemisia palmeri	San Diego Sagewort	CNPS 2				X				
Artostapylos glandulosa ssp. *crassifolia*	Del Mar Manzinita	FE, CNPS 1B		X						
Atriplex coulteri	Coulter's saltbrush	CNPS 1B								X
Brodiaea orcutti	Orcutt's brodiaea	CNPS 1B								X
Carex spissa	San Diego sedge	Common						X		
Caulanthus heterophyllus	Buck's Jewelflower	Locally rare				X				
Ceanothus cyaneus	Lakeside ceanothus	CNPS 1				X				
Ceanothus verrucosus	wart-stemmed ceanothus	CNPS 2			X					
Chamaebatia australis	Southern Mountain Misery	CNPS 4					X			
Chorizanthe procumbens ssp. *albiflora*	Prostate spineflower	CNPS 4						X		
Clarkia delicata	Delicate Clarkia	CNPS 2					X			
Comarostaphylis d. ssp. *diversifolia*	summer holly	CNPS 1B		X	X					
Convolvulus simulans	small-flowering morning glory	CNPS 4		X				X		
Cupressus forbesii	Tecate cypress	CNPS 1B								X
Dichondra occidentalis	western dichondra	CNPS 4	X	X	X				X	X
Dudleya variegata	variegated duleya	CNPS 1B	X	X	X					
Ferrocactus viridescens	San Diego barrel cactus	CNPS 2	X	X	X				X	X
Fritillaria biflora	chocolate lily	Locally rare	X							X
Haplopappus junceus [Machaeranthera juncea]	Rush-like Bristleweed	CNPS 4						X		
Harpagonella palmeri	Palmer's grappling hook	CNPS 4		X						
Hesperevax sparsiflorus	sparse-flowered evax	Locally rare								X
Iva hayesiana	San Diego marsh-elder	CNPS 2		X					X	X
Juncus acutus ssp. *leopoldii*	Spiny rush	CNPS 4	X	X					X	X
Lepidium virginicum var. *robinsonii*	Robinson's peppergrass	CNPS 1B	X	X					X	
Lilium humboldtii ssp. *ocellatum*	Humbolt's tiger lily	CNPS 4								X
Linanthus parviflorus [Cordylanthus parviflorus]	Purple bird's beak	CNPS 2						X		
Microseris douglasii var. *platycarpha*	small-flowered microseris	CNPS 4		X						

Cont.

Scientific Name	Common Name	Rank	4	L	F	V	M	H	N	S
Monardella hypoleuca ssp. *lanata*	Felt-leaved monardella	CNPS 1					X			
Monardella linoides ssp. *viminea*	willowy monardella	FE, CE, CNPS 1B								X
Muilla clevelandii	Cleveland's goldenstar	CNPS 1B	X			X				X
Nolina interrata	Dehesa beargrass	CE, CNPS 1					X			
Ophioglossum californicum	California Adder's Tongue Fern	CNPS 4				X				
Pentachaeta aurea	Golden-rayed pentachaeta	CNPS 1B	X	X	X					X
Polygala cornuta ssp. *fishiae*	Fish's Milkwort	CNPS 4					X			
Quercus dumosa	Nutall's scrub oak	CNPS 1B								X
Quercus engelmannii	Engelmann's oak	CNPS 4			X	X	X	X		X
Salvia munzii	Munz's sage	CNPS 2							X	X
Selaginella cinerascens	ashy spike moss	Locally rare	X	X	X	X			X	X
Senecio ganderi	Gander's Ragwort	CNPS 1					X			
Stemodia durantifolia	Purple stemodia / blue stemwort	CNPS 2								X
Stipa diegoensis [Achnatherum diegoense]	San Diego needlegrass San Diego stipa	CNPS 4							X	X
Viguiera laciniata	San Diego sun flower	CNPS 4						X	X	X

Status Definitions:

FE: Species designated as endangered under the federal Endangered Species Act
CE: Species designated as endangered under the state Endangered Species Act
CNPS 1B: Plants, rare, threatened or endangered in California and elsewhere
CNPS 2: Plants rare, threatened or endangered in California but more common elsewhere
CNPS 4: Plants of limited distribution. A watch list.

Preserve area abbreviations:
4: 4S Ranch open space preserve
L: Lusardi Creek open space preserve
F: Santa Fe Valley open space preserve
V: San Vicente open space preserve
M: McGinty Mountain
H: Hollenbeck Canyon Wildlife Area
N: Otay Lakes North
S: Otay Lakes South

Four species of these species; San Diego thornmint (*Acanthomintha illifolia*); Del Mar manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia*); willowy monardella (*Monardella linoides* var. *viminea*); and, Dehesa beargrass (*Nolina interrata*) are currently listed as endangered under the federal or state Endangered Species Acts. Thirty-eight of these species are listed within the California Native Plant Society's Inventory of Rare and Endangered Plants of California (Tibor

2001). Four additional species: Buck's jewelflower (*Caulanthus heterophyllus*); chocolate lily (*Fritillaria biflora*); sparse-flowered hesperevax (*Hesperevax sparsiflorus*); and, ashy spike moss (*Selaginella cinerascens*) are considered locally rare.

It is generally found that many of the rare plants found on the Lake Hodges Segment were also located within the South County Segment preserve areas, possibly because the areas are both coastal and southern regions of the valley ecoregion in San Diego County. For that reason, the two areas will be discussed together.

Lakes Hodges and South County Segments:

Twenty-nine species of rare plants were encountered during the surveys, eightenn in the Lake Hodges Segment and twenty-two in the South County Segment. The rare plants were associated with 704 separate colonies or stands. Specific colony data is detailed under Appendix A. Ten species of rare plants scattered over 82 colonies were found on the 4S Ranch South site. Fourteen species of rare plants scattered over 185 colonies were observed within the Lusardi Creek site. Nine species of rare plant scattered over 98 colonies or stands were recorded for Santa Fe Valley. Nine species of rare plants scattered over 121 colonies or stands were located in Otay Lakes North, and twenty-one species of rare plant scattered over 215 colonies or stands were recorded for Otay Lakes South.

San Diego barrel cactus (*Ferrocactus viridescens*) and ashy spike-moss (*Selaginella cinerascens*) were by far the most common and most widely encountered rare species with 121 and 110 site recorded respectively. California adolphia (*Adolphia californica*), wart-stemmed ceanothus (*Ceanothus verrucosus*), Tecate cypress (*Cupressus forbesii*), western dichondra (*Dichondra occidentalis*), Palmer's grappling hook (*Harpagonella palmeri*), Robinson's peppergrass (*Lepidium virginicum* var. *robinsonii*), San Diego needlegrass (*Stipa diegoensis*), and San Diego sun flower (*Viguiera laciniata*) were all also relatively common with between 27 and 56 recorded locations. However with the exception of western dichondra and Robinson's peppergrass, which were found on most parcels, most of these species were found on only one or two parcels. Wart-stemmed ceanothus was encountered only at Santa Fe Valley, Tecate Cypress was found only on Otay Lakes south. Palmer's grappling hook was found only at

Lusardi Creek while San Diego needlegrass and San Diego sunflower were encountered only on the Otay Lakes parcels.

Several species were found at three or fewer locations. These include Del Mar manzanita, Nuttall's scrub oak (*Quercus nuttallii*), and Coulter's saltbush (*Atriplex coulteri*) found only at Lusardi Creek; summer holly (*Comarostaphylos diversifolia* ssp. *diversifolia*) found at Lusardi Creek and Santa Fe Valley; chocolate lily found at 4S Ranch south and Otay Lakes south; Humboldt tiger lily (*Lilium humboldtii* var. *ocellatum*) found only at Otay Lakes South; and Engelmann's oak (*Q. engelmannii*) at Lusardi Creek and Santa Fe Valley.

Metro-Lakeside-Jamul Segment Preserve Areas:

A total of nineteen rare plant species were recorded within the study areas located in the Metro-Lakeside-Jamul Segment of the County of San Diego's MSCP Subarea. Seven rare plants were located on San Vicente open space preserve. McGinty Mountain preserve and Hollenbeck Canyon Wildlife Area both had a total of eight rare plant species located within the boundaries of their respective study areas.

Fourteen of the rare plant species located within the Metro-Lakeside-Jamul Segment study areas only occurred within one study area of the entire survey area. San Vicente open space preserve had the only occurrences of San Diego sagewort (*Artemisia palmeri*), Lakeside ceanothus (*Ceanothus cyaneus*), Buck's jewelflower (*Caulanthus heterophyllus*), and California Adder's Tongue Fern (*Ophioglossum californicum*). McGinty Mountain preserve had the only recorded locations of Southern mountain misery (*Chamaebatia australis*), delicate clarkia (*Clarkia delicata*), felt-leaved monardella (*Monardella hypoleuca* ssp. *Lanata*), Dehesa beargrass (Nolina interrata), Fish's milkwort (*Polygala cornuta* ssp. *Fishiae*), and Gander's ragwort (*Senecio ganderi*). Hollenbeck Canyon Wildlife Area had the only recorded locations of prostate spineflower (*Chorizanthe procumbens* ssp*. albiflora*), small-flowering morning glory (*Convolvulus simulans*), rush-like bristleweed (*Haplopappus junceus*), and purple bird's beak (*Linanthus parviflorus*)

***Acanthomintha illifolia* – San Diego thornmint**

The preferred habitat for this species is grassy openings in chaparral or sage scrub with friable or broken clay soils are the preferred habitat of this species. These small clay lenses may be associated with Las Posas or San Miguel-Exchequer soils. Typically the microhabitat favored by San Diego Thorn Mint is quite distinctive. Only spring annuals, bulbous perennials, and a few herbaceous elements such as *Sisyrinchium bellum* are found with this tiny annual. The introduced *Centaurea melitensis* often grows with it, and these spiny and superficially similar seedlings can make a quick census for the mint difficult. All sites examined have a crumbly and/or deeply fissured soil which noticeably compresses, even during the dry season, when one treads on this friable terrain. This species was located on several sites, sometimes near the edges of trails as the soil had a crumbling texture, near the summit of McGinty Mountain with population numbers estimated at over 2,250 individuals,. It was also located in Hollenbeck Canyon associated with Bosanko clay meadows with population numbers also in the thousands.

***Adolphia californica* - California Adolphia**

California adolphia is a low, spinose shrub with cream-colored flowers. It is found in association with coastal sage scrub and chaparral at 45 to 300 meters elevation from central coastal San Diego County, California, south into northwestern Baja California, Mexico. A total of 43 colonies and about 2,437 individuals of California adolphia were encountered during the survey. This species was found only at the northern parcels within Santa Fe Valley, Lusardi Creek, and 4S Ranch South. At Santa Fe Valley, a single colony of 8 individuals was located on the north side of Del Dios Highway. More colonies were anticipated in this area since it was poorly surveyed. Eight colonies supporting about 171 individuals were encountered on 4S South. These colonies are concentrated in the extreme southwestern portion of the site in coastal sage scrub and grassland. The largest population was encountered on Lusardi Creek where this shrub is relatively common, particularly on the eastern mesa. Thirty-four colonies with about 2,258 individuals were mostly associated with slopes and coastal sage scrub. About 90 percent of the adolphia was encountered during the survey was on Lusardi Creek.

***Arctostaphylos glandulosa* ssp. *crassifolia* - Del Mar manzanita**

Del Mar manzanita is a low to moderate height shrub with red bark on its stems and

branches and white, teardrop shaped flowers. This subspecies is found only in central coastal San Diego County, California, at sea level to 365 meters from Carlsbad south to Del Mar and inland to the Rancho Santa Fe area, and in northwestern Baja California, Mexico. Only a single population consisting of two separate colonies of Del Mar manzanita were encountered during the survey. About 80 individuals of this federally endangered species were estimated to occur along canyon slopes on the east side of Lusardi Creek. These plants were associated with chamise chaparral and southern maritime chaparral. The plants at Lusardi Creek have some glandular hairs but are relatively short and occur in habitat similar to Torrey Pines and the Del Mar area.

***Artemesia plameri* – San Diego Sagewort**

San Diego Sagewort is primarily found along creeks and drainages near the coast; inland it may occur in mesic chaparral conditions. Well inland near Sequan Peak this suffrutescent shrub was found in some abundance in Cieneba very rocky coarse sandy loam on a steep moist, north-facing chaparral slope. *Ceanothus leucodermis* and *Quercus berberidifolia* were the primary constituents at this locale. In its more usual riparian context, San Diego Sagewort grows within a shaded understory beneath willow, sycamore, or cottonwood. Occasionally it also is seen beneath *Quercus agrifolia*, but in decidedly mesic circumstances. This species was encountered as a large patch at head of a Coast live oak woodland in San Vicente open space preserve.

***Atriplex coulteri* - Coulter's saltbush**

The Coulter's saltbush is a low perennial, generally associated with alkaline and semi alkaline soils and clay barrens in grassland or open coastal sage scrub habitats, or soils bordering alkaline wetlands at low elevations from 3 to 460 meters elevation. It generally blooms from March and October. This species is similar to the introduced and widespread Australian saltbush (*Atriplex semibaccata*), but has red stems and lacks swollen red fruits. Coulter's saltbush is known from Santa Barbara south to San Diego County, California, the channel islands, and northwestern Baja California, Mexico. Coulter's saltbush was found only on the western mesa of Lusardi Creek. This population consists of 3 colonies and about 158

individuals. The majority of the individuals are seedlings and young plants. These colonies are growing along a dirt road. However the road does not appear to be frequently used.

***Brodiaea orcuttii* - Orcutt's brodiaea**

Orcutt's brodiaea is a scapose, purplish-blue flowered perennial originating from a bulb that blooms from May to July. It is found in cismontane woodland, closed-cone coniferous forest, chaparral, seeps, along streams, mesic grasslands, and in association with vernal pools from 30 to 1,615 meters in southern Riverside County and San Diego County, California, south into Baja California, Mexico. Orcutt's brodiaea was encountered only within the Otay Lakes South parcel on the northwestern flank of Otay Mountain within a nameless canyon that flows into Bauschalaugh Cove. The portion of the population within County lands consists of about 8 colonies and about 162 individuals. This population extends off County lands to the north. The plants typically were growing among rocks in saturated clay along the margin of a small stream or on low grassy benches bordering a wash. The flowers are somewhat smaller and paler here than in populations in northern San Diego County. Typically, only a portion of *Brodiaea* populations are detectable in any given year so it is likely this population is considerably larger than reported in this document.

***Caulanthus heterophyllus* - Buck's Jewelflower**

Chaparral and sage scrub are both utilized by Buck's Jewelflower. This annual is a fire follower which may lie dormant as seed in areas of mature chaparral or sage scrub. Hambright gravelly clay loams are utilized in Piedre de Lumbre Canyon, and the Roblar site is mapped as Cieneba very rocky coarse sandy loam. In the Vail Lake region of western Riverside County, the habitat is a rugged Chamise Chaparral with sandy openings; on the Gavilan Plateau this vegetation is interspersed with Juniper Woodland. This plant was found at two locations in San Vicente open space preserve, one consisting of approximately 10 individuals and the other consisting of over 50 individuals with many more plants scattered in a rocky ridge that extends northward to the top of the nearby canyon.

***Ceanothus cyaneus* – Lakeside ceanothus**

This plant typically favors Inland Mixed Chaparral, specifically in the region from Crest to the Lakeside foothills, includes the known habitat and range for the Lakeside Lilac. Hybrid shrubs seem to occur regularly in the latter area. Typically, this *Ceanothus* occurs in a dense, almost impenetrable chaparral with a mix of Chamise and other shrubs such as manzanita. This chaparral is taller growing and more mesic than other woody scrub areas in the region. At Crest the soil types are mapped as Acid Igneous rock land and Cieneba very rocky coarse sandy loam. One population of this species was found to occur in San Vicente open space preserve.

***Ceanothus verrucosus* - wart-stemmed ceanothus**

Wart-stemmed ceanothus is a white-flowered shrub that blooms from December through April. It is found in chaparral from sea level to 380 meters in north San Diego County, California, from the vicinity of Lake Hodges south into northwestern Baja California, Mexico. This species was encountered only within the Santa Fe Valley area. Thirty-three separate colonies were found primarily on the slopes above the San Dieguito River and in scattered colonies in the southeastern portion of Santa Fe Valley adjacent to 4S Ranch. About 1,548 individuals were counted during the survey. However, no estimates were made for the majority of the colonies mapped. The population total is likely to be considerably larger than here estimated as after the shrub blooms when it is relatively difficult to separate from other species except at close range.

***Chamaebatia australis* - Southern Mountain Misery**

This sprawling shrub, which often forms impenetrable thickets, is apparently restricted to gabbroic or metavolcanic derived soils. It may be found in conjunction with *Pickeringia montana*, and is typically surrounded by Chamise Chaparral. San Miguel-Exchequer rocky silt loams are a preferred soil type on Otay Mountain and San Miguel Mountain. Approximately 100 individuals were located as one population on McGinty Mountain, associated with *Adenostoma fasciculatum*, *Arctostaphylos glandulosa ssp. glandulosa*, *Tetracoccus dioicus*, *Rhamnus crocea*, and *Quercus berberidifolia*. The line feature, which can be seen on the associated

McGinty Map, defines the approximate southern boundary of this population. The population extends north to the next defined drainage. Another population of approximately 15 individuals combined was recorded on McGinty associated with *Adenostoma fasciculatum*, *Arctostaphylos glandulosa ssp. glandulosa*, *Salvia clevelandii*, *Tetracoccus dioicus*, *Cneridium dumosum*, *Rhamnus crocea*, *Xylococcus bicolor*, *Yucca schidigera*, *Yucca whipplei*, *Nassella pulchra*, *and Bloomeria crocea*.

***Chorizanthe procumbens* ssp*. albiflora* - Prostrate Spineflower**

Sandy openings in chamise chaparral are typical locales for the Prostrate Spineflower; however, it may also occur in sage scrub. It regularly occupies recently disturbed microhabitats such as the shoulders of dirt roads or areas of lightly brushed chaparral. The soils utilized are Crouch rocky coarse sandy loam; Fallbrook sandy loams; and Cieneba-Fallbrook rocky sandy loams. This plant was located in Hollenbeck Canyon and had approximately 50 plants growing in a small clearing of CSS/Chapparal. The population continued with the road to the west (see associated map for Hollenbeck Canyon).

***Clarkia delicata* - Delicate Clarkia**

The periphery of oak woodlands and cismontane Chaparral haunts are the favored habitats for this annual. Soils at the Black Mountain-Lusardi site are mapped as Bancas stony loam; the population here was situated primarily on very old roadcuts in partial shade. Locales where observed were partially shaded by tree canopy or large shrubs, and typically were vernally mesic situations with substantial peripheral annual and herbaceous spring growth. Approximately 75 individuals were recorded at one site on McGinty Mountain, associated with *Scrophularia californica*, *Eriogonum fasciculatum*, and *Bromus diandrus*. The GPS line feature demarcates the northern (downslope) boundary of population. All individuals were within 20 feet upslope of this line (see associated map for arc information).

***Comarostaphylis diversifolia* ssp. *diversifolia* - summer holly**

Summer Holly is a white-flowered shrub that blooms from May though June. Summer holly

typically is found in chaparral from 30 to 550 meters in elevation. It is found from southern Orange and Riverside County south through coastal San Diego County, California, into northwestern Baja California, Mexico. This species was encountered in low numbers at two of the study sites. A total of 6 individuals were detected. One small colony of 3 moderate sized individuals occurs within a small east-flowing draw on the east side of Santa Fe Valley. Another colony of perhaps 3 large individuals was observed from a distance on the southern border of Lusardi Creek in mixed coastal sage scrub and chaparral. This species is best surveyed in June when its large clusters of flowers allow for easy separation from the similar and much more common mission manzanita (*Xylococcus bicolor*).

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

The small-flowered morning-glory is a white-flowered annual herb that typically blooms between March and June. It is found from about 30 to 700 meters elevation coastal sage scrub and grassland communities with clay or serpentine soils. It is known to occur in locations throughout southern California. Only two colonies and about 41 individuals were found during the survey. These were found within the Lusardi Creek parcel in heavy clay soils and native grassland just north of Lusardi Creek. It is anticipated that this species also occurs along the east side of the Santa Fe Valley parcel. Suitable habitat was also found within the Otay Lakes South parcel. This plant was also located on Hollenbeck Canyon where heavily cracked clay dominated with *Hemizonia fasiciulata*, *Microseris* spp., *Plantago erecta.* This site is located near an historic homestead site where a Eucalyptus and Peruvian pepper tree still stand nearby. Sensitive plant: *Convolvulus simulans* was dominant in herb understory.

***Cupressus forbesii* - Tecate cypress**

Tecate cypress is a shrub or small tree that occurs in chaparral or closed cone coniferous forest from 255 to 1500 meters elevation. It is known to occur from fewer than 5 locations in Orange and San Diego County, California. Additional populations are known from Baja California, Mexico. Tecate cypress was encountered only within the Otay Lakes South parcel. About 27 separate colonies were mapped. A partial population estimate includes about 2,380 individuals occurring primarily along the canyon that flows into Bauschalaugh Cove. The

number of individuals in colonies that were not recorded with a GPS unit was for the most part not estimated. These colonies were observed from a distance. Several other colonies that were not mapped are known to occur on this parcel. Very few mature individuals were encountered in 2001. The vast majority of the individuals were newly sprouted or no more than a few years old. The average height of the individuals was about 1.5 meters and most were growing in dense stands. Evidence of large burned and dead individuals was observed in several colonies. Very large stands of Tecate cypress occur outside County lands on BLM lands to the southeast.

***Dichondra occidentalis* - western dichondra**

Western dichondra is a low creeping perennial with obscure flowers that bloom from March through July. It occurs in coastal sage scrub, chaparral, cismontane woodland, and grasslands near the coast from Santa Barbara County south through San Diego County, California, into northwestern Baja California, Mexico. A total of 21 separate colonies of western dichondra were encountered during the survey. This species was encountered at all sites with the exception of 4S Ranch North. Generally populations were situated among rocks or under shrubs particularly in burned coastal sage scrub. Two sites were encountered with the southeastern portion of Santa Fe Valley and a single population was found on Lusardi Creek. Seven colonies were found at 4S Ranch South, primarily on the east side but two were associated with a cobbly knoll in native grassland in the extreme southwestern portion of the site. Eleven colonies were found on the Otay Lakes sites, 5 on the northern parcel and 6 on the southern parcel.

***Dudleya variegata* - variegated dudleya**

Variegated dudleya is a low, ephemeral succulent perennial that originates from a corm. It blooms from May to June and is found in chaparral, coastal sage scrub, southern needlegrass grassland, and about vernal pools at 3 to 550 meters in San Diego County, California, and northwestern Baja California, Mexico. Fourteen colonies and about 2,029 individuals of variegated dudleya were encountered during the survey. Variegated dudleya was found on three of the sites: Santa Fe Valley with 6 colonies and about 295 individuals; Lusardi Creek with

5 colonies and about 1,694 individuals, and on 4S Ranch South with 3 colonies and 40 individuals. These populations represent some of the northernmost populations of the species. One additional population is known from 4S Ranch but was not within the study area. The Santa Fe Valley population is located along the eastern boundary of the parcel adjacent to 4S Ranch. The Lusardi population is mostly concentrated on the eastern flank of the eastern mesa. The population at 4S Ranch south is located on a hilltop and adjacent slopes in the extreme southwestern corner of the site. The population at 4S Ranch is larger than here reported. Variegated dudleya is also likely to occur on the Otay Lakes South parcel.

***Ferrocactus viridescens* - San Diego barrel cactus**

San Diego barrel cactus is a low, rounded and spiny succulent perennial that blooms from May though June. It occurs at 3 to 450 meters elevation in coastal sage scrub, chaparral, and grassland, often in heavy clay, from northern San Diego County, California, south into Baja California, Mexico. A total of some 121 separate colonies with about 1,140 individuals were identified within the study area. This was one of the most widespread species within the Study Area with colonies detected on all sites with the exception of 4S Ranch North. The largest number of colonies (47) was recorded on Lusardi Creek while the largest number of individuals (446) was recorded on 4S Ranch South.

***Fritillaria biflora* - chocolate lily**

Chocolate lily is a dark brown to greenish-brown flowered perennial that originates from a bulb. It blooms from February to May. Chocolate lily is found thoughout much of cismontane California mostly below 760 meters in heavy clay soil most frequently associated with native grassland. This species is uncommon in southern California. A total of two colonies with about 69 individuals were recorded during the survey. A small colony of about 3 individuals were found in the southwest corner of 4S Ranch south in native grassland. A larger colony consisting of at least 66 individuals was located in the central portion of Otay Lakes south. This latter population was recorded in November when only fruits were visible. This colony is probably larger than here indicated.

***Haplopappus junceus* [*Machaeranthera juncea*] - Rush-like Bristleweed**

A xeric, low-growing Chamise Chaparral or Diegan Sage Scrub is the preferred habitat of this inconspicuous subshrub. Acid Igneous rock lands are found at the Santee locale. Usually Rush-like Bristleweed grows in exposed locales with rocky substrate that does not foster much annual understory. This is an inconspicuous species which flowers late and is probably under-reported. One plant was found in a patch of early successional coastal sage scrub on Hollenbeck Canyon.

***Harpagonella palmeri* - Palmer's grappling hook**

The Palmer's grappling hook is a small, inconspicuous annual grows on clay soils on dry slopes and mesas in grassland, sage scrub, and open chaparral habitats below 830 meters elevation. It blooms between March and April. This species historically occurred from Los Angeles County, California, to Baja California, Mexico and on the Channel Islands. This species was found only on Lusardi Creek were it was relatively abundant in the eastern portion of the parcel. Thirty-eight colonies and about 2,218 individuals were located. The Santa Fe Valley and Otay Lakes South parcels could also contain this species.

***Hesperevax sparsiflorus* - sparse-flowered evax**

Sparse-flowered evax is a low annual with whitish foliage that blooms from March to May. It is found primarily on heavy clay soil below 760 meters throughout much of cismontane central California and western San Diego County. It is rare and localized in southern California. This species was recorded from 5 colonies consisting of about 290 individuals on Lusardi Creek. It is mostly associated with clay barrens.

***Iva hayesiana* - San Diego marsh-elder**

San Diego marsh-elder is bushy perennial herb that blooms from April to September. It is frequently found along stream courses, washes, and playas at 10 to 500 meters elevation from San Diego County, California, and northwestern Baja California, Mexico. Eight extended

colonies of this species were encountered within the Study Area on Lusardi Creek (3 colonies), Otay Lakes North (1 colony), and Otay Lakes South (4 colonies). About 327 individuals but this represents only a partial count. Actual numbers, particularly in larger colonies are difficult to estimate and the number of individuals was not estimated for the most of the populations. San Diego marsh-elder was found in association with rocky washes, along riparian corridors, or in narrow canyons.

***Juncus acutus* ssp. *leopoldii* - spiny rush**

Spiny rush is dark-leaved spiny perennial herb that blooms from May to June. It is found from sea level to 900 meters elevation along the borders of coastal salt marshes, freshwater marshes, rivers, alkaline seeps, meadows, and stream courses from San Luis Obispo County, California, south into Baja California, Mexico. A total of 12 colonies and about 3,277 individuals were recorded on Lusardi Creek, 4S Ranch South, and both Otay Lakes parcels. The largest colony was reported in western 4S Ranch South with possibly 3,000 or more individuals. Additional populations occur in areas of 4S Ranch South that were not surveyed.

***Lepidium virginicum* var. *robinsonii* - Robinson's peppergrass**

Robinson's peppergrass is a white-flowered annual herb that typically blooms between January and April. It is found in chaparral and coastal sage scrub vegetation types at sea level to 500 meters elevation in Los Angeles, Riverside, Orange, Santa Barbara, San Bernardino, Santa Cruz, and San Diego counties, California, and in Baja California, Mexico. Robbinson's pepper grass was one of the most widespread and abundant rare plants found during the survey. It was found within 4 of 6 areas including Lusardi Creek, 4S Ranch North, 4S Ranch South, and Otay Lakes North. It was particularly abundant on hillsides in 4S Ranch South and Otay Lakes North. A total of 41 colonies and about 67,496 individuals were reported. About 60 percent of the individuals were estimated to occur within Otay Lakes South. Robinson's peppergrass is an obscure annual that often blooms before most botanical surveys begin. Thus its status and distribution is currently not well known. The number of individuals and its distribution as encountered during this survey suggest that this species is perhaps more abundant than currently considered. It was found virtually everywhere on Otay Lakes North and

probably covers entire slopes as opposed to the transects reported in this document. It is undoubtedly also common within Santa Fe Valley and Otay Lakes South.

***Lilium humboldtii* ssp. *ocellatum* - Humboldt's tiger lily**

Oscellated Humboldt lily is a yellow and red flowered, tall, bulbiferous perennial herb is found in openings in chaparral, and is an understory species in cismontane woodlands and lower montane coniferous forests. It typically blooms between April and July. This species occurs at 30 to 1,800 meters elevation from San Luis Obispo County south to San Diego County, California. Three small colonies consisting of 5 individuals were recorded from Otay Lakes South in the canyon that flows into Bauschalaugh Cove in association with burned closed cone coniferous forest and mulefat/iva scrub and sycamore woodland.

***Microseris douglasii* var. *platycarpha* - small-flowered microseris**

Small-flowered microseris is an annual herb that has obscure yellow flowers that blooms from March to May. It grows in valley and foothill grasslands, cismontane woodland, coastal scrub, and vernal pools at 15 to 1,070 meters from Los Angeles County south to San Diego County, California, and into Baja California, Mexico. A total of 4 colonies consisting of about 110 individuals were encountered in eastern Lusardi Creek primarily in association with clay barrens.

***Monardella hypoleuca* ssp. *Lanata* - Felt-leaved Monardella**

Chaparral understory is the usual habitat for this suffrutescent perennial. Typically it occurs beneath mature stands of Chamise in xeric situations. Growing sympatrically may be such species as *Pedicularis densiflora*. San Miguel-Exchequer rocky silt loams are found at the Otay Mountain sites, while Acid Igneous rock lands occur on Mount Woodson. A population was found to be diffuse through the entire McGinty Mountain preserve area. It was associated with *Adenostoma fasciculatum*, *Arctostaphylos glandulosa* ssp. *glandulosa*, *Salvia clevelandii*, *Tetracoccus dioicus*, *Cneridium dumosum*, *Rhamnus crocea*, *Xylococcus bicolor*, *Yucca schidigera*, *Yucca whipplei*, *Nassella pulchra*, and *Bloomeria crocea*.

***Monardella linoides* ssp. *viminea* - willowy monardella**

Willowy monardella is a low bushy perennial with pale violet flowers that bloom from June through August. Is is found in association with washes at 50 to 200 meters from central coastal San Diego County south into Baja California, Mexico. A total of 4 colonies and 12 individuals were recorded from Otay Lakes South in the canyon that flows into Bauschalaugh Cove in association with mulefat/iva scrub and sycamore woodland. Two of these colonies were found in rocky wash while the other two were on a rocky bench bordering the creek. During preparation of the original MSCP data about 300 individuals were reported to occur along this drainage. The numbers found here suggest that the original count was significantly off or that the population has been greatly reduced since RECON performed the original surveys in the early 1990's. The area did burn recently and this could have resulted in a significant reduction. The plants found in the vicinity of Otay Mountain, including the plants located during the survey, are morphologically distinct from populations in the Kearny Mesa area and may represent a distinct taxon. The status of this taxon is currently under review by Andy Sanders of the University of California, Irvine, and Mark Elvin of the U.S. Fish and Wildlife Service.

***Muilla clevelandii* - Cleveland's goldenstar**

Cleveland's goldenstar is a low, yellow-flowered scapose perennial that originates from a bulb. It blooms in May. It is found in openings within chaparral and coastal sage scrub, southern needlegrass grassland, and in association with vernal pools at 50 to 465 meters in San Diego County, California, and northwestern Baja California, Mexico. Four colonies were recorded in the Study Area in the southwestern corner of 4S Ranch South and in the western portion of Otay Lakes South. Two of the colonies were associated with Otay Lakes South. About 3,175 individuals were recorded at this site. Two colonies were also recorded at 4S Ranch South. Numbers estimates were not made. One of these colonies was relatively small. The other probably represented several thousand plants.

***Nolina interrata* - Dehesa Nolina**

Open Southern Mixed Chaparral and Chamise Chaparral are the preferred habitats of this distinctive shrub. Near the Dehesa School a series of fires have left stands of this *Nolina* in a disturbed annual grassland. Most populations apparently occur on Las Posas stony fine sandy loams. At least 1,000 individuals, associated with mafic chaparral were recorded on McGinty Mountain. The typical plant assemblage included: *Adenostoma fasciculatum*, *Arctostaphylos glandulosa* ssp. *glandulosa*, *Salvia clevelandii*, *Tetracoccus dioicus*, *Cneridium dumosum*, *Rhamnus crocea*, *Xylococcus bicolor*, *Yucca schidigera*, *Yucca whipplei*, *Nassella pulchra*, and *Bloomeria crocea*. A large population of *Nolina interrata* was located to the southwest of saddle of the mountain. Points were taken along periphery of the population.

***Ophioglossum californicum* - California Adder's Tongue Fern**

The periphery of vernal pools, seeps, and vernally moist locales are favored by this primitive fern. On Mira Mesa this plant is found in an unusual, very open Chamise Chaparral (Redding cobbly loam), on flatlands which have mesic conditions for only a brief period in the spring. Olivenhain cobbly loam is mapped for the Proctor Valley road site, at the edge of a vernal pool. 26 plants were detected hidden in tall grass on San Vicente open space preserve. More were assumed to be present than recorded in this document.

***Pentachaeta aurea* - Golden-rayed pentachaeta**

Golden-rayed pentachaeta is a low, yellow-flowered annual that blooms from March to July. It is found in open areas within coastal sage scrub, grassland, and cismontane woodland at 80 to 1,850 meters from Los Angeles and San Bernardino Counties south through San Diego County, California, into northwestern Baja California, Mexico. A total of 12 colonies and 2,237 individuals were recorded during the study. The largest concentration of individuals (4 colonies and 1,641 individuals) were found on the ridges and slopes within burned coastal sage scrub in the northeast portion of 4S Ranch South.

***Quercus dumosa* - Nuttall’s scrub oak**

Nuttall’s scrub oak is a dense shrub from in coastal chaparral at 15 to 300 meters elevation

from near the immediate coast in Santa Barbara and Orange County, California, to about 20 kilometers inland in the vicinity of Otay Mesa in San Diego County. This species is also found in Baja California, Mexico. A single colony of about 15 individuals was located in eastern Lusardi Creek in association with Del Mar manzanita and southern maritime chaparral. This population suggests some integration with *Q. berberidifolia*.

***Quercus engelmannii* - Engelmann's oak**

Engelmann's oak is a arborescent shrub or tree that grows at 120 to 1,300 meters in chaparral, cismontane woodland, riparian woodlands, and grasslands from the foothills of the San Gabriel Mountains in Los Angeles County, south through Orange, Riverside, and San Diego Counties, into extreme northwestern Baja California, Mexico. Two individuals of this species were recorded during the study. One large individual was found in a ravine on eastern Santa Fe Valley in association with summer holly. The other, more arborescent individual, was found along a creek on Otay Lakes South.

***Salvia munzii* - Munz's sage**

Munz's sage is a purplish flowered shrub that blooms from February through April. It grows in coastal sage scrub at 120 to 1,065 meters in southwestern San Diego County, California, and northwestern Baja California, Mexico. Munz's sage was found only within the two Otay Lakes parcels. A total of 15 colonies were noted. One of the colonies at Otay Lakes North extends over approximately one quarter of the parcel. This species appears to be less abundant on Otay Lakes south where most of the colonies are smaller and more isolated.

***Selaginella cinerascens* - ashy spike moss**

Ashy spike moss is a low perennial herb that often forms grayish mats on heavy clay soils in chaparral, coastal sage scrub, and grasslands. It grows at sea level to about 400 meters from Orange and extreme southern Riverside Counties south through San Diego County, California, into northwestern Baja California, Mexico. Although recently removed from the California Native Plant Society's inventory of rare plants, its limited distribution and preference for areas mostly

west of the I-15 suggest that this plant should still be considered locally rare. About 110 colonies were recorded during the study. This species was found on every site except Rancho Jamul and Hollenbeck Canyon.

***Senecio ganderi* - Gander's Ragwort**

Chaparral understory, often beneath Chamise, is the preferred habitat of this very rare plant. Las Posas stony fine sandy loam is mapped for the Lawson and Sequan Peak sites; as well as the recently discovered population well to the north near Magee Road. Over one hundred individuals were recorded on McGinty Mountain associated with mafic chaparral and with *Adenostoma fasciculatum*, *Helianthus gracilentus*, *Tetracoccus dioicus*, *Nolina interrata*, *Nassella pulchra*, *Rhamnus crocea*, and *Mimulus aurantiacus*

***Stemodia durantifolia* - Purple stemodia**

Purple stemodia is an erect to ascending, purple-flowered perennial herb that grows along streams and in wet places. It grows at relatively low elevations in the United States from the vicinity of Palm Springs to southwestern San Diego County. The species is more widespread in Mexico. During this study, this species was encountered only on Otay South in the canyon that flows into Bauschalaugh Cove. In error, no directed surveys were conducted for this species. Four colonies were encounterd. One colony was recorded through a voucher specimen. The locality information for the other colonies has been reconstructed using the species association lists from *Brodiaea orcuttiii*. This represents a reasonable description of the distribution of this plant within the study area. However future surveys to obtain a more accurate distribution are recommended.

***Stipa diegoensis* [*Achnatherum diegoense*] - San Diego County needle grass**

San Diego County needle grass is a clump-forming perennial that blooms from February to June. It grows on rocky slopes in chaparral and coastal sage scrub at 10 to 700 meters elevation on the northern channel islands, San Diego County, California, and northwestern Baja California, Mexico. A total of 45 colonies and 725 individuals of this species were recorded

within the Study Area. This species was restricted to the Otay Lakes parcels with the majority of the individuals (80 percent) and colonies (80 percent) occurring on Otay Lakes South.

***Viguiera laciniata* - San Diego sun flower**

San Diego sun flower is a low shrubby perennial with yellow flowers that bloom from February to June. It occurs natively in chaparral and coastal sage scrub at 60 to 750 meters elevation from San Diego County, California, and Baja California, Mexico. A total of 56 colonies were recorded within the Study Area. These populations were restricted to Otay Lakes North (18 colonies) and Otay Lakes South (38 colonies). Detailed numbers estimates were not made during the course of the study.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The Santa Fe Valley, Lusardi Creek, 4S Ranch South, McGinty Mountain, Rancho jamul and Hollenbeck Canyon, Otay Lakes North, and Otay Lakes South conservation parcels of the MSCP support a high diversity of rare plants and contribute significantly to conservation within the MSCP. A total of 43 species of rare plants where identified associated with over 2,000 individual colonies. Those areas with the highest diversity of rare plants included the Lusardi Creek parcel, the extreme western and northeastern portions of 4S Ranch South, southeastern Santa Fe Valley, and Otay Lakes South. The survey areas within the metro-Lakeside-Jamul Segement of the MSCP contained locations of rare plants that were not found elsewhere in the study area, including the federally listed San Diego thornmint. The two most important sites identified in terms of diversity where the eastern mesa and rugged canyon along the north and eastern portion of Lusardi Creek and an unnamed canyon flowing into Buschalaugh Cove near the eastern end of the Otay Lakes South parcel. This area of Lusardi supported a total of 17 rare plant species while the canyon in Otay Lakes South supported 11 species. The most significant plants observed included *Arctostaphylos glandulosa* ssp. *crassifolia*, a federal Endangered Species and *Monardella linioides* ssp. *viminea*, both State and Federally listed. Also of note, Lusardi Creek supports one of the few known locations where *Atriplex coulteri* occurs on protected lands.

Generally the parcels surveyed were good condition. Three of the parcels, western Santa Fe Valley, northeastern 4S Ranch South, and Otay Lakes South had been significantly impacted by fire in recent years. These areas were easily accessible at this time. Human-induced disturbance was largely restricted to narrow roads. However at Lusardi Creek small stands of Eucalyptus occur along the southern border of the parcel and on the central mesa. The chemicals in the leaves dropped from these trees suppress native vegetation. Large forests of Eucalyptus occur along the San Dieguito River and in some tributaries in western Santa Fe Valley. Parts of the central mesa on the Lusardi Creek site display evidence of past soil disturbance, possibly discing. These areas have now largely recovered but support significantly fewer rare plants than surrounding areas. On going activities in association with border security are impacting the southern Otay Lakes parcel. New trails were generated by the Border Patrol between May and November 2001.

Non-native species, with the exception of European annual grasses, were not widespread within the study area. However, species like wild artichoke (*Cynara cardunculus*) are common immediately outside of some parcels like 4S South and will require monitoring.

Santa Fe Valley surveyed later in the spring of 2001 and long after the peak bloom for wart-stemmed ceanothus and this species can be difficult to differentiate from other chaparral species at a distance. A review of the parcel in February or March when the species is in bloom would improve the known distribution of this species. This was not possible in 2002 due to the sever drought conditions experienced. Robinson's peppergrass is almost certainly to be found on Otay Lakes south. It is most detectable in March and early April. The survey of Otay Lakes south was not initiated until late May.

Otay Lakes North, on the southern flank of the Jamul Mountains supports a moderate number of rare plants. Most of these species are generally CNPS List 2 or CNPS List 4. Those areas immediately below and to the south of this parcel, on the more gentle mesas and slopes bordering Otay Lake, have a significantly higher diversity of rare plants including many CNPS List 1B species. Additionally, it is evident that the canyon leading into Buschalaugh Cove on Otay Lakes South is also a critical rare plant area. Most of this canyon appears to be protected either by the City of San Diego along the shore of Otay Lake (Water District Land), BLM (the upper portions of the canyon), or the County (Otay Lakes South).

At least one species of plant should have been encountered but was not. The southernmost population of thread-leaved brodiaea (*Brodiaea filifolia*) was discovered on 4S Ranch by Dudeck in the late 1990's. This population was transplanted into the heavy clay soils associated with native grassland in the southwestern portion of 4S Ranch South. Flags and cages were located in this area suggesting a transplant project was in progress. However, there was no visible evidence that any thread-leaved brodiaea was successfully transplanted.

Ashy spike moss (*Selaginella cinerascens*) has recently been removed from the CNPS Inventory of rare plants. However its removal may have been premature. This species is more abundant than most rare plants. Here it was found on all parcels within the study area.

However most colonies were relatively well defined and it was not ubiquitous throughout the parcels with distributions similar to or less common than *Ferrocactus viridescens*, *Viguiera laciniata, Salvia munzii*, or *Lepidium virginicum* var. *robinsonii*. It is recommended that continued monitoring of the status of this species occurs.

Few signs of human impacts due to inappropriate uses such as off-road vehicle use were encountered in the survey areas. However, it is recommended that public outreach programs continue to educate the adjacent property owners and users of these preserve areas of the value of these resources and their long-term benefit to the community as well as to continued high levels of local biodiversity.

6.0 REFERENCES

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Appendix A: MSCP Sensitive Plant Monitoring

This appendix lists every GPS file recorded during the two-year study. This lists the data alphabetically by *location*, i.e., study area name, by *date*, i.e., from the earliest to the latest, and subsequently alphabetically by the scientific name of the *plant*, i.e., the Latin binomial. The rover file numbers are also listed on this appendix as it the botanist's name that created the file. There is also a separate column that estimates the number of individuals for each point or polygon file created. This data could be extracted from the notes section of the rover file in some cases.

Attachments: Nine "stand-alone" map products showing the updated vegetation mapping and the location of the rare plant species.