APPENDIX A

Baseline Biological Resources Evaluation
Lusardi Creek Preserve

BASELINE BIOLOGICAL RESOURCES EVALUATION

LUSARDI CREEK

PRESERVE

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Executive Summary

ICF Jones & Stokes conducted baseline biodiversity surveys of the County of San Diego's (County) Lusardi Creek Preserve (Preserve) to provide the Department of Parks and Recreation with biological data to develop a Resource Management Plan (RMP) including Area Specific Management Directives (ASMDs). To provide a baseline evaluation of biological resources, the following studies were conducted by ICF Jones & Stokes: (1) vegetation mapping; (2) rare plant surveys; (3) pitfall trap arrays to sample amphibians, reptiles, and small mammals; (4) avian point counts; (5) nocturnal bird surveys; (6) acoustic sampling and roost surveys for bats; (7) small mammal trapping; (8) a track and sign survey for medium-to-large mammals; and (9) a camera station survey for medium-to-large mammals.

This report summarizes all survey methodologies and data collected during the 2008 survey period (February through October). This report also includes recommendations for adaptive management, including management and monitoring of vegetation communities and sensitive plants, and management and monitoring of sensitive wildlife species, including species covered by the South County Multiple Species Conservation Program (MSCP).

The Preserve includes approximately 194.5[1] acres of native/naturalized vegetation communities including Diegan coastal sage scrub, chamise chaparral, southern maritime chaparral, southern willow scrub, non-native grasslands, valley needlegrass grasslands, and disturbed habitat all of which are within the MSCP. The undeveloped portion of the Preserve is mapped as Pre-approved Mitigation Area (PAMA) and is considered an MSCP Preserve.

The current surveys documented nine land cover types and 292 species within the Preserve. The surveys detected 177 plant species, 55 bird species, 24 mammal species (eight bats, nine small mammals, and seven medium and large bodied mammals), 12 herptiles (three amphibian and nine reptiles), and 24 invertebrate species. This list includes 31 special-status species (18 wildlife and 13 plants) of which eight (six wildlife and two plants) are MSCP-covered species.

[1] The assessor's parcel data list the Preserve to be 193 acres; however, calculations generated from the GIS data show the Preserve as 194.5 acres. Therefore, this report references the Preserve as 194.5 acres.

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1.0 Introduction

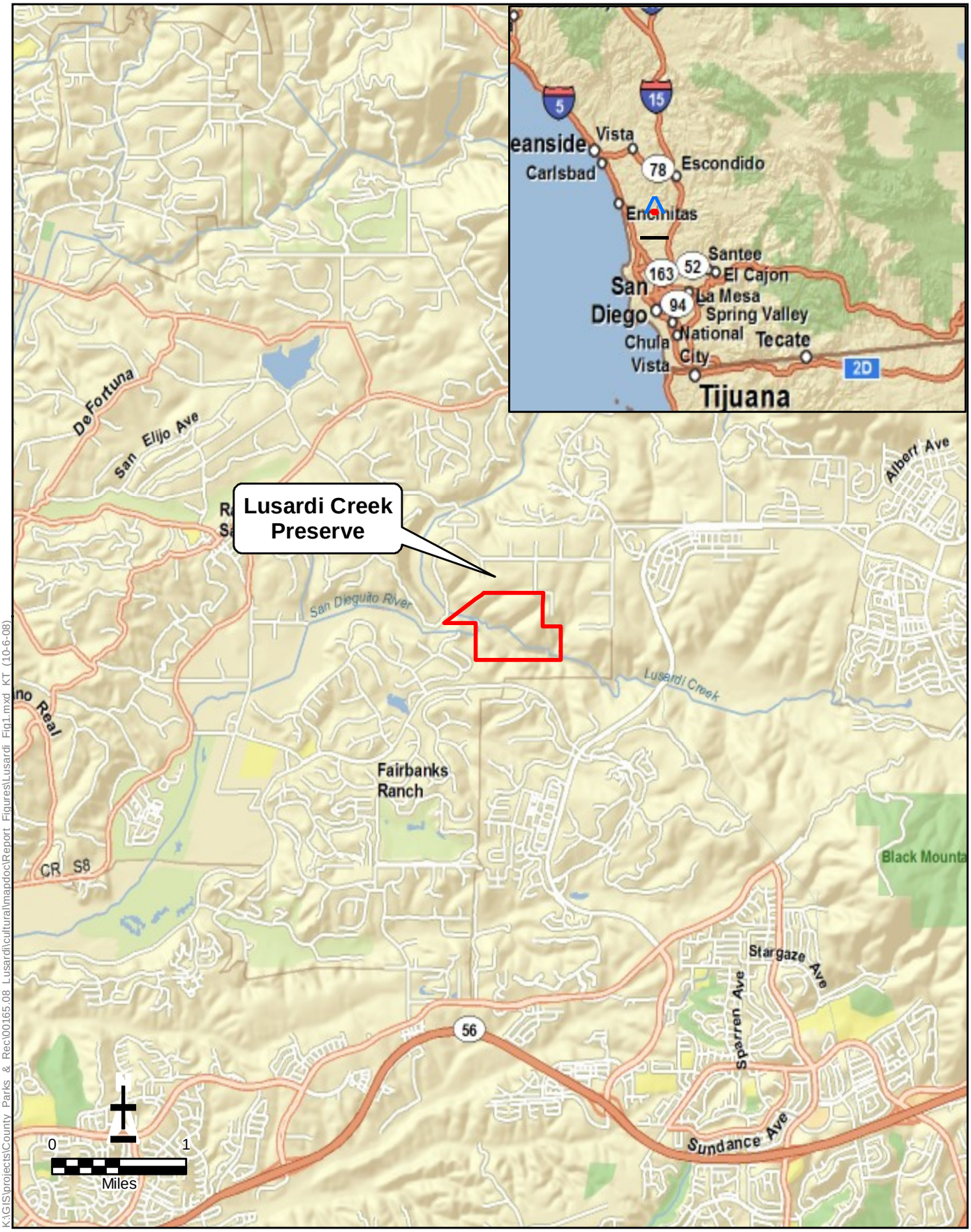
Baseline biological resources surveys were conducted within the County of San Diego's (County) Lusardi Creek Preserve (Preserve). The purpose of these surveys was to identify and map existing resources and to provide the Department of Parks and Recreation with information for the development of a Resource Management Plan (RMP) including Area Specific Management Directives (ASMDs). These ASMDs will provide the management framework for monitoring and managing the Preserve's resources.

The Preserve is regionally located along the northern boundary of the City of San Diego, slightly southeast of the community of Rancho Santa Fe and west of the community of 4S Ranch (Figure 1). The Preserve is specifically located just north of San Dieguito Road, west of Del Sur and south of Artesian Road (Figure 2). The 194.5-acre[1] Preserve is located in the San Dieguito River watershed, approximately 0.15 mile east of the San Dieguito River. The Preserve is accessed from the north via Rio Vista Road and from the west from San Dieguito Road. The Preserve is surrounded on all sides by open space lands and sparse rural residential development. Elevations within the Preserve range from approximately 24 meters (m) [80 feet (ft)] above mean sea level (AMSL) at the western most boundary and 119 m (390 ft) AMSL along the northeastern most ridge top.

To provide a baseline evaluation of biological resources, the following studies were conducted by ICF Jones & Stokes: (1) vegetation mapping; (2) rare plant surveys; (3) pitfall trap arrays to sample amphibians, reptiles, and small mammals; (4) avian point counts; (5) nocturnal bird surveys; (6) acoustic sampling and roost surveys for bats; (7) small mammal trapping; (8) a track and sign survey for medium-to-large mammals; and (9) a camera station survey for medium-to-large mammals.

In addition to methods and results for all the work conducted, this report provides brief recommendations and options to preserve and enhance the biological resources present within the Preserve.

[1] The assessor's parcel data list the Preserves to be 193 acres; however, calculations generated from the GIS data show the Preserves as 194.5. Therefore, this report references the Preserve as 194.5 acres.



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SOURCE: ESRI Street Map (2008)

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Figure 1
Regional Location Map
Lusardi Creek Preserve

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Figure 2
Project Vicinity Map
Lusardi Creek Peserve

2.0 Study Area

2.1 Physical and Climatic Conditions

2.1.1 Geography

The natural setting within the Preserve is characterized by the Lusardi Creek Valley running through the southern portion with the larger San Dieguito River Valley immediately adjacent to the west. The Preserve contains an upland area dissected by small tributary drainages to Lusardi Creek that have created several narrow, steep canyons or ravines (see Figure 2). Elevations range between approximately 119 m (390 ft) AMSL at the north-central edge of the Preserve, to approximately 24 m (80 ft) AMSL in the west-central edge of the Preserve along the bottom of Lusardi Creek near the confluence with the San Dieguito River. The closest sources of fresh water are Lusardi Creek running through the southern part of the Preserve and the San Dieguito River just beyond the westernmost boundary of the Preserve.

2.1.2 Geology and Soils

The Preserve contains three distinct geologic categories of bedrock: pre-Cretaceous metamorphic rocks of the Bedford Canyon Formation, pre-Cretaceous metavolcanic rocks of the Santiago Peak Volcanics Formation, and Eocene sedimentary rocks of the Poway Conglomerate Formation (Strand 1962). The pre-Cretaceous metamorphic rocks are located only in the southeast corner of the Preserve. The pre-Cretaceous metavolcanic rocks are also exposed mostly in the easternmost and southeastern areas of the Preserve, but several boulder outcrops are also exposed in other places particularly along the steep ravines and bluffs on the Preserve. The Eocene sedimentary Poway Conglomerate Formation is present over most of the rest of the Preserve. The pre-Cretaceous metamorphic rock types are described by Strand (1962) as consisting of interbedded black to dark-gray argillite (metashale), slate, quartzite, graywacke, local conglomerate, and dark-colored recrystallized limestone. The Santiago Peak Volcanics Formation is described as predominantly dark-colored flows, tuff, breccias, and agglomerate of predominantly andesitic rocks. The Poway Conglomerate Formation, which overlies these metamorphic rocks on the Preserve, is now recognized as consisting of several distinct formations including the

Stadium Conglomerate, the Mission Valley Formation, and the Pomerado Conglomerate (Kennedy and Peterson 1975). Now referred to as the Poway Group, these formations variously contain rounded-cobble conglomerate and sandstone with lesser occurrences of siltstone and mudstone. Also present in narrow bands along the banks of Lusardi Creek are more recent sediments of Pleistocene and/or Holocene age sediments (Strand 1962; Weber 1963).

Several general soil associations are represented within the Preserve: Huerhuero series, Olivenhain series, Riverwash, San Miguel-Exchequar, Terrace escarpments, and Tujunga series (Figure 3; USDA 1973).

The ***Huerhuero*** soil series consists of moderately well drained loams that have a clay subsoil. These soils developed in sandy marine sediment and are typically found on slopes ranging from 2 to 30 percent with elevation ranging from 3 to 122 m (10 to 400 ft). In a representative profile the surface layer is brown and pale-brown, strongly acid and medium acid loam about 31 cm (12 in) thick. The upper part of the subsoil is brown, moderately alkaline clay and extends to a depth of about 104 cm (41 in). Below this, and extending to a depth of more than 152 cm (60 in), is a brown, mildly alkaline clay loam and sandy loam. The specific soil type found in the Preserve is Huerhuero loam (2 to 9 percent slopes, eroded). Within the Preserve this soil type primarily supports chamise chaparral and Diegan coastal sage scrub.

The ***Olivenhain*** soil series is characterized by well drained, moderately deep to deep cobbly loams and is usually found on slopes ranging from 2 to 50 percent. It is found on dissected marine terraces at elevations ranging from 30–183 m (100–600 ft). The surface layer is usually 25 cm (10 in) thick and moderately acidic. The topsoil is brown and reddish-brown and cobbly loam in texture. The subsoil is reddish-brown, red, and pink in color, strongly acidic, very cobbly clay and clay loam and is about 81 cm (32 in) thick. The substratum is pinkish-white in color and strongly acidic. Runoff is medium to rapid and the erosion hazard is moderate to high. The specific soil type found in the Preserve is Olivenhain cobbly loam (2 to 9 percent slopes, 9 to 30 percent slopes and 30 to 50 percent slopes). Within the Preserve Olivenhain soils primarily support non-native grassland and valley needlgrass grassland.

Riverwash occurs in a small area within the stream banks along the San Diego River. Riverwash is a term used to collectively refer to unconsolidated sands, gravels, and cobbles that occur in intermittent or ephemeral stream courses. This soil is often barren due to scour from storm events. This soil type occurs exclusively along the river bottom. Within the Preserve Riverwash soils support southern willow scrub.

The ***San Miguel-Exchequar*** soil series is characterized by well drained silt loams over metavolcanic rock and is usually found on slopes ranging from 30 to 75 percent. These soils are located in mountain uplands between 122 m (400 ft) and 1,006 m (3,300 ft). The series consists of 50

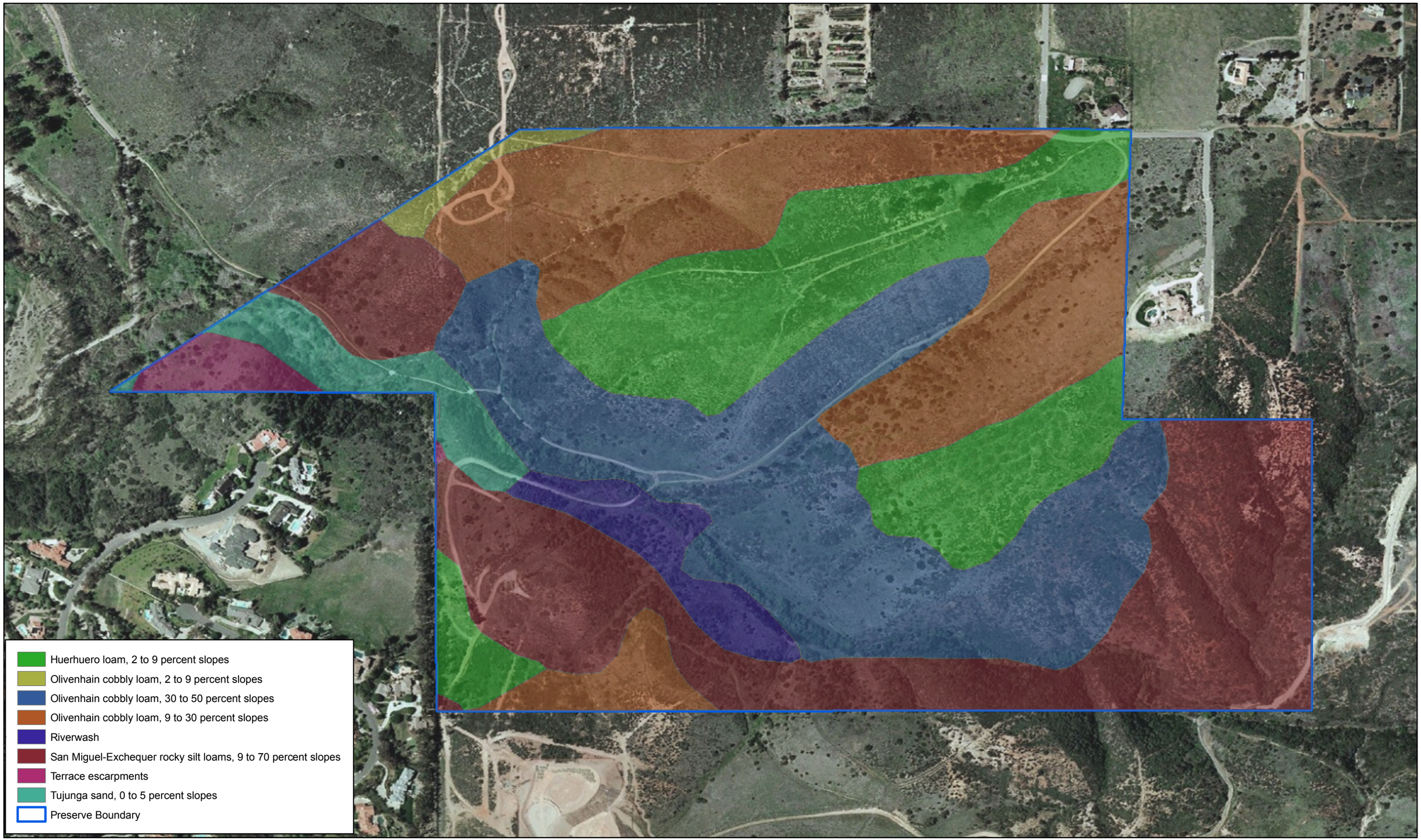

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Figure 3
Soils
Lusardi Creek Preserve

percent San Miguel silt loam, 40 percent Exchequar silt loam and 10 percent rock outcrops. The surface layer is usually yellow red silt sandy loam underlain by clay and then metavolcanic rock. Permeability is slow to moderate and runoff is medium to rapid. The specific soil type found in the Preserve is San Miguel-Exchequar rocky silt loam (9 to 70 percent slopes). Within the Preserve southern mixed chaparral and southern maritime chaparral are found on San Miguel-Exchequar soils.

Terrace escarpments are steep to very steep escarpments that occur on the even fronts of terraces or alluvial fans. This soil is usually found between narrow floodplains and the adjacent uplands and steep sides of drainage ways. Non-native grassland and southern mixed chaparral occur on terrace escarpment soils within the Preserve.

The ***Tujunga*** soil series is characterized by very deep excessively drained sands derived from recent granitic alluvium and is usually found on slopes ranging from 0 to 5 percent. These soils are located on alluvial fans and floodplains between sea level and 457 m (1,500 ft) AMSL. The surface layer is usually brown sand approximately 36 cm (14 in) thick, over pale brown coarse sand over 152 cm (60 in) thick. Permeability is rapid in this soil and runoff is very slow. The specific soil type found in the Preserve is Tujunga sand (0 to 5 percent slopes). These soils occur within the southern willow scrub found along the western most portion of Lusardi Creek.

2.1.3 Climate

A semi-permanent, Pacific high-pressure cell, located over the Pacific Ocean, dominates San Diego County's climate. This cell drives the dominant on-shore circulation, maintaining clear skies for much of the year. Summers in the Preserve are typically warm and dry, while winters are mild with occasional rain (USDA 1973).

The Western Regional Climate Center, a collaborative project of the National Oceanic and Atmospheric Agency and the Desert Research Institute, maintains a climatic station in San Diego – the closest such station to the Preserve. Data collected at the station indicate that the area experiences a normal mean temperature of approximately 63 degrees Fahrenheit (^{o}F), with a mean maximum temperature of 69 ^{o}F and a mean minimum of 56 ^{o}F. In a normal year, precipitation on the Preserve averages 23 cm (9 in) and falls mostly in the winter and spring (San Diego County Flood Control District 2007).

A predominant feature of the local climate is the sea-breeze/land-breeze cycle. During the daytime, particularly in the summer, on-shore winds move inland with speeds of approximately seven to ten miles per hour (mph). Easterly land breezes of approximately two to four mph often occur at night. Surrounding rugged terrain, which induces turbulence into

the airflow, modifies the influence of this cycle. This cycle is also periodically affected by land airflow that dominates weather patterns. The most widely recognized of these are the Santa Ana conditions, during which strong, hot and dry easterly winds prevail for two- or three-day periods.

2.1.4 Fire Cycles

The Preserve is dominated by grasslands and scrub communities which are naturally maintained by infrequent fires. If the natural fire cycle is suppressed, these vegetation communities can become senescent, declining in both health and diversity. If the fire frequency is increased, vegetation could shift towards disturbed grassland or opportunistic pioneering shrub communities. The fire cycles within the area are affected by actions within and adjacent to the Preserve. Surrounding development and brush management actions associated with urban development have altered the fire cycles throughout most of western San Diego County. According to the County fire burn data, the majority of the Preserve burned in the 2007 Witch Fire (Figure 4).

2.1.5 Hydrology

The Preserve is situated within the San Dieguito River Watershed. Designated beneficial uses for the San Dieguito River and its tributaries include municipal and domestic supply; agricultural supply; industrial service supply; industrial process supply; warm freshwater habitat; cold freshwater habitat; wildlife habitat; and rare, threatened, or endangered species habitat (California Regional Water Quality Control Board San Diego Region 2003). Lusardi Creek traverses the southern portion of the Preserve and eventually flows into the San Dieguito River just west of the Preserve boundary (Figure 4).

2.1.6 Trails

The Preserve does not contain any formerly designated trails but does contain approximately three miles of existing dirt roads. These roads are well established and are primarily used by the San Diego County Water Authority (SDCWA) and San Diego Gas & Electric (SDG&E) to access infrastructure within and immediately adjacent to the Preserve (Figure 5).

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Figure 4
Hydrology & 2007 Witch Fire Burn Map
Lusardi Creek Preserve

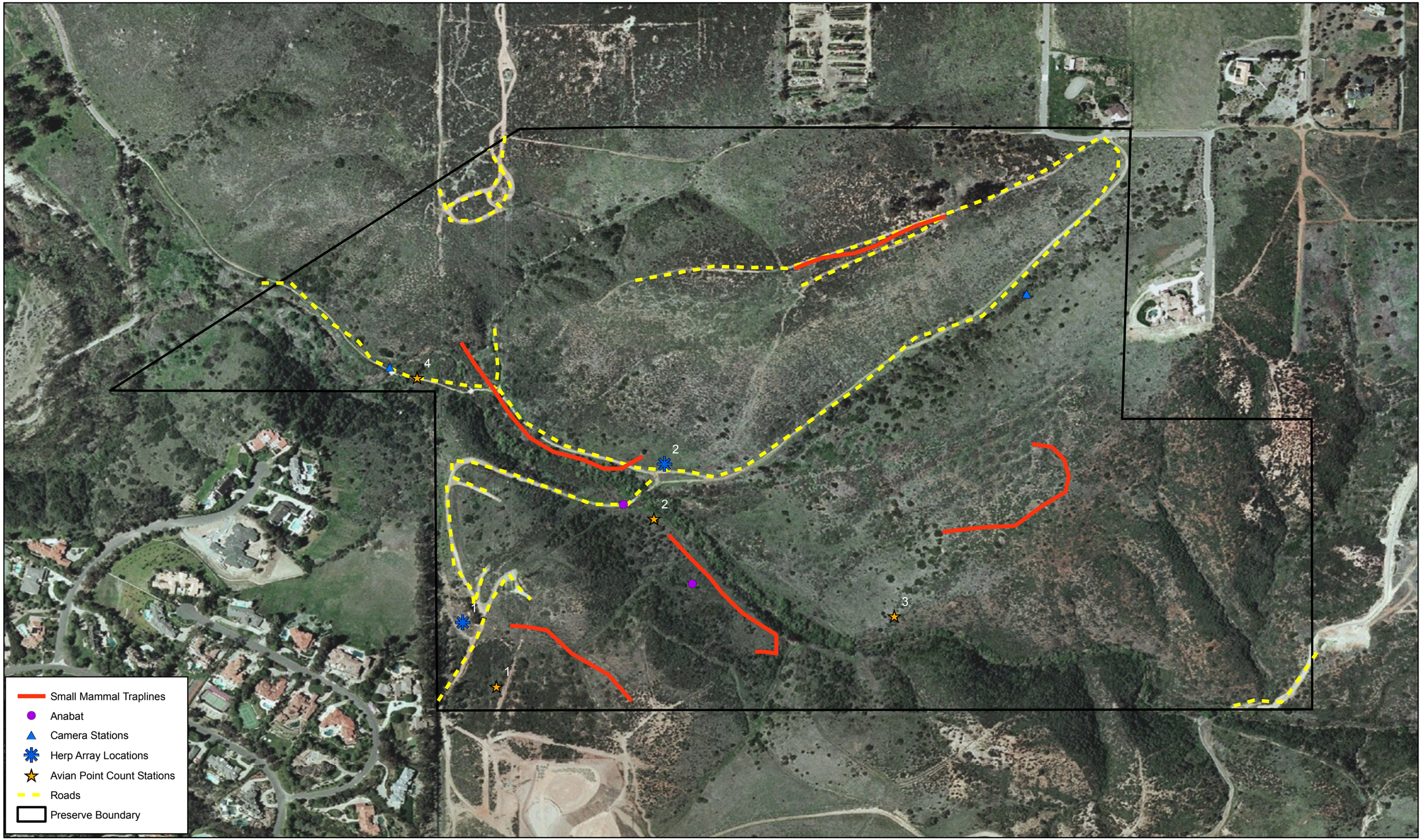

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Figure 5
Existing Dirt Roads and Biological Sampling Locations
Lusardi Creek Preserve

3.0 Methods

Place names in this report follow both specific names and standards used for mapping by the U.S. Geological Survey (USGS). The following sources are followed for taxonomy and nomenclature, including both scientific and standardized English names: Rebman and Simpson (2006) for plants; Arnett (2000) for higher taxonomic categories of invertebrate animals; generally Opler and Wright (1999) or Hogue (1993) for invertebrate species; Collins and Taggart (2002) for amphibians and reptiles; American Ornithologist's Union (1998 and supplements) for birds; and Baker et al. (2003) for mammals. Where this information differs from MSCP names, the MSCP information is provided parenthetically. For clarity and to differentiate standardized, sourced, English names for species from descriptions (e.g., Yellow Warbler and not any other warbler that is yellow), we follow most published sources of standardized names by capitalizing them; we also include the scientific binomial from the cited reference with the first mention of a species in the body of this report.

3.1 Vegetation

Prior to conducting surveys for the project, searches of available literature and databases were conducted to determine special-status species previously detected or with potential to occur in the Preserve and to assess the physical characteristics of the site and surrounding areas. Available data that were reviewed included the California Natural Diversity Database (CNDDB) (CDFG 2008), the U.S. Department of Agriculture (USDA) soil survey of the area (USDA 1973), and USGS topographic maps to identify potential stream courses and other notable topographic features.

Surveys were conducted to categorize and map the plant communities within the Preserve, map special-status plants, and document all flora observed (Table 1). During each rare plant survey ICF Jones & Stokes botanists traversed the study area by meandering transects in an effort to accurately categorize vegetation communities and to identify the locations of any special-status species readily detectable. During these surveys, all plant species detected were recorded (Appendix A).

Vegetation communities were mapped on a "one-inch equals 200 feet" (1:200) scale aerial photograph of the Preserve in the field and later digitized into a geographic information system (GIS) coverage using ArcGIS software. Mapping included the entire 194.5-acre Preserve and vegetation communities were categorized using standard County classifications (Holland 1986 as modified by Oberbauer 2005). All plant species observed were noted, and plants that could not be identified in the field were identified later using taxonomic keys including Beauchamp (1986) and Hickman (1993), or verified with herbarium specimens at the San Diego Natural History Museum.

Table 1. Vegetation Mapping and Floristic Inventory Surveys at the Preserve in 2008

Survey Personnel	Date
Korey Klutz, Andrew Borcher	02/27/2008
Korey Klutz, Brant Primrose, Cristian Singer	03/12/2008
Korey Klutz	03/24/2008
Korey Klutz,	04/14/2008
Ian Cain, Korey Klutz	05/28/2008
Korey Klutz	10/13/2008

Locations of special-status plant populations were mapped using either sub-meter accurate global positioning system (GPS) or recreational grade GPS receivers [accurate from 1 to 5 m (3 to 16 ft)]. Groups of individuals were mapped as single points with attribute data including total individuals observed.

3.2 Invertebrates

3.2.1 Quino Checkerspot Butterfly

Quino Checkerspot Butterfly protocol surveys were not conducted because the location of the Preserve is outside the United States Fish & Wildlife Service (USFWS) Quino survey area. However, general butterfly surveys were conducted during the months of March and April 2008.

3.2.2 Other Invertebrates

In addition to butterflies, several other invertebrates were either identified during active surveys or after being captured in the pitfall traps

associated with the herpetological surveys. All unidentifiable invertebrates were photographed, and those photographs were provided to a local entomologist for identification. All identified invertebrates are listed in the wildlife table in Appendix B.

3.3 Herpetofauna

ICF Jones & Stokes conducted surveys for herpetofauna (amphibians and reptiles) within the Preserve from March through July 2008. Terrestrial herpetological surveys were conducted using pitfall trap arrays as outlined in the USGS's "Herpetological Monitoring Using a Pitfall Trapping Design in Southern California" (Stokes et al. 2001). This design uses a standardized array of pitfall traps, funnel traps, and drift fencing to perform long-term research over a wide geographic area with replicates among site localities, habitats, and environments.

The optimal design for drift fencing includes a three-arm array with seven pitfall traps and three funnel traps. This study's array design was consistent with this optimal design, and recommendations for array materials and trap construction were followed. As the site temperatures were not excessive during the trapping period, biologists constructed funnel traps with no pitfall trap retreat underneath, as described in the above referenced protocol.

Two sites were selected for the array construction based on access, vegetation community, soils, and topography. One array was constructed on a hilltop in non-native grassland in the southwest corner, and the other in non-native grassland just north of Lusardi Creek (Figure 5). Locations were mapped using GIS technologies.

All areas immediately surrounding the arrays were actively searched for herptiles during the array monitoring. Active searching included looking under shrubs and logs. All herptiles captured or observed during active searches and other wildlife surveys were recorded and are included in the wildlife table in Appendix B.

3.3.1 Monitoring Arrays

Array traps were sampled on four consecutive days once a month beginning in March and continuing through July. The traps were opened on a Monday afternoon, sampled Tuesday through Friday, and closed Friday.

Array traps were checked during early morning hours to ensure that animals were released before daytime temperatures reached levels that could result in mortality. All animals were identified to species and immediately released at the point of capture. Biologists did not handle

animals other than to photograph and release them from traps. Because the trapping effort's purpose was to generate an inventory of species present within the Preserve (i.e., not to assess population sizes or dynamics), individuals were not marked, weighed, or otherwise measured.

Data were recorded on paper and entered into an Excel spreadsheet. Recorded information included species and trap number.

3.3.2 Other Herpetofaunal Methods

Dip netting for the purpose of tadpole identification was performed in any pooled or slow-flowing waterways within the Preserve. A handheld net was pulled through the water to capture tadpoles, which were identified and released into the same pool or stream.

Based on site conditions of the Preserve, ICF Jones & Stokes concluded that focused breeding surveys for Arroyo Toad (*Bufo californicus*) would not be a productive use of survey effort, as there is no potentially suitable breeding habitat within the Preserve. This assessment was based on the lack of primary constituent elements of Arroyo Toad habitat such as sandy low-gradient open-wash habitat with slow moving or pooling water (USFWS 1999). Sandy low-gradient open-wash habitat is absent within the Preserve. Thus, the species is considered absent.

3.4 Birds

3.4.1 Diurnal Point Count Survey

Avian use of the study area was formally documented through the use of four point count stations sampled once a month for six months beginning in April and concluding in September (Figure 5). Point counts provide a repeatable, quantitative sampling method for a broad spectrum of birds that is complementary to the general reconnaissance effort, strengthening the reference information developed on relative abundance of birds.

With sufficient sample size and accuracy, data generated can be evaluated against many hypotheses, even at some later time. At larger time and/or spatial scales, the data produced on species richness and turnover can contribute to information on connectivity and response to disturbances. The data set may increase in value over time through its function as reference data contributing to investigation and calibration of both local and larger scale changes.

Point count methods followed recommendations provided in Ralph et al. (1995) for extensive (i.e., station independent) surveys. See that source

for detailed discussion of the basis for, and further details on, the methods presented here. A summary of methods, including additions beyond the recommendations, is provided below.

Stations were placed non-randomly to maximize sampling of the study area and to minimize coverage of outside areas. No particular features (e.g., plant community, slope or aspect) were selected for or avoided, primarily due to the broad objectives of the study. Stations were generally located at or near existing trails to facilitate access. Prior to the first counts, all stations were mapped in the field, located using GPS, marked for later identification, and photographed. The view-shed from each point was also photographed in the four cardinal compass directions.

Counts were conducted at each station once a month (April through September). The following recommendations, drawn directly from Ralph et al. (1995), were followed:

- Stations were located at least 250 m (820 ft) apart to ensure independence (i.e., no or minimal overlapping of individual birds detected).
- Counts were conducted at each station for ten minutes (stratified into periods of three, two and five minutes) and started quickly upon reaching the point.
- All detected birds were counted except for any judged to have been counted at a previous station.
- Both seen and heard individuals were recorded as long as clearly identified.
- Birds were recorded within each time stratum as: (1) within a 50 m (164 ft) radius from the station, (2) outside the 50 m (164 ft) radius, or (3) flying over. This will allow rudimentary density estimates (without weighting for detectability).
- Individuals were counted at the location where first detected and time of first detection, even when not identified until they have moved or a new time period has begun.
- Adverse weather conditions were avoided (e.g., dense fog, strong winds, extended rain).
- Stations were counted in the same order each time, starting at approximately the same time relative to sunrise, and finishing within four hours after sunrise. Note that counting stations in the same order each time is recommended as the preferred method where the primary purpose of the data is for comparison with future data sets at the same study area. For the current work this was judged to be a higher priority than maximizing comparability with point counts investigating regional issues, which are best counted by randomizing the order of stations within sites and the order of sites within a day.

Additional point count methods used beyond those provided in Ralph et al. (1995) include:

- No attempts were made to attract birds, such as through use of taped vocalizations or "pishing" (imitating avian scold or alarm calls).
- Prior to the initial point counts, the observer practiced distance estimations by locating an object roughly 40 to 60 m (131 to 197 ft) away, assigning it as beyond or closer than 50 m (164 ft).This was done several times on several different days, in different directions, and on varied terrain, but always in open shrub lands similar to that in which the stations were located.
- Birds noted only in flight were additionally recorded as either utilizing the landscape (e.g., actively foraging swallows and raptors, and raptors using thermal updrafts) or not (e.g., birds commuting between distant habitat patches off-site, such as cormorants over an upland site, or birds migrating high overhead).
- Birds were only counted when they had clearly fledged and moved away from their nest. Thus young raptors, which often spend several transitional days immediately adjacent to the nest, were not counted until they were detected in a part of the tree or cliff where they were not expected to have reached by walking or climbing.
- Vocalization type was typically used to categorize birds that were heard only with regard to whether or not they were assumed to be flying over or perched. Thus, flight calls for a particular species were used to categorize a bird as in flight, making it important to separate calls accurately by type for species heard only.
- When a flock was only heard, only the number definitely heard was recorded, but when a flock was seen and individuals could not be precisely counted, a best estimate was used. Note that with or without this method, point count censusing assumes that at each station an observer has a good opportunity to see and hear birds and (for comparison among stations) that stations are comparable in this regard.
- No individual birds were 'discarded' (not counted) due to lack of identification, unless they were at the level of simply, "unidentified bird" (e.g., an unrecognized call). Instead they were retained at the highest level of identification supported (e.g., "hummingbird sp."). Variability among surveyors in such treatment can substantially affect estimates of abundance for some groups, or for overall avian abundance.

Numerous issues that may substantially affect how data are recorded or later interpreted from avian point counts are typically not addressed in published work on suggested methods, in published results, or both. To aid future comparability while also allowing current point counts to provide censusing of a broad spectrum of bird species and behaviors, the following additional discussion of methods is provided.

Birds recorded but not identified to the level of species are counted in the totals and other statistics for individuals, but not the totals or statistics for species, except where they clearly represented species otherwise unrecorded. Thus, "raptor sp." would not add to the overall species total if raptors were also recorded to the species level. However, individual "raptor sp." would (1) be counted in the total species number for the particular counts on which they occurred when no other raptors were recorded and identified to species on that count, and (2) add to the total abundance of birds in any relevant totals.

"Fly-by" (also called "fly-over") birds were not generally added to the totals calculated for numbers of individuals or species. This is standard practice for point count analysis (Ralph et al. 1995). The rationale is that such birds are neither making any use of nor influencing the study area. However, totals here do include small numbers of birds judged to be foraging or hunting while in flight over the study area, as they are anticipated to be making use of the study area in the same way that a bird foraging from a perch at the same distance from the observer is making use of the study area. For the current work, most observations of swifts, swallows, and raptors (including Turkey Vultures) are included.

The point counts were designed as 'two-interval' counts (referring to distance, not time), using the terminology of Bibby et al. (2000; pp. 101-102). A radius of 50 m (164 ft) was set, and all birds recorded were categorized as inside or outside of the resulting circle. This allows a calculation of density with an adjustment for detectability, but one must guess in applying the detectability adjustment, as this format does not allow testing of how detectability for a given species attenuates across distance (e.g., half normal to a fixed limit). Because the sample size is limited and fragmentation and disturbance make generalizations about distribution across the site tenuous, no density-based estimates of total abundance are provided for any species based on the current results.

3.4.2 Nocturnal Bird Survey

Nocturnal bird surveys were conducted for nighttime birds at the Preserve. Methods included a combination of walking and slowly driving roads, looking and listening for birds. A moderately powerful headlamp was used to aid identifications.

3.5 Small Mammal Trapping

On July 21, 2008, ICF Jones & Stokes biologists Phillip Richards and Cindy Dunn assessed the physical conditions, vegetative community distribution, vegetative cover, and accessibility for planning the trapping program for small mammals. All portions of the Preserve were visually inspected to determine representative small mammal sampling locations.

For the purposes of this project, "small mammals" include species in the shrew, squirrel, pocket gopher, heteromyid, mouse, rat, and vole families.

Small mammal trapping on the Preserve consisted of five traplines totaling 200 traps. Each trapline was set for four nights for a total of 800 trap nights. All five traplines were initially set and baited during the afternoon of July 21, 2008. Traps were systematically checked in the early morning between 0430 and 0925 from July 22 through July 25, 2008 (Table 2). Trapline 1 was located along the southwest corner of the Preserve and consisted of 40 traps (Figure 5, Table 3). Trapline 2 was located along the northwest end of the valley floor and consisted of 30 traps (Figure 5, Table 3). Trapline 3 was located along the southern part of the valley floor [and approximately 31 m (100 ft) upstream from Trapline 2] and consisted of 30 traps (Figure 5, Table 3). Trapline 4 was located along the southeast part of the Preserve and consisted of 60 traps (Figure 5, Table 3). Trapline 5 was located along the northern part of the Preserve and consisted of 40 traps.

Trapline locations were selected based on three criteria: 1) sampling of different vegetative communities, 2) geographic distribution across the Preserve, 3) and sampling of unique features (e.g., washes). Sequentially numbered 12-inch Sherman live traps were set at dusk, approximately 5 to 10 m (16 to 33 ft) apart. Traps were set and placed where potential small rodent captures were judged to be most probable. Where rodent sign was not apparent, traps were placed near the base of shrubs. The location of each trap was recorded using a recreational grade GPS receiver (Garmin brand, WAAS enabled). Mixed birdseed was used as bait, and a few seeds were trailed out from the mouth of the trap, usually toward a game trail, burrow, or open area. All traps were checked and closed at dawn.

When animals were captured, each animal was transferred from the trap into a cloth bag. The animals were removed by their napes and identified to species. The sex and reproductive condition of each animal was recorded (i.e., testes scrotal, not scrotal, vagina perforate, not perforate). Any mites, ticks, or other parasites were noted. Digital photos were taken of some specimens. Once the data were recorded onto data sheets, each animal was released where captured. This whole process took several minutes for each capture. The released animals were observed until they moved to the safety of a burrow or clump of vegetation.

Table 2. Personnel, Date, Time, and Conditions of the Small Mammal Trapping at the Preserve in 2008

Trapline	Personnel	Date Checked	Time Checked	Conditions
1	Phillip Richards Cindy Dunn	7/22/08	0900	Cloudy; 69°F; Wind 0-1; No Moon Visible; Moderate-High Humidity
		7/23/08	0750	Cloudy; 66°F; Wind 0; No Moon Visible; Moderate-High Humidity
	Phillip Richards James Hickman	7/24/08	0732	Cloudy; 65°F; Wind 0-3; No Moon Visible; Moderate-High Humidity
		7/25/08	0715	Cloudy; 68°F; Wind 0-1; No Moon Visible; Moderate-High Humidity
2	Phillip Richards Cindy Dunn	7/22/08	0541	Cloudy; 65°F; Wind 0; No Moon Visible; Moderate-High Humidity
		7/23/08	0521	Cloudy; 64°F; Wind 0; No Moon Visible; Moderate-High Humidity
	Phillip Richards James Hickman	7/24/08	0515	Cloudy; 64°F; Wind 0; No Moon Visible; Moderate-High Humidity
		7/25/08	0512	Partly Cloudy; 62°F; Wind 0-1; No Moon Visible; Moderate-High Humidity
3	Phillip Richards Cindy Dunn	7/22/08	0430	Cloudy; 65°F; Wind 0; No Moon Visible; Moderate-High Humidity
		7/23/08	0448	Cloudy; 64F; Wind 0; No Moon Visible; Moderate-High Humidity
	Phillip Richards James Hickman	7/24/08	0430	Cloudy; 62°F; Wind 0; No Moon Visible; Moderate-High Humidity
		7/25/08	0430	Partly Cloudy; 60°F; Wind 0-1; Last/4 Moon Visible; Moderate-High Humidity
4	Phillip Richards Cindy Dunn	7/22/08	0621	Cloudy; 66°F; Wind 0-1; No Moon Visible; Moderate-High Humidity
		7/23/08	0555	Cloudy; 64°F; Wind 0; No Moon Visible; Moderate-High Humidity
	Phillip Richards James Hickman	7/24/08	0553	Cloudy; 64°F; Wind 0; No Moon Visible; Moderate-High Humidity
		7/25/08	0551	Cloudy; 62°F; Wind 0-1; No Moon Visible; Moderate-High Humidity
5	Phillip Richards Cindy Dunn	7/22/08	0802	Cloudy; 68°F; Wind 0-1; No Moon Visible; Moderate-High Humidity
		7/23/08	0701	Cloudy; 66°F; Wind 0; No Moon Visible; Moderate-High Humidity
	Phillip Richards James Hickman	7/24/08	0651	Cloudy; 64°F; Wind 0-1; No Moon Visible; Moderate-High Humidity
		7/25/08	0720	Cloudy; 66°F; Wind 0; No Moon Visible; Moderate-High Humidity

Table 3. Trapline Description

Trapline	Trap Nights	Number of Traps	Trap Sequence	Physical Description	Vegetative Community
1	4	40	1 - 40	Along a north-facing slope; ground surface disturbed by disking; soils mostly loamy with gravel and cobbles; vegetation in early stages of recovery after 2007 wildfire; relatively low shrub cover with a few areas dominated by ruderal herbs	Southern mixed chaparral
2	4	30	41 - 70	Along terraces adjacent to north side of creek; soils loamy on upper terraces with gravel and cobbles on lower terraces; mixed densities of shrubs and willow trees	Southern willow scrub
3	4	30	71 - 100	Along terraces adjacent to south side of creek and base of north facing slope; soils loamy with gravel and cobbles (soils on slope disturbed by disking); dense riparian cover adjacent to creek and mixed densities of shrub cover (recovering after 2007 wildfires)	Southern willow scrub and southern mixed chaparral
4	4	60	101 - 160	Along south facing slope; mostly loamy soil with scattered rocky outcrops; dense shrub cover (most of this area not burned in 2007 wildfire)	Coastal Sage Scrub
5	4	40	161 - 200	Hilltop; ground surface disturbed by disking; soils mostly loamy with gravel and cobbles; vegetation in early stages of recovery after 2007 wildfire; relatively low shrub cover with a few areas dominated by ruderal herbs	Chamise chaparral

3.6 Medium and Large Mammals

For the purposes of this project, "medium and large mammals" include all mammals in the hare, rabbit, beaver, canid, procyonid, mustelid, skunk, cat, and cervid families.

3.6.1 Camera Tracking Stations

Remote camera stations were used to help document the presence of medium and large mammals within the Preserve. These stations allow for the detection of species that are rarely encountered because of their nocturnal or crepuscular activity patterns. Within the Preserve, two camera tracking stations were set up at locations that were judged to have a high potential for movement of medium and large mammals (e.g., along game trails, abandoned roadways, and hiking trails; Figure 5).

Each station consisted of one Moultrie infrared digital game camera. These cameras were programmed to record an image every time the motion sensor was triggered. Each image includes an information tag that records the date, time, temperature, camera id, and moon phase. Once in place the cameras were periodically checked and all recorded images were downloaded to a portable hard drive. This method allowed the cameras to record continuously throughout the study period (June 5 - September 3, 2008). The digital images were then interpreted and all animals were identified to the species level (Appendix B).

3.6.2 Mammal Track and Sign Survey

Sections of existing trails and roads were carefully examined for tracks and signs (e.g., scat, scrapings, etc.) of medium and large mammals throughout the survey season. These surveys were primarily conducted during the day; however, periodic nighttime surveys were also performed. Daytime surveys involved hiking accessible roads and trail reaches and periodic inspections of hilltops, ridges, drainages, and game trails. Nighttime surveys involved a combination of driving, hiking and listening within the Preserve. When feasible, handheld lights were used to identify any wildlife or wildlife signs observed during the survey. Finally, mammal tracks and sign were also carefully evaluated when detected during other fieldwork.

3.7 Bats

In this study, only passive Anabat surveys were conducted. Specifically passive surveys consisted of using Anabat II bat detectors (Titley Electronics, New South Wales, Australia). Anabat II bat detectors (Anabats) are utilized to detect and record bat echolocation signals (O'Farrell et al. 1999). These calls are then analyzed and most can be identified to the species level by a biologist experienced with bat vocalization identification. Passive Anabats are designed to automatically turn on and off at set times (i.e. sunset and sunrise), and automatically record bat echolocation signals to a compact flash card. Bat echolocation calls are then downloaded from the compact flash card to a computer and analyzed in the laboratory using specialized software designed for the Anabat system called 'Analook' (version 3.3q). An attempt was made to identify all recorded bat echolocation calls and an index of relative bat activity was generated by taking the number of bat call files recorded divided by the number of Anabat nights (number of Anabats times number of recording nights) multiplied by a factor of 10 to reduce use of fractional numbers.

Passive Anabats were used to survey for bats in the Preserve during three monitoring sessions: spring, summer, and fall 2008. During all three monitoring sessions, one passive Anabat unit was placed in the Preserve to monitor bats for three consecutive nights.

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4.0 Results and Discussion

4.1 Vegetation

Vegetation communities and land cover types present within the Preserve consist of southern mixed chaparral, chamise chaparral, southern maritime chaparral, Diegan coastal sage scrub, valley needlegrass grassland, non-native grassland, southern willow scrub, riparian scrub and disturbed habitat (Figure 6, Table 4). A description of the vegetation communities and the dominant plant species detected during the survey are found below. A complete list of plant species observed within the Preserve is provided as Appendix A.

Table 4. Vegetation Communities and Land Cover Types within the Preserve

Vegetation/Land Cover Type	Acreage
Southern Mixed Chaparral	30.2
Southern Maritime Chaparral	4.94
Chamise Chaparral	12.05
Diegan Coastal Sage Scrub	28.0
Valley Needlegrass Grassland	7.1
Non-native Grassland	98.0
Southern Willow Scrub	8.3
Riparian Scrub	0.82
Disturbed Habitat	5.0
Total	**194.5**

4.1.1 Southern Mixed Chaparral (37120)

Southern mixed chaparral is a broad-leaved sclerophyll shrub community forming dense often impenetrable vegetation dominated by Chamise (*Adenostoma fasciculatum*), Mission Manzanita (*Xylococcus bicolor*), Lemonadeberry (*Rhus integrifolia*), and Toyon (*Heteromoles arbutifolia*). Other species observed during the field surveys included Laurel Sumac (*Malosma luarina*), Mexican Elderberry (*Sambucus mexicanus*), Poison Oak (*Toxicodendron diverilobum*), Bushrue (*Cneoridium dumosum*), and Spiny

Redberry (*Rhamnus crocea*). This community is found along the steep north facing slopes located within the southern portion of the Preserve.

4.1.2 Southern Maritime Chaparral (37C30)

Southern maritime chaparral is a broad-leaved sclerophyll shrub community restricted to the coastal fog belt in San Diego County. Indicator plants observed within the Preserve included Del Mar Manzanita (*Arctostaphylos glandulosa* ssp. *glandulosa*) and Nuttall's Scrub Oak (*Quercus dumosa*). Other plants observed included Bushrue, Chamise, Toyon, California Adolphia (*Adolphia californica*), and Black Sage (*Salvia mellifera*). This community is located in the southeastern portion of the Preserve.

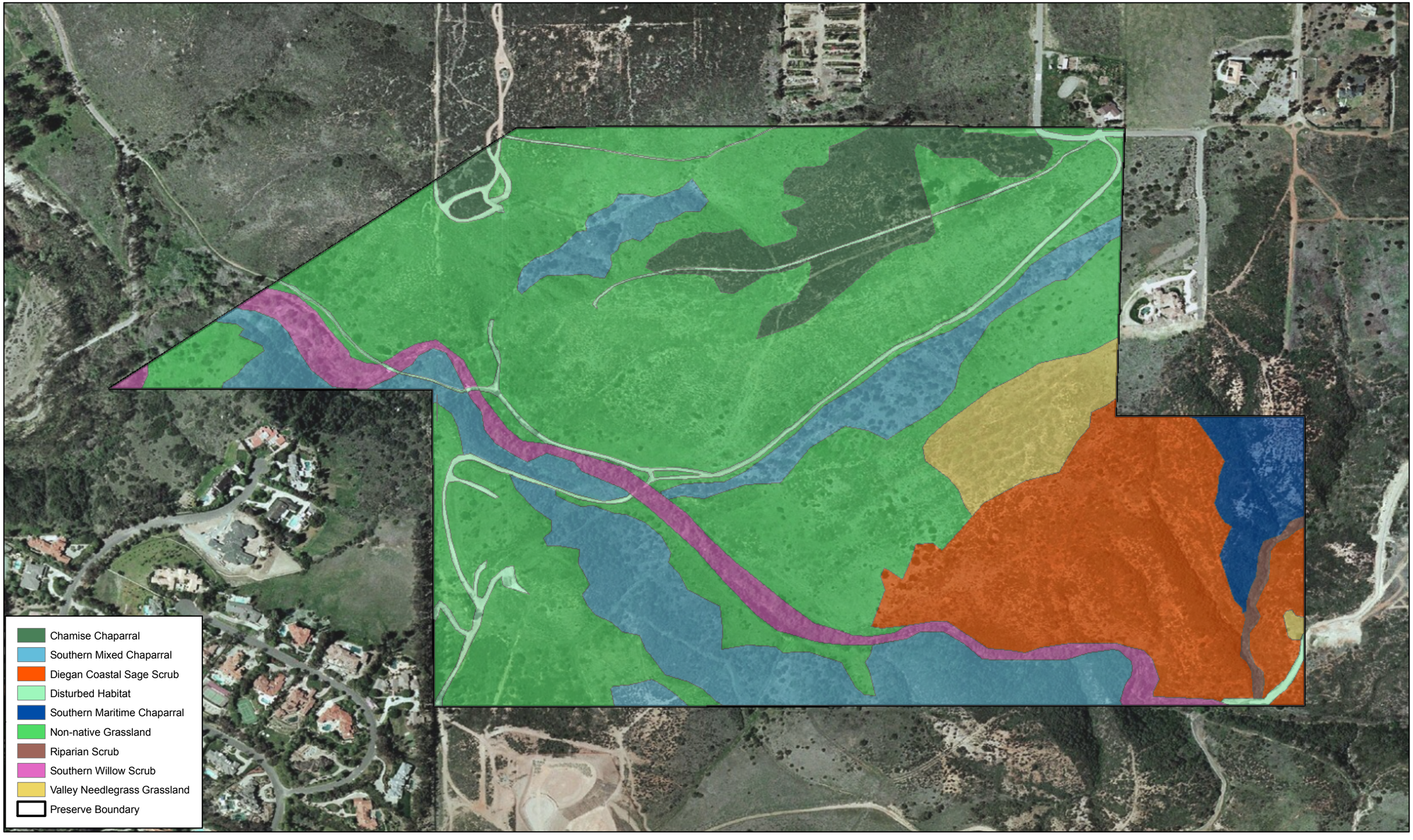
4.1.3 Chamise Chaparral (37200)

Chamise chaparral is a broad-leaved sclerophyll shrub community consisting almost entirely of Chamise. Other plants observed during the field surveys included Bushrue and Black Sage. This community is located in the northeastern portion of the Preserve.

4.1.4 Non-Native Grassland (42200)

Non-native grassland is characterized by a dense to sparse cover of annual grasses reaching up to one m (three ft), which may include numerous native wildflowers, particularly in years of high rainfall. These annuals germinate with the onset of the rainy season and set seeds in the late spring or summer. This community is usually found on fine-textured soils that proceed from moist or waterlogged in the winter to very dry during the summer and fall (Holland 1986). Non-native grasslands, in many circumstances, have replaced native grasslands as a result of disturbance (directly manmade [e.g., mechanical disturbance, grazing] or natural [i.e. altered fire cycles]).

Due to the 2007 Witch Fire, it is likely that non-native grasslands within the Preserve have replaced areas of maritime succulent sage scrub and Diegan coastal sage scrub. Dominant plants observed within the Preserve included Tocolate (*Centaurea melitensis*), Short-pod Mustard (*Hirchfeldia incana*), Foxtail Chess (*Bromus madritensis*), Slender Wild Oat (*Avena barbata*), Rip Gut (*Bromus diandrus*), Common Tarweed (*Deinandra fasciculatum*), and Graceful Tarplant (*Holocarpha virgata* ssp. *elongata*). Non-native grasslands are abundant and occur throughout most of the Preserve except for the southeastern most portions.



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Feet

Figure 6
Vegetation Communities
Lusardi Creek Preserve

4.1.5 Valley Needlegrass Grassland (42110)

Valley needlegrass grasslands consist of midheight grasses dominated by perennial tussock forming Purple Needlegrass (*Nassella pulchra*). On site this community was strongly associated with heavy clay soils and mima topography located along the ridge tops southeast of the main dirt road that bisects the Preserve. Characteristic species observed included Common Tarplant, Blue Eyed Grass (*Sysrinchium bellum*), Wild Celery (*Apiastrum angustifolium*), Blue Dicks (*Dichelostemma capitata*), San Diego Barrel Cactus (*Ferocactus viridescens*), Palmer's Grappling Hook (*Harpagonella palmeri*), Ashy Spike Moss (*Sellaginella cinerascens*), and Variegated Dudleya (*Dudleya variegata*).

4.1.6 Diegan Coastal Sage Scrub (32500)

Diegan coastal sage scrub is a native habitat type composed of a variety of soft, low, aromatic shrubs characteristically dominated by drought-deciduous species. It typically develops on south-facing slopes and other xeric situations (Holland 1986). Dominant plants observed on site included California Sagebrush (*Artemisia californica*), California Buckwheat (*Eriogonum fasciculatum*), Black Sage, Bushrue, Laurel Sumac, and California Adolphia. Diegan coastal sage scrub occurs primarily within the southeastern portion of the Preserve. However, this vegetation community was likely more widespread within the Preserve prior to the 2007 Witch Fire.

4.1.7 Southern Willow Scrub (63320)

Southern willow scrub consists of a dense broad-leafed winter deciduous riparian thicket dominated by Arroyo Willow (*Salix lasiolepis*), Red Willow (*Salix laevigata*) and Mule-fat (*Baccharis salicifolia*). Dominant understory plants observed within this community included San Diego Marsh Elder (*Iva hayesiana*), Southwestern Spiny Rush (*Juncus acutus* ssp. *leopoldii*), and Yerba Mansa (*Anemopsis californica*). Southern willow scrub occurs throughout the center portion of the Preserve and is specifically associated with Lusardi Creek.

4.1.8 Riparian Scrub (63300)

Riparian scrub within the Preserve consists of a dense mixture of perennial wetland shrubs including Southwestern Spiny Rush, San Diego Marsh Elder and San Diego Carex (*Carex spissa*). This community occurs within a tributary to Lusardi Creek in the southeastern most portion of the Preserve.

4.1.9 Disturbed Habitat (11300)

Disturbed habitat within the Preserve consists entirely of existing dirt roads that are used by the SDCWA and SDG&E to access infrastructure within and immediately adjacent to the Preserve.

4.1.10 Special-Status Plant Species

The following section discusses special-status plant species observed within the Preserve. A special-status plant species is one listed by federal or state agencies as threatened or endangered; considered to be of special status by one or more special interest groups, such as the California Native Plant Society (e.g., CNPS List 1, 2, 3, and 4 Plant Species); or is included on the County's Sensitive Plant list (Group A, B, C, or D Listed Plants).

Special-status plant species observed within the Preserve consist of Graceful Tarplant, Small Flowered Morning Glory (*Convolvulus simulans*), Nuttall's Scrub Oak, Del Mar Manzanita, Robinson's Pepper Grass (*Lepidium virginicum* spp. *robinsonii*), Summer Holly (*Comarostaphylos diversifolia*), Western Dichondra (*Dichondra occidentalis*), California Adolphia, Palmer's Grappling Hook (*Harpagonella palmeri*), Variegated Dudleya (*Dudleya variegata*), San Diego Barrel Cactus (*Ferocactus viridescens*), San Diego Marsh Elder, and Southwestern Spiny Rush.

Special-Status Plant Species Observed

Graceful Tarplant (*Holocarpha virgata* ssp. *elongata*)

CNPS List 4, San Diego County Group D

Graceful Tarplant is typically found within non-native grasslands. This species is found within the non-native grasslands along the western portion of the Preserve (Figure 7).

Small Flowered Morning Glory (*Convolvulus simulans*)

CNPS List 4, San Diego County Group D

Small Flowered Mourning Glory is found on clay soils which are typically devoid of shrubs. This species is found on clay soils atop the mesa within the eastern portion of the Preserve (Figure 7).

Nuttall's Scrub Oak (*Quercus dumosa*)

CNPS List 1B, San Diego County Group A

Invasive Plant Species

- Castorbean
- Date Palm
- Eucalyptus Tree
- Fan Palm
- Giant Reed
- Pampas Grass
- Tamarisk
- Graceful Tarplant
- San Diego Marsh Elder & Southwestern Spiny Rush
- Graceful Tarplant
- Small Flowering Morning Glory
- Nuttall's Scrub Oak
- Del Mar Manzanita
- Robinson's Pepper Grass
- Summer Holly
- Western Dichondra
- California Adolphia
- Palmer's Grappling Hook
- San Diego Barrel Cactus
- Variegated Dudleya
- San Diego Marsh Elder
- Southwestern Spiny Rush
- Preserve Boundary

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Figure 7
Special Status Plant Species
Lusardi Creek Preserve

Nuttall's Scrub Oak is a shrub that grows within coastal chaparral. This species occurs within the southern maritime chaparral located along the easternmost portion of the Preserve (Figure 7).

Del Mar Manzanita (*Arctostaphylos glandulosa* ssp. *glandulosa*)

Federally Endangered, CNPS List 1B, MSCP Covered Species, San Diego County Group A

Del Mar Manzanita occurs within coastally influenced chaparral in San Diego County. This species occurs within the southern maritime chaparral located along the easternmost portion of the Preserve (Figure 7).

Robinson's Pepper Grass (*Lepidium virginicum* spp. *robinsonii*)

CNPS List 1B, San Diego County Group A

Robinson's Pepper Grass occurs within openings in chaparral and coastal sage scrub. This species was observed atop the mesa in the southeastern portion of the Preserve (Figure 7).

Summer Holly (*Comarostaphylos diversifolia*)

CNPS List 1B, San Diego County Group A

Summer Holly typically occurs in southern mixed chaparral and southern maritime chaparral. This species was observed within the southern mixed chaparral located just south of Lusardi Creek (Figure 7).

Western Dichondra (*Dichondra occidentalis*)

CNPS List 4, San Diego County Group D

Western Dichondra is an annual herb that typically grows in southern mixed chaparral, Diegan coastal sage scrub, and grasslands. This species was observed atop the two most northern mesas in the Preserve (Figure 7).

California Adolphia (also known as San Diego Adolphia) (*Adolphia californica*)

CNPS List 2, San Diego County Group B

California Adolphia occurs primarily within Diegan coastal sage scrub. This species was common throughout most of the upland habitats within the Preserve (Figure 7).

Palmer's Grappling Hook (*Harpagonella palmeri*)

CNPS List 2, San Diego County Group B

Palmer's Grappling Hook is associated with clay soils within coastal sage scrub. This species is found on clay soils atop the mesa within the central portion of the Preserve (Figure 7).

Variegated Dudleya (*Dudleya variegata*)

CNPS List 1B, MSCP Covered Species, San Diego County Group A

Variegated Dudleya is associated with openings within chaparral and coastal sage scrub. This perennial from corm (or underground plant stem) prefers clay soils and is typically found within close proximity to vernal pools. This species is found within the valley needlegrass grasslands located within the eastern portion of the Preserve (Figure 7).

San Diego Barrel Cactus (also known as Coast Barrel Cactus) (*Ferocactus viridescens*)

CNPS List 2, MSCP Covered Species, San Diego County Group B

San Diego Barrel Cactus is associated with Diegan coastal sage scrub and maritime succulent scrub. This species was widely distributed within the non-native grassland and Diegan coastal sage scrub in the Preserve.

San Diego Marsh Elder (*Iva hayesiana*)

CNPS List 2, San Diego County Group B

San Diego March Elder is associated with intermittent streambeds, seeps and sandy alluvial embankments. This species was a dominant understory shrub within the southern willow scrub in Lusardi Creek (Figure 7).

Southwestern Spiny Rush (*Juncus acutus* ssp. *leopoldii*)

CNPS List 4, San Diego County Group 4

Southwestern Spiny Rush is associated with intermittent streambeds and seeps. This species was a dominant understory shrub within the southern willow scrub in Lusardi Creek (Figure 7).

Special-Status Plant Species not Observed but with a High Potential to Occur

Thread-leaved Brodiaea (*Brodiaea filifolia*)

CNPS List 1B, San Diego Count Group A, MSCP Covered Species

Thread-leaved Brodiaea is a perennial from corm that is typically found in vernally moist grasslands. The CNDDB reports this species from less than 0.3-

mile from the eastern Preserve boundary. Appropriate habitat for Thread-leaved Brodiaea occurs throughout most of the Preserve.

4.1.11 Invasive Plant Species

In general, the upland areas within the Preserve are dominated primarily by native or naturalized plant species although a burned patch of Eucalyptus trees (*Eucalyptus* sp.) does occur within northeastern portion of the Preserve. Several invasive plant species were also observed within Lusardi Creek. These plants included Tamarisk (*Tamarix ramosissima*), Castor Bean (*Ricinus communis*), Canary Island Date Palm (*Phoenix canariensis*), Fan Palm (*Washingtonia fillifera*), Giant Reed (*Arundo donax*), and Pampas Grass (*Cortaderia* sp.) (Figure 7).

4.2 Invertebrates

All invertebrates identified on the Preserve below the level of family are included in Appendix B.

4.2.1 Butterflies

Butterfly species observed on the Preserve include Sara's Orangetip (*Anthocaris sara*), Behr's Metalmark (*Apodemia mormo virgulti*), Brown Elfin (*Callophyrys augustinus*), Funereal Duskywing (*Erynnis funeralis*), Pale Swallowtail (*Papillo eurymedon*), Common White (*Pontia protodice*), Painted Lady (*Vanessa cardui*), and Orange Sulfur (*Colias eurytheme*).

No Quino Checkerspot Butterfly (*Euphydras editha quino*) surveys were performed because the Preserve is outside of the USFWS recommended survey area. However, the primary host plant for Quino Checkerspot Butterflies, the Dwarf Plantain (*Plantago erecta*), is abundant on the hilltops north of Lusardi Creek.

4.2.2 Other Invertebrates

Sixteen other invertebrate species were captured in the pitfall traps associated with the herpetological array or observed during other fieldwork (Appendix B). These species were identified in the field, or photographed and provided to a local entomologist to identify. No invertebrate species were collected.

4.2.3 Special-Status Invertebrate Species

No special-status invertebrate species are reported within the Preserve by the CNNDB (CDFG 2008).

Special-Status Invertebrate Species Observed

No special-status butterfly species or other invertebrate species were detected during any surveys.

Special-Status Invertebrate Species not Observed but with a High Potential to Occur

No special-status invertebrate species have high potential to occur at the Preserve.

4.3 Amphibians

One amphibian species, Western Toad (*Bufo boreas*), was captured in the pitfall traps during the 2008 sampling period at the Preserve. Two additional amphibian species, Pacific Chorus Frog (*Pseudacris regilla*) and Bullfrog (*Rana catesbeiana*), were identified from tadpoles during dip-netting within Lusardi Creek.

Other amphibians with potential to occur are limited to Arboreal Salamander (*Aneides lugubris*), Garden Slender Salamander (*Batrachoseps major major*), Common Ensatina (*Ensatina eschscholtzi*), California Chorus Frog (*Pseudacris cadaverina*), and Western Spadefoot (*Spea hammondii*). Western Spadefoot is the only sensitive species with potential to occur.

4.3.1 Special-Status Amphibian Species

Special-Status Amphibian Species Observed

No sensitive amphibian species were detected during the 2008 surveys.

Special-Status Amphibian Species not Observed but with a High Potential to Occur

Western Spadefoot (*Scaphiopus [=Spea] hammondii*)

State Species of Special Concern, San Diego County Group II

The Western Spadefoot range covers the central portion of northern California, the Great Valley, and Coast Ranges from San Francisco to Baja California (Lemm 2006). Although they spend the great majority of their life outside water, they require temporary rain pools with water temperatures between 48° and 86°F (9° and 30° C) lasting upwards of three weeks. These pools must also lack predators of eggs and tadpoles such as introduced fishes, bullfrogs, and crayfishes (Jennings and Hayes 1994). Vernal pools are sometime occupied, but in all cases the species must have access to soils suitable for digging to allow estivation during the dry season. Tolerance of disturbance is high where conditions are otherwise suitable, and the species is sometimes found in pools resulting from landscape modification by man, even adjacent to roads. This species has high potential to occur in pooled areas of Lusardi Creek.

4.4 Reptiles

During the 2008 sampling at the Preserve, nine reptile species were detected (Table 5, Appendix B). The following six reptile species were captured by arrays: Southern Alligator Lizard (*Elgaria multicarinata*), Western Fence Lizard (*Sceloporus occidentalis*), Coronado Skink (*Eumeces skiltonianus interparietalis*), Orange-throated Whiptail (*Cnemidophorus hyperythrus beldingi*), Coastal Western Whiptail (*Cnemidophorus tigris stejnegeri*), and Longnose Snake (*Rhinocheilus lecontei*). Three species were observed or detected but not captured in the arrays: Side-blotched Lizard (*Uta stansburiana*), Common Kingsnake (*Lampropeltis getula*), and Red Diamond Rattlesnake (*Crotalus ruber ruber*).

Based on the presence of potentially suitable habitat, several additional reptile species may also occur. Sensitive species include: California Legless Lizard (*Anniella pulchra*), San Diego Horned Lizard (*Phrynosoma coronatum blainvillii*), San Diego Ringneck Snake (*Diadophis punctatus similis*), Coastal Rosy Boa (*Lichanura trivirgata roseofusca*), Coastal Patch-nosed Snake (*Salvadora hexalepis vigultea*), and Two-striped Garter Snake (*Thamnophis hammondii*). Other potential species include Western Banded Gecko (*Coleonyx variegatus*), Gilbert's Skink (*Eumeces gilberti*), Granite Spiny Lizard (*Sceloporus orcutti*)Granite Night Lizard (*Xantusia henshawi*), Western Racer (*Coluber mormon*), Western Blind Snake (*Leptotyphlops humilis*), Night Snake (*Hypsiglena torquata*), Coachwhip (*Masticophis flagellum*), Striped Racer (*Masticophis lateralis*), Gopher Snake (*Pituophis catenifer*), Speckled Rattlesnake (*Crotalus mitchellii*), Southern Pacific Rattlesnake (*Crotalus*

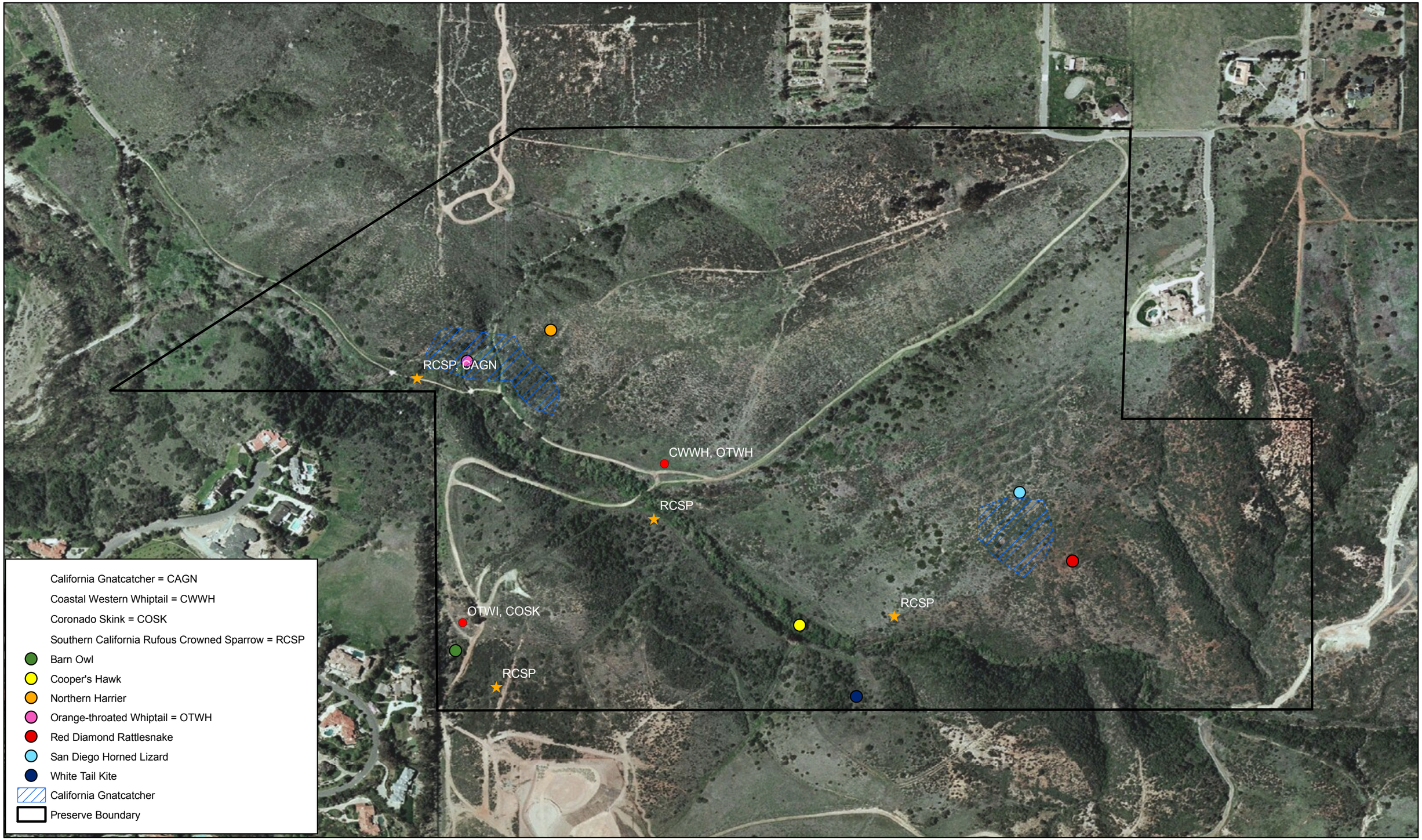

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Figure 8
Special Status Wildlife Species
Lusardi Creek Preserve

oreganus), Western Blackhead Snake (*Tantilla planiceps*), and Lyre Snake (*Trimorphodon biscutatus*).

Table 5. Reptile Species Observed or Captured within the Preserve during 2008 Surveys

Scientific Name	Common Name	Special Status
Elgaria multicarinata	Southern Alligator Lizard	
Sceloporus occidentalis	Western Fence Lizard	
Uta stansburiana	Side-blotched Lizard	
Eumeces skiltonianusinterparietalis	Coronado Skink	CSC, CSDS Group II
Cnemidophorus hyperythrus beldingi	Orange-throated Whiptail	CSC, MSCP, CSDS Group II
Cnemidophorus tigris stejnegeri	Coastal Western Whiptail	CSDS Group II
Lampropeltis getula	Common Kingsnake	
Rhinocheilus lecontei	Longnose Snake	
Crotalus ruber ruber	Red Diamond Rattlesnake	CSC, CSDS Group II

CSC= California Species of Concern, MSCP= Multiple Species Conservation Program, CSDS= County of San Diego Sensitive Animal

4.4.1 Special-Status Reptile Species

Four special-status reptile species were detected during the surveys. These include Coronado Skink, Orange-throated Whiptail, Coastal Western Whiptail, and Red Diamond Rattlesnake.

Special-Status Reptile Species Observed

Coronado Skink (*Eumeces skiltonianus interparietalis*)

State Species of Special Concern, San Diego County Group II

The Coronado Skink is a medium-sized secretive lizard that is typically found in the moister areas of coastal sage, chaparral, oak woodlands, pinon-juniper, riparian woodlands and pine forests (Jennings and Hayes 1994). Their prey includes small invertebrates found in leaf litter or dense vegetation at the edges of rocks and logs. The Coronado skink is found along the coastal plain and Peninsular Ranges west of the deserts from approximately San Gorgonio Pass in Riverside County south to San Quentin, Mexico (Jennings and Hayes 1994). This species was captured in array 2 (Figure 8) and is presumed to inhabit the main valley that supports Lusardi Creek.

Orange-throated Whiptail (*Cnemidophorus hyperythrus beldingi*)

State Species of Special Concern, MSCP Covered Species, San Diego County Group II

The Orange-throated Whiptail is a medium-sized lizard that ranges from Southern California (specifically Corona del Mar in Orange County and Colton in San Bernardino County) southward to the tip of Baja California, Mexico. Historically, most populations of the Orange-throated Whiptail were found on floodplains or terraces along streams in brushy areas with loose soil and rocks (McGurty 1980). Habitat types they are known to use include chaparral, non-native grassland, coastal sage scrub, juniper woodland, and oak woodland. California Buckwheat is an important indicator of appropriate habitat for Orange-throated Whiptails (Dudek 2000). This plant species is a colonizer of disturbed, sandy soils and usually indicates open shrub spacing that is required for foraging and thermoregulatory behavior. Orange-throated Whiptails appear to be dietary specialists with most (> 85%) of its prey being comprised of termites (Dudek 2000). The decline of Orange-throated Whiptails is likely due to loss of habitat to agriculture and urban development. This species was captured in both arrays 1 and 2 and was also observed during active surveys in the chaparral and scrub habitats west of array 2 (Figure 8). This species is presumed to be abundant within the Preserve.

Coastal Western Whiptail (*Cnemidophorus tigris multiscutatus*)

San Diego County Group II

Coastal Western Whiptail is a medium-sized slender lizard that is found in arid and semiarid desert to open woodlands where the vegetation is sparse (Stebbins 2003). Its range includes coastal Southern California and western Baja California. The decline of Coastal Western Whiptails is likely due to loss of habitat to agriculture and urban development. This species was captured in array 2, and observed during active searches within the chaparral and scrub habitats within the Preserve (Figure 8). This species is presumed to be abundant within the Preserve.

Red Diamond Rattlesnake (*Crotalus ruber ruber*)

State Species of Special Concern, San Diego County Group II

The Red Diamond Rattlesnake is a large, heavy-bodied rattlesnake that has a wide tolerance for varying environments and can be found in a variety of vegetation types, but it is most commonly seen in areas with heavy brush and cactus, rocks or boulders (Stebbins 2003). The known range extends from San Bernardino County along the coastal and desert slopes southward to Baja California. Adult Red Diamond Rattlesnakes eat mostly squirrels and rabbits but lizards, specifically the Western Whiptail, are a significant food source for juveniles (Jennings and Hayes 1994). Urban development and the trend towards planting orchards on the steeper rocky hillsides have significantly decreased the amount of appropriate habitat for this species (Jennings and Hayes 1994).This species was observed within the coastal sage scrub north of Lusardi Creek (Figure 8). The majority of the Preserve supports appropriate habitat for this species.

Special-Status Reptile Species not Observed but with a High Potential to Occur

San Diego Horned Lizard (*Phyrnosoma coronatum blainvillii*)

State Species of Special Concern, San Diego County Group II

The San Diego Horned Lizard is a large lizard that historically was found in Kern, Los Angeles, Santa Barbara, and Ventura counties southward to Baja California, Mexico. Horned Lizards inhabit a variety of vegetation communities including coastal sage, annual grassland, chaparral, oak woodland, riparian woodland, and coniferous forest (Stebbins 2003). Loose, fine soils with a high sand content, an abundance of prey and open areas with limited overstory typify suitable habitat for this species (Jennings and Hayes 1994).

The San Diego Horned Lizard's insectivorous diet consists mostly of native Harvester Ants (*Pogonmyrmex* sp.) which make up over 90% of their prey items, but it is an opportunistic feeder that will take other insects including termites, beetles, flies, wasps, and grasshoppers (Stebbins 2003, Jennings and Hayes 1994). This species has disappeared from about 45% of its former range and a number of factors have led to this decline including habitat fragmentation and degradation, loss of native prey to exotic species, and extensive collection for the curio trade (Jennings and Hayes 1994). The specialized diet of Harvester Ants has made Horned Lizards especially vulnerable to extirpation since the introduction of Argentine Ants (*Linepithema humile)*. The majority of the Preserve supports appropriate habitat for this species.

Coastal Rosy Boa (*Charina trivirgata roseofusca*)

San Diego County Group II

Coastal Rosy Boas are heavy-bodied snakes that inhabit arid scrublands, semi-arid and rocky shrublands, rocky deserts, canyons, and other rocky areas (Stebbins 2003). This species eats rodents, small birds, lizards, small snakes, and amphibians and kills its prey by constriction. Coastal Rosy Boas occur in southwestern California from the coastal slopes of the San Gabriel and San Bernardino mountains, and across the peninsular ranges into the desert in San Diego County (Stebbins 2003). Threats to this species include habitat degradation and fragmentation from urban development. This species has the potential to occur in any of the habitats found on the Preserve.

Coast Patch-nosed Snake (*Salvadora hexalepis virgutea*)

State Species of Special Concern, San Diego County Group II

The Coast Patch-nosed Snake is a medium-sized, slender snake that is a habitat generalist that makes use of whatever vegetative cover is available and thrives in most environments. It is also a generalist in its diet, opportunistically feeding on anything it can overpower including small mammals, lizards, and the eggs of

lizards and snakes. The species ranges from Creston in San Luis Obispo County southward into Baja California (Stebbins 2003). This species' decline is likely due to conversion of habitat to development, agriculture or non-native plant species. This species has high potential to occur throughout the Preserve due to presence of suitable habitat.

Two-striped Garter Snake (*Thamnophis hammondii)*

State Species of Special Concern, San Diego County Group I

Two-striped Garter Snake occurs west of the deserts and Central Valley from Salinas, Monterey County, south into Baja California, and at elevations from sea level up to about 2,438 m (8,000 ft) in the San Jacinto Mountains (Jennings and Hayes 1994). It is often in water and rarely found far from it, though it is also known to inhabit intermittent streams having rocky beds bordered by willow thickets or other dense vegetation (Jennings and Hayes 1994). They will also inhabit large riverbeds such as those of the Santa Ana and Santa Clara Rivers if riparian vegetation is available, and even occur in artificial impoundments if both aquatic vegetation and suitable prey items (small amphibians and fish) are present (Jennings and Hayes 1994). Declines are attributable directly to loss of riparian habitats. This species has potential to occur within Lusardi Creek.

San Diego Ringneck Snake (*Diadophis punctatus similis*)

San Diego County Group II

The San Diego Ringneck Snake is a small, thin snake that prefers moist habitats, including wet meadows, rocky hillsides, gardens, farmland, grassland, chaparral, mixed coniferous forests, and woodlands (Stebbins 2003). It is secretive in its behavior, usually found under the cover of rocks, wood, bark, boards, and other surface debris. Ringneck snakes eat small salamanders, tadpoles, small frogs, small snakes, lizards, worms, slugs, and insects. This species' range includes San Diego County along the coast and into the Peninsular range, southwestern San Bernardino County, and barely south into northern Baja California (Stebbins 2003). Threats to this species include habitat degradation and fragmentation from urban development. This species has high potential to occur throughout the Preserve due to presence of suitable habitat.

4.5 Birds

Avian species richness (total species detected) was found to be moderate at the Preserve. In total, 55 bird species were detected with 47 bird species detected during the point counts and eight species detected during other fieldwork (Table 6). These included year-round residents, winter-only species, breeding species that migrate to the Neotropics, and species that are strictly migratory through the Preserve, neither breeding nor wintering there.

The Preserve's avifauna is a mixture of species that are closely associated with the riparian habitat and Diegan coastal sage scrub. These species include Anna's Hummingbird (*Calypte anna*), Nuttall's Woodpecker (*Picoides nuttallii*), Ash-throated Flycatcher (*Myiarchus cinerascens*), Bushtit (*Psaltriparus minimus*), Bewick's Wren (*Thryomanes bewickii*), House Wren (*Troglodytes aedon*), Wrentit (*Chamaea fasciata*), Common Yellowthroat (*Geothlypis trichas)*, Spotted Towhee (*Pipilo maculates*), California Towhee (*Pipilo crissalis*), Southern California Rufous-crowned Sparrow (*Aimophila ruficeps canescens*), Song Sparrow (*Melospiza melodia*), Black-headed Grosbeak (*Pheucticus melanocephalus*), Blue Grosbeak (*Passerina caerulea*), Lazuli Bunting (*Passerina amoena*), House Finch (*Carpodacus mexicanus*), and Lesser Goldfinch (*Carduelis psaltria*).

The Preserve has a good diversity of raptors (birds of prey), including seven observed raptor species: White-tailed Kite (*Elanus leucurus*), Northern Harrier (*Circus cyaneus*), Cooper's Hawk (*Accipiter cooperii*), Red-tailed Hawk (*Buteo jamaicensis*), American Kestrel (*Falco sparverius*), Barn Owl (*Tyto alba*) and Great Horned Owl (*Bubo virginianus*). These birds are using the Preserve for foraging and some species have potential to breed on site; however, no active raptor nests were observed.

There is no reasonable potential for Southwestern Willow Flycatcher (*Empidonax traillii extimus*) to occur at the Preserve beyond rare and brief visits, due to lack of suitable habitat. The riparian habitat on site is more of a secondary riparian system and this species is typically found in mature and extensive stands of riparian habitat. It is likely that other subspecies of Willow Flycatcher pass through the Preserve in spring and fall, though they were not recorded during the current work. There is potential for Least Bell's Vireo (*Vireo bellii pusillus*) to occur at the Preserve. The riparian habitat within the Preserve has a dense understory and there is an upper canopy in some areas, both of which are required by this species.

Two non-native or invasive bird species were detected during the surveys: European Starling (*Sturnus vulgaris*) and Brown-headed Cowbird (*Molothrus ater*). Brown-headed Cowbird, an obligate brood parasite, was apparently present only as a migrant and wanderer on the Preserve. Thirteen sightings of individuals, mainly males, were recorded on or over the Preserve. No juveniles were detected indicating that this species may not parasitize nests on the Preserve. There were 11 sightings of European Starling and these birds were at avian point count station 1 near the Eucalyptus trees and close to the homes. This species does not currently pose a significant threat to the native avian species on the Preserve.

4.5.1 Point Count Results

As detailed in Section 3.4, ten-minute avian point counts were conducted at four stations monthly from April through September 2008 (Figure 5). ICF Jones & Stokes' Wildlife Biologist Kylie Fischer conducted all of the counts.

A total of 55 bird species were detected during the survey of Lusardi Creek Preserve with 47 bird species detected during the point counts and eight species detected during other fieldwork (Table 6). The most regularly encountered and/or most numerous bird species were Anna's Hummingbird, Bushtit, Bewick's Wren, Wrentit, Common Yellowthroat, Spotted Towhee, California Towhee, Southern California Rufous-crowned Sparrow, Song Sparrow, House Finch, and Lesser Goldfinch.

Table 6. Avian Species Detected at the Preserve in 2008

Scientific Name	Common Name	Observed or Detected	Special Status	Breeding Status
Callipepla californica	California Quail	X		?
Ardea alba	Great Egret	O		
Elanus leucurus	White-tailed Kite	O	CFP, CSDS Group I	
Circus cyaneus	Northern Harrier	O	CSC, MSCP, CSDS Group I	
Accipiter cooperii	Cooper's Hawk	O	MSCP, CSDS Group I	
Buteo jamaicensis	Red-tailed Hawk	X		?
Falco sparverius	American Kestrel	X		?
Charadrius vociferus	Killdeer	X		
Zenaida macroura	Mourning Dove	X		pr
Geococcyx californianus	Greater Roadrunner	O		
Tyto alba	Barn Owl	O	CSDS Group II	?
Bubo virginianus	Great Horned Owl	X		pr
Chordeiles acutipennis	Lesser Nighthawk	X		pr
Phalaenoptilus nuttallii	Common Poorwill	O		pr
Archilochus alexandri	Black-chinned Hummingbird	X		
Calypte anna	Anna's Hummingbird	X		pr
Calypte costae	Costa's Hummingbird	X		?
Picoides nuttallii	Nuttall's Woodpecker	X		pr
Colaptes auratus	Northern Flicker	X		
Sayornis nigricans	Black Phoebe	X		pr
Sayornis saya	Say's Phoebe	X		
Myiarchus cinerascens	Ash-throated Flycatcher	X		?
Tyrannus vociferans	Cassin's Kingbird	X		CO
Vireo gilvus	Warbling Vireo	X		
Aphelocoma californica	Western Scrub-Jay	X		pr
Corvus brachyrhynchos	American Crow	X		
Corvus corax	Common Raven	X		

Scientific Name	Common Name	Observed or Detected	Special Status	Breeding Status
Stelgidopteryx serripennis	Northern Rough-winged Swallow	X		
Petrochelidon pyrrhonota	Cliff Swallow	X		
Psaltriparus minimus	Bushtit	X		pr
Thryomanes bewickii	Bewick's Wren	X		CO
Troglodytes aedon	House Wren	X		pr
Polioptila californica californica	Coastal California Gnatcatcher	X	FT, CSC, MSCP, CSDS Group I	pr
Chamaea fasciata	Wrentit	X		pr
Mimus polyglottos	Northern Mockingbird	X		pr
Toxostoma redivivum	California Thrasher	X		pr
Sturnus vulgaris	European Starling	X		?
Phainopepla nitens	Phainopepla	X		
Vermivora celata	Orange-crowned Warbler	X		
Geothlypis trichas	Common Yellowthroat	X		pr
Wilsonia pusilla	Wilson's Warbler	X		
Pipilo maculatus	Spotted Towhee	X		pr
Pipilo crissalis	California Towhee	X		pr
Aimophila ruficeps canescens	Southern California Rufous-crowned Sparrow (=California Rufous-crowned Sparrow)	X	MSCP, CSDS Group I	pr
Melospiza melodia	Song Sparrow	X		pr
Zonotrichia leucophrys	White-crowned Sparrow	X		
Pheucticus melanocephalus	Black-headed Grosbeak	X		pr
Passerina caerulea	Blue Grosbeak	X		
Passerina amoena	Lazuli Bunting	X		
Agelaius phoeniceus	Red-winged Blackbird	X		
Molothrus ater	Brown-headed Cowbird	X		?
Icterus cucullatus	Hooded Oriole	O		
Icterus bullockii	Bullock’s Oriole	X		
Carpodacus mexicanus	House Finch	X		pr
Carduelis psaltria	Lesser Goldfinch	X		pr

Legend

*=Non-native or Invasive species

Observed or Detected: X = detected during point count, O = Observed during other fieldwork, FB = overhead or fly-by only

Special Status: FE= Federally Endangered, FT=Federally Threatened, SE= State Endangered, CSC= California Species of Special Concern, CFP= California Fully Protected, MSCP= Multiple Species Conservation Program Covered Species,

Scientific Name	Common Name	Observed or Detected	Special Status	Breeding Status
CSDS=County of San Diego Sensitive Animal				
Breeding Status: CO = Confirmed breeding, pr = Probable breeder,? = Possible breeder. Rating is based on number of observations and period of observation (i.e. was the species identified throughout the breeding season or only during certain times of the year)				

Tables 7 and 8 provide quantitative summaries of the results for species and individuals. Station 1 shows a much higher number of observations than the other three points. This station is immediately adjacent to a stand of Eucalyptus trees and large numbers of House Finches and Lesser Goldfinches used these trees for roosting. The greatest number of species were detected at station 4 (34 species) and the lowest number was at station 1 (28 species). One observation of an unknown woodpecker species and unknown kingbird species were excluded from the calculation of total species. The woodpecker was only heard drumming, but was most likely a Nuttall's Woodpecker as this species was regularly observed at the Preserve. The kingbird was seen in flight and the lighting and circumstances did not allow the observer to see any identifying characteristics beyond type of bird. Two observations of unknown species were excluded from the species data but were included as bird observations. The biologist was confident that these observations were not of a bird that had already been documented during the point count.

Table 7. Avian Point Counts–Totals for Individuals*

	Point Count Stations					
Month	**1**	**2**	**3**	**4**	**Total # of Individuals**	**Mean # of Individuals**
April	40	31	37	55	163	40.8
May	53	25	26	26	130	32.5
June	42	26	33	37	138	34.5
July	53	20	27	35	135	33.8
August	67	21	21	24	133	33.3
September	57	15	23	36	131	32.8
Total # of Individuals	312	138	167	213	830	
Mean # of Individuals	52.0	23.0	27.8	35.5		34.6

* See Section 3.4.1 regarding the exclusion of individuals recorded as "fly-bys".

Table 8. Avian Point Counts–Totals for Species*

	Point Count Stations					
Month	**1**	**2**	**3**	**4**	**Total # of Species**	**Mean # of Species**
April	18	17	18	21	32	18.5
May	14	14	15	20	25	15.8
June	20	15	18	16	31	17.3
July	15	11	13	17	26	14.0
August	18	12	12	12	26	13.5
September	14	13	13	17	24	14.3
Total # of Species	28	31	32	34		31.25
Mean # of Species	16.5	13.7	14.8	17.2		17.8

* Birds not identified to species were excluded from the calculation. "Fly-by" species were included in the calculations.

4.5.2 Nocturnal Survey Results

The nocturnal bird surveys documented four nocturnal species using the Preserve: Barn Owl, Great Horned Owl, Lesser Nighthawk (*Chordeiles acutipennis*), and Common Poorwill (*Phalaenoptilus nuttallii*). One Barn Owl was detected flying from the Preserve to the adjacent Eucalyptus trees at the southern entrance to the Preserve. A Great Horned Owl pair was consistently detected near point count station 2 in the eastern portion of the Preserve. These birds were heard immediately prior to or during each sampling period at station 2. At least two Lesser Nighthawk use areas were identified and at least one Common Poorwill use area was detected. The Preserve supports low potential for one additional nocturnal species, the Western Screech-owl (*Megascops kennicottii*). There are no woodland vegetation communities on site, which is the preferred habitat of this species.

4.5.3 Special-Status Bird Species

The following six special-status species were detected during the point counts: White-tailed Kite, Northern Harrier, Cooper's Hawk, Barn Owl, Coastal California Gnatcatcher and Southern California Rufous-crowned Sparrow. See Figure 8 for locations of special-status birds detected during the surveys.

Special-Status Bird Species Observed

White-Tailed Kite (*Elanus caeruleus)*

State Fully Protected Species (nesting), San Diego County Group I

The White-tailed Kite is found in lower elevations in open grasslands, agricultural areas, wetlands, and oak woodlands. Their primary source of food is the California Vole (*Microtus californicus sanctidiegi*) (Unitt 2004). The White-tailed Kite typically forages in open undisturbed habitats and nests in the tops of dense oak, willow or other large trees (Unitt 2004). This species is on the decline mostly due to urban sprawl; however, it is still considered fairly widespread throughout the foothills of San Diego County (Unitt 2004).

White-tailed Kites were seen foraging over the Preserve. The riparian habitat in the center of the Preserve along Lusardi Creek is not mature enough to be used as nesting substrata. This species most likely nests in the surrounding habitat. The sighting at the Preserve is not regionally significant as this species is still widespread.

Northern Harrier (*Circus cyaneus*)

State Species of Special Concern, MSCP Covered Species, San Diego County Group I

The Northern Harrier is associated with open grassland and marshes. This species typically forages in open, undisturbed habitat and nests on the ground in areas of dense low-growing vegetation to help conceal the nest. Nesting Northern Harriers are now considered rare and the known breeding population in San Diego County is estimated at 25 to 75 pairs (Unitt 2004). As with other ground nesting grassland birds, the Northern Harrier population is on the decline due to urban sprawl (Unitt 2004).

A Northern Harrier was observed foraging over the Preserve in September. This bird scared up a flock of several hundred House Finches. There is minimal suitable breeding habitat within the boundary of the Preserve and if this species was nesting on the Preserve, the location would have been evident and identified through the course of the point count surveys. This species most likely nests in the surrounding area. If this species was to use the Preserve for breeding, it would be a regionally significant sighting.

Cooper's Hawk (*Accipiter cooperii*)

MSCP Covered Species, San Diego County Group I

The Cooper's Hawk is a resident of riparian deciduous habitats and oak woodlands but in recent times has become adapted to urban park environments (Unitt 2004). This species hunts their primary source of food, passerines, in broken woodlands and forest margins and they are also known to take fish and

mammals. The Cooper's Hawk population declined due to hunting and loss of habitat; however, this species is making a comeback through its adaptation to the urban environment (Unitt 2004).

A Cooper's Hawk was observed in April and was not observed again. This species may nest in surrounding habitat and use the Preserve sporadically for foraging. The sighting at the Preserve is not regionally significant as this species is still widespread.

Barn Owl (*Tyto alba*)

San Diego County Group II

The Barn Owl is the owl species that is most tolerant to urban sprawl. It will nest in buildings, nest boxes, at the base of the leaves in palm trees, and in cavities in native trees. Even though this species is tolerant of human development, dense housing communities do not provide suitable nesting habitat and increased traffic has a negative effect on the species (Unitt 2004).

A Barn Owl was detected flying from the Preserve to the adjacent Eucalyptus trees at the southern entrance to the Preserve. This bird most likely breeds in the adjacent habitat and forages on the Preserve. This sighting is not regionally significant as this species is still widespread.

Coastal California Gnatcatcher (*Polioptila californica californica*)

Federally Threatened, State Species of Special Concern, MSCP Covered Species, San Diego County Group I

The Coastal California Gnatcatcher (*Polioptila californica californica*) is a small resident insectivorous species whose occurrence is strongly associated with sage scrub habitats found throughout southern California into northern Baja California, Mexico. Although California Gnatcatchers have a close association with sage scrub, this species has also been documented using coastal sage-chaparral scrub, chamise chaparral and other habitat types such as the ecotone between coastal sage scrub and grasslands (Campbell et al. 1998, Bontrager 1991, K. Fischer pers. obs.). Habitat destruction, fragmentation and modification have led to this species' decline (USFWS 1993). Loss of habitat resulting from agriculture and urban development were leading causes of the species' decline until 2003 when the Cedar Fire destroyed almost 28% of the remaining habitat that the USFWS believed to be suitable for the Coastal California Gnatcatcher (Bond and Bradley 2003). The 2007 Witch Fire also decimated many acres of coastal sage scrub occupied by California Gnatcatchers. The extent of damage to the California Gnatcatcher population is unknown at this time.

Two use areas for the Coastal California Gnatcatcher were detected within the Preserve (Figure 8). One use area is in the burned western portion of the Preserve and the birds were detected at the riparian edge north to the top of the slope. This pair consists of male and female hatch year birds. Ms. Fischer was able to confirm male and female juvenile plumage on each bird. They were first detected

during a point count in June and were detected during each subsequent point count sampling period. All sightings of these birds were within recovering coastal sage scrub. The second use area is at the western edge of the unburned coastal sage scrub in the eastern portion of the Preserve. California Gnatcatchers were first detected at this location in July and during a survey in August an adult pair in breeding plumage was confirmed. An additional independent juvenile was also in the area but the adults did not appear to be feeding the bird. It can be assumed that this pair breeds in this area.

Regionally, the sighting at the Preserve may not have been significant as Coastal California Gnatcatchers are still found throughout San Diego County; however, as the status of the California Gnatcatcher population in San Diego is still unknown, all sightings should be considered significant and important to the continued existence of this species. The use of the burned coastal sage scrub is a significant sighting as the area is mostly dominated by non-native species at this stage of recovery.

Southern California Rufous-crowned Sparrow (*Aimophila ruficeps canescens*)

MSCP Covered Species, San Diego County Group I

The Southern California Rufous-crowned Sparrow is a resident species that is closely associated with coastal sage scrub, steep rocky hillsides, burned chaparral, and openings in mature chaparral (Unitt 2004). Preferring open habitat, with approximately 50 percent shrub cover, this species seeks cover in shrubs, rocks, grass, and forb patches (Dudek 2000, Unitt 2004). The Southern California subspecies is restricted to semiarid coastal sage scrub and sparse chaparral from Santa Barbara south to the northwestern corner of Baja California (Dudek 2000). Rufous-crowned Sparrows are declining due to loss of appropriate habitat and are sensitive to habitat fragmentation (Unitt 2004).

Southern California Rufous-crowned Sparrows were detected throughout the recovering coastal sage scrub found at the Preserve. As this species is still found throughout San Diego County in large numbers (Unitt 2004), the individuals detected do not represent a regionally significant population.

Special-Status Bird Species not Observed but with a High Potential to Occur

Turkey Vulture (*Cathartes aura*)

San Diego County Group I

Turkey Vultures are often seen foraging over woodlands and nearby open country (Unitt 2004). They prefer dry, open country and ranch lands and often occur along roadsides where carrion is common. They nest in crevices among granite boulders (Unitt 2004). The Turkey Vulture's range has been retracting

from the coast due to human disturbance, loss of foraging habitat and pesticide contamination (Unitt 2004). This species is still common in the undeveloped areas of east San Diego County. Turkey Vultures have high potential to forage over the Preserve but there is no nesting habitat present.

Sharp-shinned Hawk (*Accipiter striatus*)

San Diego County Group I

Sharp-shinned Hawks breed in young coniferous forests with high canopies. This species has not been documented breeding in San Diego, however, some summer sightings have been recorded (Unitt 2004). It is considered a fairly common migrant and winter resident, except in areas with deep snow (Dudek 2000). The known population breeding within California is very small and is vulnerable to impacts from falconry and logging. This species has high potential to occur as a migrant within the Preserve.

Merlin (*Falco columbarius*)

San Diego County Group II

The Merlin is most often seen in grasslands but has the potential to occur in any habitat type except dense woodland (Unitt 2004). This species is a rare winter visitor to San Diego County that feeds mostly on small birds and can be found where small birds flock (Unitt 2004). This species has high potential to occur as a migrant within the Preserve.

Loggerhead Shrike (*Lanius ludovicianus*)

State Species of Special Concern, San Diego County Group I

Loggerhead Shrikes are found near grassland, open sage scrub and chaparral, and desert scrub (Unitt 2004). They nest in dense vegetation adjacent to their open foraging habitats. Shrikes prefer to sit on an exposed tree limb or utility line looking for prey. They attack their prey from either a hovering flight above, or from their perch. The Loggerhead Shrike population in San Diego County is on the decline due to loss of habitat to development and habitat fragmentation (Unitt 2004). The species is still found throughout the County on the coastal plain and into the desert. Loggerhead Shrikes have been documented in the general vicinity (Unitt 2004) and have high potential to forage and nest at the Preserve.

California Horned Lark (*Eremophila alpestris actia*)

San Diego County Group II

The California Horned Lark is a resident of a variety of open habitats, usually where trees and large shrubs are absent (Zeiner *et al.* 1990). This subspecies primarily breeds in open fields and grasslands and is found along the coastal slope of San Diego County east to Jacumba (Unitt 2004). Continuing threats to this species include habitat destruction and fragmentation. This species has been

documented in the general vicinity (Unitt 2004) and has a high potential to occur on the Preserve.

Bell's Sage Sparrow (*Amphispiza belli belli*)

San Diego County Group I

The Bell's Sage Sparrow is a resident species that is usually found in chaparral and coastal sage scrub in southern California into Baja California. This mostly ground-dwelling species prefers open chaparral and sage scrub and is one of the first species to inhabit recently burned habitat (Unitt 2004). This subspecies occurs along the coastal lowlands, inland valleys, and in the lower foothills of the local mountains in southern California into Baja California (Dudek 2000). The decline in this species can be attributed to fire suppression, invasion by exotic plant species, loss of habitat to agriculture and urban development, and population isolation due to habitat fragmentation (Unitt 2004, Dudek 2000). The Bell's Sage Sparrow is documented as breeding in the vicinity (Unitt 2004) and has a high potential to occur on the Preserve.

4.6 Small Mammal Trapping

In total, nine small mammal species were recorded at the Preserve during small mammal trapping and other surveys (Tables 9 and 10). These species were detected through capture, direct observation or sign. The trapping results indicate that the Preserve has good abundance and species diversity in small mammals with 219 captures from seven species (Table 9). The species detected are commonly found in the habitats located within the Preserve.

Table 9: Trapline Capture Summary for 2008

Scientific Name	Common Name	Special Status	Trapline Number					
			1	2	3	4	5	Total
Chaetodipus californicus femoralis	Dulzura Pocket Mouse	CSC, CSDS Group II	3 ♂ 3 ♀	12 ♂ 4 ♀	9 ♂ 8 ♀	13 ♂	8 ♂ 1 esc	45 ♂ 15 ♀ 1 esc
Dipodomys simulans (=*Dipodomys agilis simulans*)	Dulzura Kangaroo Rat			1 ♂			7 ♂ 2 ♀ 2 esc	8 ♂ 2 ♀ 2 esc
Peromyscus californicus insignis	California Mouse		1 ♂ 3 ♀	4 ♂	4 ♂ 1 ♀	1 ♂ 1 ♀		10 ♂ 5 ♀
Peromyscus fraterculus (=*Peromyscus eremicus fraterculus*)	Northern Baja Mouse		10 ♂ 15 ♀	6 ♀	8 ♂ 12 ♀	17 ♂ 8 ♀	9 ♂ 7 ♀	44 ♂ 48 ♀
Peromyscus maniculatus gambelii)	American Deer Mouse		9 ♂ 5 ♀ 1 esc	1 ♂	1 ♀		6 ♂ 1 ♀	16 ♂ 7 ♀ 1 esc
Neotoma fuscipe macrotis	Dusky-footed Woodrat		1 ♂			5 ♂ 2 ♀ 1 esc		6 ♂ 2 ♀ 1 esc
Neotoma lepida intermedia)	San Diego Desert Woodrat	CSC, CSDS Group II	3 ♂			2 ♂ 1 ♀		5 ♂ 1 ♀
Total			54	28	43	51	43	219

Legend:

♂ = male, ♀ = female, released = released prior to determining sex, and esc = escaped prior to determining sex

Special Status: CSC= California Species of Concern, CSDS= County of San Diego Sensitive Animal

Table 10. Small Mammals Detected through Other Survey Methods at the Preserve in 2008

Scientific Name	Common Name	Special Status	Vegetation Communities	Method of Detection
Spermophilus beecheyi nudipes	California Ground Squirrel		all communities	visual, sign
Thomomys bottae	Botta's Pocket Gopher		all communities	sign, captured in pitfall arrays
Peromyscus sp.	Deer Mouse		all communities	captured in pitfall arrays
Chaetodipus californicus femoralis	Dulzura Pocket Mouse	CSC, CSDS Group II	all communities	captured in pitfall arrays

Legend:
Special Status: CSC= California Species of Concern, CSDS= County of San Diego Sensitive Animal

4.6.1 Special-Status Small Mammals

Sensitive species captured consist of Dulzura Pocket Mouse (*Chaetodipus californicus femoralis*) and San Diego Desert Woodrat (*Neotoma lepida intermedia*). Other sensitive species with potential to occur include Northwestern San Diego Pocket Mouse (*Chaetodipus fallax fallax*).

Special-Status Small Mammal Species Observed

Dulzura Pocket Mouse (*Chaetodipus californicus femoralis*)

State Species of Special Concern, San Diego County Group II

Dulzura Pocket Mouse is mainly active on the ground, but also climbs shrubs and small trees when feeding (CDFG 2005). This species can become torpid by day at any time of the year, and is inactive in cold wet weather. It breeds in spring to early summer and occurs from sea level to approximately 2,408 m (7,900 ft) AMSL (CDFG 2005). This species prefers dense chaparral and is less common in dry grassland and desert scrub. During the 2008 trapping program on the Preserve, 61 of the 219 animals captured were Dulzura Pocket Mouse.

San Diego Desert Woodrat (*Neotoma lepida intermedia*)

State Species of Special Concern, San Diego County Group II

San Diego Desert Woodrat requires large amounts of water, which it obtains from fleshy plants such as *Yucca* species and Prickly Pear Cactus (*Opuntia* sp.). It usually makes a stick house under one of these food plants, or may den among rocks (CDFG 2005). House materials include cacti, sticks, bones and a variety of trash. Houses provide insulation against heat as well as protection from predators. This species breeds in late winter or spring, occurs from sea level to

approximately 2,591 m (8,500 ft) AMSL in deserts and coastal sage scrub, and prefers areas with rocky outcrops and plentiful succulents (CDFG 2005). During the 2008 trapping program on the Preserve, six of the 219 animals captured were San Diego Desert Woodrat.

Special-Status Small Mammal Species not Observed but with a High Potential to Occur

Northwestern San Diego Pocket Mouse (*Chaetodipus fallax fallax*)

State Species of Special Concern, San Diego County Group II

The Northwestern San Diego Pocket Mouse is typically found in coastal sage scrub, sage scrub/grassland ecotones, and chaparral (Dudek 2000). It inhabits open, sandy areas of both the Upper and Lower Sonoran areas of southwestern California and northern Baja California (Dudek 2000). This species is sensitive to habitat fragmentation and degradation, which has led to its decline. The Northwestern San Diego Pocket Mouse has potential to occur in all habitats found on the Preserve.

4.7 Medium and Large Mammals

4.7.1 Camera Tracking Stations

Evaluation of the images captured at the two camera stations resulted in the identification of the following four species of mammals: Coyote (*Canis latrans*), Common Raccoon (*Procyon lotor*), Bobcat (*Felis rufus*), and Southern Mule Deer (*Odocoileus hemionus fuliginata*) (Table 11, Appendix B). See Figure 5 for camera station locations.

4.7.2 Track and Sign Surveys

The following seven mammal species were detected in the Preserve through tracks, sign, and nocturnal surveys: Desert Cottontail (*Sylvilagus audubonii*), Domestic Dog (*Canis familiaris*), Coyote, Common Raccoon, Bobcat, Domestic Horse (*Equus caballus*), and Southern Mule Deer (Table 11, Appendix B). Movement of larger animals appeared to be concentrated along easily traveled routes with good visibility such as roads and ridges. Most signs of smaller animals were within natural communities with cover, especially chaparral.

Other species not detected, but judged to have high potential to occur based on previously documented observations include: Black-tailed Jackrabbit (*Lepus californicus*), Common Gray Fox (*Urocyon cinereoargenteus*), and Mountain Lion (*Puma concolor*) (CBI 2003). These species were all recorded by the San

Diego Tracking Team during a focused study of wildlife corridor movement conducted in 2002.

Due to the proximity to large amounts of open space and the presence of potentially suitable habitat, the following species may also utilize the Preserve: Brush Rabbit (*Sylvilagus bachmani*), Long-tailed Weasel (*Mustela frenata*), Opossum (*Didelphis virginiana*), Striped Skunk (*Mephitis mephitis*), and Western Spotted Skunk (*Spilogale gracilis*).

Lusardi Creek serves as an important wildlife corridor linking Black Mountain Open Space Park to the San Dieguito River. Certainly it can be assumed that larger mammals regularly move on, off of, and across the Preserve, to and from adjacent open space.

Table 11. Medium and Large Mammals Detected at the Preserve in 2008

Scientific Name	Common Name	Special Status	Vegetation Communities	Method of Detection
Sylvilagus audubonii	Desert Cottontail		all communities	visual, sign
**Canis familiaris*	Domestic Dog		all communities	visual, sign
Canis latrans	Coyote		all communities	visual, sign, camera station
Procyon lotor	Common Raccoon		all communities	sign, camera station
Lynx rufus	Bobcat		all communities	sign, camera station
**Equus caballus*	Domestic Horse		all communities	sign
Odocoileus hemionus fuliginata	Southern Mule Deer	MSCP, CSDS Group II	all communities	visual, sign, camera station

Legend:

*=non-native species

Special Status: MSCP= Multiple Species Conservation Program Covered Species, CSDS= County of San Diego Sensitive Animal

4.7.3 Special-Status Medium and Large Mammal Species

One special-status medium or large mammal species was detected during the surveys: Southern Mule Deer.

Special-Status Medium and Large Mammal Species Observed

Southern Mule Deer (*Odocoileus hemionus fuliginata*)

San Diego County Group II, MSCP Covered Species

Southern Mule Deer are common across the western U.S. in a variety of habitats from forest edges to mountains and foothills (Whitaker 1996). Southern Mule Deer prefer edge habitats, rarely travel or forage far from water and are most active around dawn and dusk. Southern Mule Deer individuals were observed and also were photographed by the camera stations.

Special-Status Medium and Large Mammal Species not Observed but with a High Potential to Occur

San Diego Black-tailed Jackrabbit (*Lepus californicus*)

State Species of Special Concern, San Diego County Group I

The San Diego Black-tailed Jackrabbit is a large, long-legged hare, with distinctive long ears and a blackish tail (Whitaker 1996). The Black-tailed Jackrabbit inhabits a wide range of habitats, including deserts, irrigated croplands, high mountains to 2,500 m (8,202 ft) AMSL, and is commonly found in the western U.S. to Mexico and Baja California. The San Diego population is found mostly on the coastal side of local mountains in open habitats, usually avoiding dense stands of chaparral or woodlands (Stephenson and Calcarone 1999). This species has been declining due to urban development, habitat loss, and fragmentation leading to population isolation (Dudek 2000). Suitable habitat for this species occurs within the Preserve.

Mountain Lion (*Puma concolor*)

San Diego County Group II

Mountain Lions prefer rocky areas, cliffs, and ledges that provide cover within open woodlands and chaparral (Dudek 2000). Riparian areas also provide protective habitat connections for movement between fragmented habitats. This species is widespread in North and South America and occupies a broad variety of habitats from the northern limit of the Canadian forests to Patagonia in South America. Populations of this species require large areas (at least 850 square miles) to sustain themselves (Dudek 2000). Habitat fragmentation, loss of large areas of undeveloped land, road kills, indiscriminate shootings, animal control measures, and loss of a natural prey base have led to the decline of this species. This Preserve and the surrounding open space provide habitat for Mountain Lion to use for foraging and cover. As there is a large amount of open space

surrounding the Preserve, potential for this species to move through the Preserve is high.

4.8 Bats

A total of eight bat species were detected using passive Anabats during the three seasons of bat monitoring (Table 12). The most active bat species detected were the Yuma Myotis (*Myotis yumanensis*), Mexican Free-tailed Bat (*Tadarida brasiliensis*), and Big Brown Bat (*Eptesicus fuscus*). Species detected infrequently included the Small-footed Myotis (*Myotis ciliolabrum*), Western Red Bat (*Lasiurus blossevillii*), and Pocketed Free-tailed Bat (*Nyctinomops femorosaccus*).

Seasonal trends observed included a suite of species detected during all three seasons of monitoring; the Yuma Myotis, Canyon Bat (*Parastrellus hesperus*), and Mexican Free-tailed Bat. There was one species detected only during the summer: the Long-eared Myotis (*Myotis evotis*). There were two species detected only during the fall: the Western Red Bat and Small-footed Myotis.

A moderate number of bat species appear to be supported by the Preserve. The Preserve is somewhat homogeneous, but contains two habitat features important to bats in the southern California landscape; riparian and scrub vegetation (Krutzsch 1948, Stokes et al 2005).

Table 12. Bat Species detected at the Preserve in 2008

Bat Species			Relative Activity Index*			
Scientific Name	**Common Name**	**Special Status**	**Spring**	**Summer**	**Fall**	**Average Activity Index****
Myotis ciliolabrum	Small-footed Myotis	CSDS Group II	*nd*	*nd*	3.33	1.11
Myotis evotis	Long-eared Myotis	CSDS Group II	*nd*	33.33	*nd*	11.11
Myotis yumanensis	Yuma Myotis	CSDS Group II	26.67	893.33	33.33	317.78
Parastrellus hesperus	Canyon Bat		3.33	70.00	13.33	28.89
Eptesicus fuscus	Big Brown Bat		*nd*	13.33	80.00	31.11
Lasiurus blossevillii	Western Red Bat	CSC, CSDS Group II	*nd*	*nd*	30.00	10.00
Nyctinomops femorosaccus	Pocketed Free-tailed Bat	CSC, CSDS Group II	6.67	3.33	*nd*	3.33
Tadarida brasiliensis	Mexican Free-tailed Bat		120.00	83.33	323.33	175.56

Legend:

nd = not detected

* Number of bat passes per Anabat night X 10

** Average of seasonal measures of relative activity for each bat species detected

Special Status:

CSC= California Species of Special Concern, CSDS= County of San Diego Sensitive Animal

4.8.1 Special-Status Bat Species

The following five sensitive species were detected during the surveys: Small-footed Myotis, Long-eared Myotis, Yuma Myotis, Western Red Bat, and Pocketed Free-tailed Bat. This Preserve provides suitable roosting and foraging opportunities for a number of sensitive bat species and appears to be important for bats in the region.

Special-Status Bat Species Observed

Small-footed Myotis (*Myotis ciliolabrum*)

San Diego County Group II

The Small-footed Myotis is found throughout most of western North America, from southwestern Canada south into Mexico (BCI 2008). There is not much information on the habitat requirements of this species, but it has been documented under rock slabs and in crevices, mine tunnels, under loose tree bark, and in buildings (BCI 2008). This species hibernates in caves, typically in small groups. Reasons for decline are poorly understood as there has been little

research conducted on this species. Both suitable roosting and foraging habitat for the Western Red Bat occur in the Preserve.

Long-eared Myotis (*Myotis evotis*)

San Diego County Group II

Long-eared Myotis is found in western North America from British Columbia south through California to Baja Mexico (BCI 2008). This species prefers coniferous forest in higher altitudes and will roost in caves, rock crevices, under tree bark or in buildings (BCI 2008). There is minimal roosting habitat for this species available at the Preserve. The Preserve may just be used for foraging by this species.

Yuma Myotis (*Myotis yumanensis*)

San Diego County Group II

The Yuma Myotis is found throughout much of the western U.S. and up into Canada (BCI 2008). The species is always found near lakes, creeks or ponds where the species forages over the water. Typically, individuals skim low over the water and snatch up flying insects but they can forage in other mesic areas. The species roosts by day usually in buildings or bridges but have been documented using mines or caves (BCI 2008). Yuma Myotis are threatened by loss of riparian habitat and the decline in permanent water sources in the southwest. There is minimal roosting habitat for this species available on the Preserve; therefore, it may just be used for foraging by this species.

Western Red Bat (*Lasiurus blossevillii*)

State Species of Special Concern, San Diego County Group II

Western Red Bats are found from southern Canada, throughout the U.S., all the way down to South America (BCI 2008). Several species in the genus *Lasiurus* are commonly referred to as "tree bats" because they roost only in tree foliage. The Western Red Bat is a typical tree bat, with a close association with cottonwoods (*Populus* sp.) and riparian areas (BCI 2008). Like all tree bats, this species is solitary, coming together only to mate and to migrate. Western Red Bats typically forage along forest edges, in small clearings, or around street-lights where they prefer moths (BCI 2008). Although largely undocumented, this species' decline appears to be in part due to the loss of lowland riparian forests in the Southwest. Both the roosting and foraging needs of the Western Red Bat could be supported by the Preserve.

Pocketed Free-tailed Bat (*Nyctinomops femorosaccus*)

State Species of Special Concern, San Diego County Group II

Pocketed Free-tailed Bats are rarely found in southwestern California. These bats live in arid desert areas and roost in crevices high on cliff faces in rugged

canyons (BCI 2008). Nursery colonies are relatively small and usually include fewer than 100 individuals. This species primarily forages on large moths, especially over water. The regional status and species trends are unclear, but it is likely vulnerable to disturbance, especially at roosts, and perhaps also to threats to food supply from man-made toxins. There is no roosting habitat for this species available at the Preserve. The Preserve may just be used for foraging by this species.

Special-Status Bat Species not Observed but with a High Potential to Occur

Pallid Bat (*Antrozous pallidus*)

State Species of Special Concern, San Diego County Group II

Pallid bats are widely distributed in the southwestern U.S. and northern Mexico (BCI 2008). They are locally common across most of California except in the far northwest and in higher portions of the Sierra Nevada. Habitats utilized include a wide variety of grasslands, shrublands, woodlands, and forests, including mixed conifer forest (Zeiner et al. 1990). They appear to be most common in open, dry, rocky lowlands and they roost in caves, mines, as well as crevices in rocks, buildings and trees.

This is a colonial species that forages low over open ground, often picking up beetles and other species of prey off the ground (Zeiner et al. 1990). Flight is slow and maneuverable, and they are able to take a wide variety of prey, including large, hard-shelled insects (Zeiner et al. 1990). They have separate night and day roosts, hibernate in winter, and the sexes segregate in summer. There is minimal roosting habitat for this species available on the Preserve. The Preserve has potential to be used for foraging by this species.

Big Free-tailed Bat (*Nyctinomops macrotis*)

San Diego County Group II

Big Free-tailed Bats are typically found in desert and arid grasslands with rocky out-crops, canyons, or cliffs (BCI 2008). This species roosts on cliffs and occasionally in buildings. Isolated populations can be found throughout the southwestern U.S. into Mexico. The regional status and species trends are unclear, but it is likely vulnerable to disturbance, especially at roosts, and perhaps also to threats to food supply from man-made toxins. The Big Free-tailed Bat has potential to forage over the Preserve.

Western Mastiff Bat *(Eumops perotis)*

State Species of Special Concern, San Diego County Group II

Western Mastiff Bats are the largest native bats in the U.S. This subspecies occurs from the western foothills of the Sierra Nevada and the coastal ranges (south of San Francisco Bay) southward into Mexico (BCI 2008). In southern California, they are found throughout the coastal lowlands up to drier mid-elevation mountains, but avoid the Mohave and Colorado deserts (Zeiner et al. 1990). Habitats include dry woodlands, shrublands, grasslands, and occasionally even developed areas. This big bat forages in flight and most prey species are relatively small, low to the ground, and weak-flying. For roosting, Western Mastiff Bats appear to favor rocky, rugged areas in lowlands where abundant suitable crevices are available for day roosts (BCI 2008). Roost sites may be in natural rock or in tall buildings, large trees or elsewhere. The reasons for this species' decline are poorly understood but probably are related to disturbance, habitat loss, and perhaps widespread use of pesticides. The Western Mastiff Bat may forage over the Preserve.

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5.0 Conclusions and Management Recommendations

The current surveys documented nine land cover types and 292 species within the Preserve. The surveys detected 177 plant species, 55 bird species, 24 mammal species (eight bats, nine small mammals, and seven medium and large bodied mammals), 12 herptiles (three amphibian and nine reptiles), and 24 invertebrate species. This list includes 31 special-status species (18 wildlife and 13 plants) of which eight (six wildlife and two plants) are MSCP-covered species.

Specific management recommendations are provided for the various taxonomic groups assessed during this survey effort. In addition to these management recommendations we also recommend implementing the monitoring protocols addressed in the Biological Monitoring Plan for the MSCP (Monitoring Plan) (Ogden 1996) as appropriate within the Preserve. The Monitoring Plan identifies three types of MSCP biological monitoring including 1) habitat monitoring, 2) corridor monitoring, and 3) covered species monitoring.

Habitat monitoring is designed to focus on three areas including 1) permanent habitat loss as a result of development; 2) temporary habitat changes as a result of natural events (e.g., fires and flooding); and 3) loss of habitat value as a result of edge effects or other human related impacts.

Corridor monitoring within the Monitoring Plan is designed to assess utilization of key habitat linkages within the MSCP. Specifically the use of animal sign (track and scat) and visual sightings shall be used to determine presence of focal species.

Covered species monitoring within the Monitoring Plan is designed to identify 1) short term threats to species persistence and 2) longer-term trends that may suggest declining populations. Specifically, the covered species monitoring will 1) document protection of covered species, 2) document changes in preserved populations, 3) include collection of new biological data, 4) include evaluation of impacts of land uses, and 5) include evaluation of management activities within the Preserve.

The MSCP Monitoring Plan identifies 29 monitoring sites throughout the plan area. None of these sites are located within the Preserve; however, monitoring of MSCP-covered species is required.

It should be noted that that the Monitoring Plan is in the process of being revised by the USFWS (Animal Monitoring Protocol) and the USGS (Plant Monitoring Protocol). The revised Animal Monitoring Protocol covers the following species: California Gnatcatcher, Coastal Cactus Wren, Light-footed Clapper Rail, Tricolored Blackbird, Southwestern Willow Flycatcher, Burrowing Owl, California Least Tern, Thorne's Hairstreak, Wandering Skipper, and San Diego and Riverside Fairy Shrimp. The revised Plant Monitoring Protocol covers all of the MSCP-covered plant species.

5.1 Flora

It is recommended that the County maintain an updated vegetation community map to be used as a tool for adaptive management within the Preserve. The vegetation map should be updated every three years. The purpose of the ongoing mapping effort should be to document changes in the vegetation communities within the Preserve that could affect quality and usage by wildlife. Vegetation mapping/monitoring should also address habitat value for special-status plant species. Special-status plants species detected during the 2008 surveys consisted of Graceful Tarplant, Small Flowered Morning Glory, Nuttall's Scrub Oak, Del Mar Manzanita, Robinson's Pepper Grass, Summer Holly, Western Dichondra, California Adolphia, Palmer's Grappling Hook, Variegated Dudleya, San Diego Barrel Cactus, San Diego Marsh Elder and Southwestern Spiny Rush. Periodic botanical surveys are recommended to monitor the special-status species detected in the Preserve. Such surveys would ideally occur during years of average or above-average rainfall in order to maximize detection.

Variegated Dudleya and San Diego Barrel Cactus are both MSCP-covered species and are required by the MSCP Monitoring Plan to be monitored. Monitoring guidelines for Variegated Dudleya within the Monitoring Plan includes implementing site specific monitoring at five locations within the MSCP plan area and following ASMDs. ASMDs for Variegated Dudleya must include species-specific monitoring and specific measures to protect against detrimental edge effects including effects caused by recreational activities. Monitoring guidelines for San Diego Barrel Cactus include implementing habitat-based and photo plot monitoring within the MSCP plan area. Monitoring for these species within the Preserve will also adhere to the revised Plant Monitoring Protocol currently in preparation by USGS.

Vegetation monitoring for habitat value should be focused to identify adverse changes and their effects on the vegetation over time. This includes dramatic changes such as fire, as well as slower but equally important effects such as invasion by non-natives or slow decline of existing species. The Preserve should be managed for the benefit of special-status species and MSCP-covered species without substantive efforts to alter or restrict the natural course of ecosystem development and dynamics.

Due to the Preserve's close proximity to rural residential development a fire management plan should be completed in order to establish appropriate limited building zones and fuel modification zones along the perimeter of the Preserve.

As detailed in Section 4.1.11 several invasive plants listed by the California Invasive Plant Council (Cal-IPC) occur within Lusardi Creek (Table 13). It is recommended that Tamarisk, Castor Bean, Canary Island Date Palm, Fan Palm, Giant Reed, and Pampas Grass be removed from the Preserve. These enhancement efforts will increase habitat quality within the riparian habitat found on the Preserve.

Table 13. Non-Native Plants with Highest Priority for Control on the Preserve

Species	Cal-IPC Status
Castor Bean (*Ricinus communis*)	Limited
Giant Reed (*Arundo donax*)	High
Canary Island Date Palm (*Phoenix canariensis*)	Limited
Fan Palm (*Washingtonia* sp.	
Tamarisk (*Tamarix ramosissima*)	High
Pampas Grass (*Cortaderia sp.*)	High

5.2 Invertebrates

Butterflies are known to exhibit "hilltopping" behavior. This behavior was observed on the Preserve at various rock outcrops at high points on the hills. Therefore, planned trails and public vistas should not be installed, or should be installed with minimal disturbance, on the highest points of hills.

Centipedes, tarantulas, ants, wasps, bees, and other venomous invertebrates are common within the Preserve. Ticks are also likely to occur. Signs should be posted to alert Preserve users of their presence, recommending avoidance and providing information on what to do in case of a bite or sting.

5.3 Herpetofauna

The Preserve supports several special-status herpetofauna species that will likely be encountered by the public on the roads and trails and off trails in the natural communities. These include one MSCP-covered species, the Orange-throated Whiptail, which is commonly found on roads and trails and may burrow within loose sand along the roads. Signs should be posted to inform Preserve users to stay on roads and trails and to avoid wildlife when encounters occur in order to reduce negative effects on the species listed above and other special-status herptiles. It should also be clear to Preserve users that animal collecting is prohibited.

MSCP monitoring requirements for the Orange-throated Whiptail include implementing site specific trapping for presence/absence. None of these trapping locations are located within the Preserve. The herpetological pitfall arrays installed as a part of this study will be sampled periodically to monitor the Orange-throated Whiptail population at the Preserve.

Rattlesnakes occur within the Preserve and on all occasions during the 2008 fieldwork were observed on or near roads and trails. Signs should be posted to alert Preserve users of rattlesnake presence, recommending avoidance and providing information on what to do in case of a bite.

5.4 Birds

Avian diversity on the Preserve reflects good integrity. A total of 55 bird species was documented on the Preserve; these include four MSCP-covered species: Northern Harrier, Cooper's Hawk, Coastal California Gnatcatcher, and Southern California Rufous-crowned Sparrow. MSCP monitoring requirements for Northern harrier, Cooper's Hawk, and Southern California Rufous-crowned Sparrow include implementing habitat-based monitoring for each species. The Monitoring Plan also requires site specific nest monitoring for the Northern Harrier and Cooper's Hawk.

Coastal California Gnatcatchers were observed at the Preserve in 2008. It is uncertain if the pair of juveniles will stay at the Preserve to breed in future years. The area they were observed in is dominated by Short-pod Mustard (*Hirshfeldia incana*) and non-native grasses (*Avena* and *Bromus* sp.) and the coastal sage has not returned to a level that would be expected to support a breeding pair. The adult pair was observed in habitat that is suitable for breeding. The size of this pair home range was not determined during the 2008 surveys. There is a large area that may be used by Coastal California Gnatcatchers and may support additional pairs in the future. Surveys should be conducted periodically to monitor the status of the Coastal California Gnatcatcher population at the Preserve. MSCP monitoring guidelines for the Coastal California Gnatcatcher include implementing ASMDs at 31 sites within the MSCP plan area. These ASMDs must include measures to reduce edge effects and minimize disturbance during the nesting period, fire protection measures to reduce the potential for habitat degradation due to unplanned fire and management measures to maintain or improve habitat quality including vegetation structure. As described above in section 5.0 the Coastal California Gnatcatcher MSCP monitoring protocols are in the process of being revised by the USFWS. Once complete, these revised monitoring protocols will be implemented on the Preserve for the Coastal California Gnatcatcher.

Brown-headed Cowbirds were detected using the Preserve during this baseline study. No juveniles were detected throughout the course of the surveys and most observations were of males. This species does not currently appear to be adversely affecting the native species. Cowbird use of the Preserve should be

monitored and if juveniles are observed the County may consider implementing a trapping program. Trapping is not appropriate at this time.

The natural resources found at the Preserve are vulnerable, as bird habitat, to alteration from invasive plants, from additional fires at short intervals, and from increased development in the surrounding areas. The latter is likely to lead to increased numbers of European Starlings, American Crows (*Corvus brachyrhynchos)*, and Western Scrub-jays (*Aphelocoma californica*). Though the latter two species are native, artificially elevated populations of these aggressive nest predators can lead to high nest mortality rates among other native birds. Most of the American Crow observations (69 out of 85 total observations) during the point counts were overhead flying from one housing development to another. Western Scrub-jays are currently not a large problem on the Preserve with 8 total observations of the species.

Both quantitative and qualitative monitoring of bird populations by qualified personnel is recommended. Quantitative monitoring can consist, for example, of maintaining the avian point counts. If necessary for budgetary reasons, they could be conducted at less frequent intervals (e.g., every other month), or only periodically (e.g., every other year). The accumulation of data over time will prove extremely valuable to identify trends in bird populations both at the Preserve and across the region.

Qualitative monitoring can range from informal efforts, such as compiling a bird checklist for the Preserve and soliciting new or interesting observations, to intensive efforts such as encouraging research use of the Preserve. It is important to recognize that the avifauna of the Preserve will naturally change over time, due to regional effects, climate change, and natural turnover. Without monitoring, there is potential for the Preserve to be managed for resources no longer present, or in conflict with resources present but unrecognized.

5.5 Small Mammals

Habitat fragmentation is a leading cause in the decline of small mammal populations in species with low mobility (Vander Haegen et al. 2001). Patches of habitat occupied by sensitive species should be connected to wildlife corridors (such as riparian areas) to allow individuals to disperse and not become isolated and vulnerable. Future plans for the Preserve should address the potential isolation and genetic flow effects it may have on small mammal populations.

The small mammal species captured or observed at the Preserve are associated with shrub- and grass-dominated habitats. Habitat conservation is the primary way to protect small mammal populations from decline. Habitats found on the Preserve should not be degraded through activities such as off-road or off-trail use, conversion to other vegetation types, or the spraying of insecticides for insect control (i.e., ants or mosquitoes). Insectivorous mammal species are

sensitive to the use of insecticides and if these methods are proposed for use in control of pest insect species, other alternatives should be explored.

5.6 Medium to Large Mammals

Lusardi Creek lies between large amounts of open space, and serves as an important corridor for wildlife movement. Maintaining/improving movement connections between the San Dieguito River and Black Mountain Open Space will be an important consideration over time. Specific attention should be given to areas where roads cross over the creek, as these areas may end up with sediment build up, or dense vegetation that may inhibit animal movement. In order to maintain the habitat value trash removal and programs/signage that help educate the local residents about the need to protect wildlife corridors should be put in place.

Southern Mule Deer was the only MSCP-covered mammal species detected during the field surveys. MSCP monitoring requirements for Southern Mule Deer include monitoring suitable habitat and wildlife corridor sites within the MSCP. As detailed above, the Preserve has the potential to serve as an important corridor for wildlife movement between adjacent open space areas. Monitoring for medium and large mammals will include periodic sampling at the camera stations used during this study.

Due to the proximity to residential development, species such as domestic dog and cats are likely to be found utilizing the Preserve. Both of these species have the potential to negatively impact the native species by introducing disease, or simply causing the native species to avoid portions of the Preserve. Future management decisions should consider the removal of any feral populations of cats/dogs, and restricting access for these species within the Preserve by erecting fences along the edge of housing developments.

Domestic dogs on leash are allowed within the Preserve. It is recommended that the County amend signage to state that dog owners should remove all feces in order to minimize potential vector born disease transmission to the local coyote population. In addition, feces bags and disposal bins should be provided at trailheads to encourage the public to remove feces.

5.7 Bats

The following items are recommended to maintain and increase the habitat suitability for bats within the Preserve.

- Maintain riparian and scrub vegetation – these habitats are likely very important to both foraging and roosting bats.
- Provide artificial bat roosting substrate –installing artificial bat houses on the Preserve is recommended since roosting habitat is generally lacking. This

- will help attract bats into safe roosting environments and hopefully deter them from roosting in the houses that are found adjacent to the Preserve.

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Appendix A

Vascular Plants Detected at the Lusardi Creek Preserve in 2008

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Scientific Name	Common Name	Special Status
SELAGINELLACEAE — Spike-Moss Family		
Selaginella bigelovii	Bigelow's Spike-Moss	
Selaginella cinerascens	Mesa Spike-Moss	
ALLIACEAE — Onion Family		
Allium praecox	Early Onion	
ARECACEAE — Palm Family		
Washingtonia sp.		
CYPERACEAE — Sedge Family		
Bolboschoenus maritimus paludosus	Prairie Bulrush	
Eleocharis macrostachya	Pale Spike-Rush	
Schoenoplectus americanus	Olney's Bulrush	
HYACINTHACEAE — Hyacinth Family		
Chlorogalum parviflorum	Small-flower Soap-Plant/Amole	
JUNCACEAE — Rush Family		
Juncus acutus ssp. *leopoldii*	Southwestern Spiny Rush	CNPS List 4, CSDS Group D
Juncus arcticus. *mexicanus*	Mexican Rush	
Juncus bufonius. var. *bufonius*	Toad Rush	
LILIACEAE — Lily Family		
Calochortus splendens	Splendid Mariposa Lily	
POACEAE (GRAMINEAE) — Grass Family		
**Agrostis viridis*	Water Bent	
**Arundo donax*	Giant Reed	
**Avena barbata*	Slender Wild Oat	
Bothriochloa barbinodis	Cane Bluestem	
Bromus carinatus var. *carinatus*	California Brome	
**Bromus diandrus*	Ripgut Grass	
**Bromus hordeaceus*	Soft Chess	
**Bromus madritensis* ssp. *rubens*	Foxtail Chess, Red Brome	
**Cortaderia* sp.	Pampas Grass	
**Cynodon dactylon*	Bermuda Grass	
Distichlis spicata	Saltgrass	
**Gastridium ventricosum*	Nit Grass	
Leymus condensatus	Giant Wild-Rye	

Scientific Name	Common Name	Special Status
**Lolium multiflorum*	Italian Ryegrass	
Muhlenbergia microsperma	Little-seed Muhly	
Nassella lepida	Foothill Needlegrass	
Nassella pulchra	Purple Needlegrass	
**Pennisetum setaceum*	African Fountain Grass	
**Piptatherum miliaceum*	Smilo Grass	
**Polypogon monspeliensis*	Annual Beard Grass	
**Schismus barbatus*	Mediterranean Schismus	
**Vulpia myuros* var. *hirsuta*	Hairy Rat-tail Fescue	
THEMIDACEAE — Brodiaea Family		
Bloomeria crocea var. *crocea*	Common Goldenstar	
Dichelostemma capitatum ssp. *capitatum*	Blue Dicks	
TYPHACEAE — Cattail Family		
Typha sp.	Cattail	
ADOXACEAE — Adoxa Family		
Sambucus mexicana	Blue Elderberry	
AMARANTHACEAE - Amaranth Family		
**Atriplex semibaccata*	Australian Saltbush	
**Chenopodium murale*	Nettle-leaf Goosefoot	
**Salsola tragus*	Prickly Russian-Thistle, Tumbleweed	
ANACARDIACEAE - Sumac or Cashew Family		
Malosma laurina	Laurel Sumac	
Rhus integrifolia	Lemonadeberry	
Toxicodendron diversilobum	Western Poison-Oak	
APIACEAE (UMBELLIFERAE) — Carrot Family		
Apiastrum angustifolium	Mock-Parsley	
**Apium graveolens*	Common Celery	
**Conium maculatum*	Common Poison Hemlock	
Daucus pusillus	Rattlesnake Weed	
**Foeniculum vulgare*	Sweet Fennel	
ASTERACEAE (COMPOSITAE) — Sunflower Family		
Ambrosia psilostachya	Western Ragweed	
Artemisia californica	Coastal Sagebrush	
Baccharis pilularis	Chaparral Broom, Coyote Brush	

Scientific Name	Common Name	Special Status
Baccharis salicifolia	Mule-Fat, Seep-Willow	
Baccharis sarothroides	Broom Baccharis	
**Carduus pycnocephalus*	Italian Thistle	
**Centaurea melitensis*	Tocalote	
Chaenactis artemisiifolia	White Pincushion	
Chaenactis glabriuscula var. *glabriuscula*	Yellow Pincushion	
**Chrysanthemum coronarium*	Garland/Crown Daisy	
**Conyza bonariensis*	Flax-leaf Fleabane	
Conyza canadensis	Horseweed	
Corethrogyne filaginifolia var. *filaginifolia*	Common Sand-Aster	
**Cotula sp.*	African Brass-Buttons	
**Cynara cardunculus*	Artichoke Thistle, Cardoon	
Deinandra fasciculata	Fascicled Tarweed	
Encelia californica	California Encelia	
Eriophyllum confertiflorum var. *confertiflorum*	Long-stem Golden-Yarrow	
Filago californica	California Filago	
**Filago gallica*	Narrow-leaf Filago	
Gnaphalium stramineum	Cotton-batting Plant	
Grindelia camporum var. *bracteosa*	Rayless Gumpant	
Gutierrezia sarothrae	Broom Matchweed/Snakeweed	
Hazardia squarrosa var. *grindelioides*	Southern Sawtooth Goldenbush	
**Hedypnois cretica*	Crete Hedypnois	
Holocarpha virgata ssp. elongata	Graceful Tarplant	CNPS List 4, CSDS Group D
**Hypochaeris glabra*	Smooth Cat's Ear	
Isocoma menziesii var. *menziesii*	Spreading Goldenbush	
Iva hayesiana	San Diego Marsh-Elder	CNPS List 2, CSDS Group B
**Lactuca serriola*	Prickly Lettuce	
Lasthenia gracilis	Common Goldfields	
Osmadenia tenella	Osmadenia	
**Picris echioides*	Bristly Ox-Tongue	
Porophyllum gracile	Odora	
Pseudognaphalium biolettii	Bicolor Cudweed	
**Senecio vulgaris*	Common Groundsel	
**Silybum marianum*	Milk Thistle	

Scientific Name	Common Name	Special Status
Solidago californica	California Goldenrod	
**Sonchus asper* ssp. *asper*	Prickly Sow-Thistle	
**Sonchus oleraceus*	Common Sow-Thistle	
Stephanomeria diegensis	San Diego Wreath-Plant	
Stephanomeria exigua ssp. *deanei*	Deane's Small Wreath-Plant	
Uropappus lindleyi	Silver Puffs	
Xanthium strumarium	Cocklebur	
BERBERIDACEAE — Barberry Family		
Berberis pinnata ssp. *pinnata*	Shiny-leaf Barberry	
BORAGINACEAE — Borage Family		
Cryptantha intermedia	Nievitas Cryptantha	
Harpagonella palmeri	Palmer's Grappling-Hook	CNPS List 4, CSDS Group D
BRASSICACEAE (CRUCIFERAE) — Mustard Family		
**Brassica nigra*	Black Mustard	
**Hirschfeldia incana*	Short-pod Mustard	
Lepidium nitidum var. *nitidum*	Shining Peppergrass	
Lepidium virginicum L. var. *robinsonii*	Robinson's Peppergrass	CNPS List 1B, CSDS Group A
**Raphanus sativus*	Wild Radish	
Rorippa nasturtium-aquaticum	Water-Cress	
CACTACEAE — Cactus Family		
Cylindropuntia prolifera	Coast Cholla	
Ferocactus viridescens var. *viridescens*	Coast Barrel Cactus	CNPS List 2, CSDS Group B
Opuntia littoralis	Coast Prickly-Pear	
CAPPARACEAE — Caper Family		
Isomeris arborea	Bladderpod	
CAPRIFOLIACEAE — Honeysuckle Family		
Lonicera subspicata	Southern Honeysuckle	
**Silene gallica*	Common Catchfly	
Silene laciniata ssp. *laciniata*	Southern Pink	
Spergularia salina	Salt Marsh Sand-Spurry	
Helianthemum scoparium	Peak Rush-Rose	
CONVOLVULACEAE — Morning-Glory Family		
Calystegia macrostegia ssp. *cyclostegia*	Coast Morning Glory	
Convolvulus simulans	Small-flower Bindweed	CNPS List 4, CSDS Group D

Scientific Name	Common Name	Special Status
Dichondra occidentalis	Western Dichondria	CNPS List 4, CSDS Group D
CRASSULACEAE — Stonecrop Family		
Crassula connata	Pygmyweed	
Dudleya edulis	Ladies' Fingers	
Dudleya pulverulenta	Chalk Dudleya	
Dudleya variegata	Variegated Dudleya	CNPS List 1B, CSDS Group A
CUCURBITACEAE — Gourd Family		
Marah macrocarpus var. *macrocarpus*	Manroot, Wild-Cucumber	
ERICACEAE — Heath Family		
Arctostaphylos glandulosa ssp. *crassifolia*	Del Mar Manzanita	CNPS List 1B, CSDS Group A
Comarostaphylis diversifolia ssp. *diversifolia*	Summer-Holly	CNPS List 1B, CSDS Group A
Xylococcus bicolor	Mission Manzanita	
EUPHORBIACEAE - Spurge Family		
Ricinus communis	Castor Bean	
FABACEAE (LEGUMINOSAE) - Legume Family		
Lathyrus vestitus	San Diego Sweet Pea	
Lotus purshianus var. *purshianus*	Spanish-Clover	
Lotus scoparius var. *scoparius*	Coastal Deerweed	
Lupinus hirsutissimus	Stinging Lupine	
Lupinus microcarpus var. *microcarpus*	Red-flower Lupine	
Lupinus succulentus	Arroyo Lupine	
**Medicago polymorpha*	California Burclover	
**Melilotus indicus*	Indian Sweetclover	
FAGACEAE — Oak Family		
Quercus dumosa	Nuttall's Scrub Oak	CNPS List 1B, CSDS Group A
FRANKENIACEAE — Frankenia Family		
Frankenia salina	Alkali-Heath	
GENTIANACEAE — Gentian Family		
Centaurium venustum	Canchalagua	
GERANIACEAE — Geranium Family		
**Erodium botrys*	Long-beak Filaree/Storksbill	
GROSSULARIACEAE — Gooseberry Family		
Ribes speciosum	Fuchsia-flower Gooseberry	

Scientific Name	Common Name	Special Status
HELIOTROPACEAE — Heliotrope Family		
Heliotropium curassavicum	Salt Heliotrope	
HYDROPHYLLACEAE — Waterleaf Family		
Emmenanthe penduliflora var. *penduliflora*	Whispering Bells	
Eucrypta chrysanthemifolia var. *chrysanthemifolia*	Common Eucrypta	
Phacelia cicutaria var. *hispida*	Caterpillar Phacelia	
LAMIACEAE (LABIATAE) — Mint Family		
Salvia apiana	White Sage	
Salvia columbariae	Chia	
Salvia mellifera	Black Sage	
Stachys ajugoides. var. *rigida*	Hedge-Nettle	
LYTHRACEAE — Loosestrife Family		
**Lythrum hyssopifolia*	Grass Poly	
MALVACEAE — Mallow Family		
Malacothamnus fasciculatus	Chaparral Bushmallow	
**Malva parviflora*	Cheeseweed	
MYRTACEAE — Myrtle Family		
**Eucalyptus sp.*	Gum	
NYCTAGINACEAE — Four O'clock Family		
Mirabilis laevis var. *crassifolia*	Coastal Wishbone Plant	
ONAGRACEAE — Evening-Primrose Family		
Camissonia bistorta	California Sun Cup	
Camissonia californica	False-Mustard	
OXALIDACEAE — Oxalis Family		
**Oxalis pes-caprae*	Bermuda-Buttercup	
PAPAVERACEAE — Poppy Family		
Eschscholzia californica	California Poppy	
Mimulus aurantiacus var. *puniceus*	Coast Monkey Flower	
Mimulus guttatus	Seep Monkey Flower	
PLANTAGINACEAE — Plantain Family		
Antirrhinum nuttallianum ssp. *subsessile*	Big-gland Nuttall's Snapdragon	
Linaria canadensis	Large Blue Toadflax	
Plantago erecta	Dot-seed Plantain	

Scientific Name	Common Name	Special Status
******Plantago major*	Common Plantain	
POLEMONIACEAE — Phlox Family		
Linanthus dianthiflorus	Farinose Ground Pink	
POLYGONACEAE — Buckwheat Family		
Chorizanthe fimbriata var. *laciniata*	Lacinate Spineflower	
Eriogonum fasciculatum	California Buckwheat	
******Rumex crispus*	Curly Dock	
PORTULACACEAE — Purslane Family		
Claytonia perfoliata ssp. *perfoliata*	Miner's-Lettuce	
PRIMULACEAE — Primrose Family		
******Anagallis arvensis*	Scarlet Pimpernel, Poor Man's Weatherglass	
RHAMNACEAE — Buckthorn Family		
Adolphia californica	Spineshrub	CNPS List 2, CSDS Group B
Rhamnus crocea	Spiny Redberry	
ROSACEAE — Rose Family		
Adenostoma fasciculatum	Chamise	
Cercocarpus minutiflorus	San Diego Mountain-Mahogany	
Heteromeles arbutifolia	Toyon, Christmas Berry	
RUBIACEAE — Madder or Coffee Family		
Galium angustifolium ssp. *angustifolium*	Narrow-leaf Bedstraw	
Galium nuttallii ssp. *nuttallii*	San Diego Bedstraw	
SALICACEAE — Willow Family		
Salix exigua	Narrow-leaf Willow	
Salix gooddingii	Goodding's Black Willow	
Salix laevigata	Red Willow	
Salix lasiolepis	Arroyo Willow	
SAXIFRAGACEAE — Saxifrage Family		
Jepsonia parryi	Coast Jepsonia	
SOLANACEAE — Nightshade Family		
Datura wrightii	Western Jimson Weed	
Solanum parishii	Parish's Nightshade	
TAMARICACEAE — Tamarisk Family		
******Tamarix ramosissima*	Tamarisk/Salt-Cedar	

Scientific Name	Common Name	Special Status
URTICACEAE — Nettle Family		
Urtica dioica ssp. *holosericea*	Hoary Nettle	
**Urtica urens*	Dwarf Nettle	
VITACEAE — Grape Family		
Vitis girdiana	Desert Wild Grape	

Legend:

Status:

CNPS List – California Native Plant Society

1B – Rare, threatened or endangered in California and elsewhere

2 – Rare, threatened or endangered in California but more common elsewhere

3 – May be rare but more research needed to determine true status

4 – Limited distribution and are uncommon but not presently rare or endangered

San Diego County Group (CSDS)

A – Rare, threatened or endangered in California and elsewhere

B – Rare, threatened or endangered in California but more common elsewhere

C – Maybe quite rare, but more information is needed to determine their status

D – Limited distribution and are uncommon but not presently rare or endangered

References

Scientific and common names are from Hickman (1993) and Skinner and Pavlik (1994). Additional common plant names are taken from Abrams (1923, 1944), Abrams and Ferris (1960), Beauchamp (1986), McAuley (1996), Munz (1974), Skinner and Pavlik (1994), and Simpson and Rebman (2006).

Appendix B

Wildlife Species Detected at the Lusardi Creek Preserve in 2008

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Scientific Name	Common Name	Method of Detection	Special Status
INVERTEBRATES			
Butterflies			
Anthocaris sara	Sara's Orangetip	X	
Apodemia mormo virgulti	Behr's Metalmark	X	
Callophrys augustinus	Brown Elfin	X	
Erynnis funeralis	Funereal Duskywing	X	
Papillo eurymedon	Pale Swallowtail	X	
Pontia protodice	Common White	X	
Vanessa cardui	Painted Lady	X	
Colias eurytheme	Orange Sulfur	X	
Other Invertebrates			
Aphonopelmus eutylenum	Tarantula	XT	
Apiomerus crassipes	Assassin Bug	XT	
Apis mellifera	European Honey Bee	XT	
Argia vivida	Vivid Dancer	XT	
Armadillidium vulgare	Pill Bug	XT	
Calosoma pustulosis	Common Calosoma	XT	
Centhophilus californicus	Camel Cricket	XT	
Cratidus osculans	Wooly Darkling Beetle	XT	
Eleodes sp.	Stink Beetle	XT	
Gryllus sp.	Field Cricket	XT	
Hemipepsis sp.	Tarantula Hawk	XT	
Okanagana sp.	Cicada	XT	
Bothriocytum californicum	Trapdoor Spider	X	
Scolopendra polymorpha	Centipede	XT	
Stenopelmatus sp.	Jerusalem Cricket	XT	
Trimerotropis pallidipennis	Pallid-Winged Grasshopper	XT	
HERPTILES			
Bufo boreas	Western Toad	XT	
Pseudacris regilla [*Hyla regilla*]	Pacific Chorus Frog	X	
**Rana catesbeiana*	Bullfrog	X	
Elgaria multicarinata	Southern Alligator Lizard	X	
Sceloporus occidentalis	Western Fence Lizard	XT	

Scientific Name	Common Name	Method of Detection	Special Status
Uta stansburiana	Side-blotched Lizard	X	
Eumeces skiltonianus interparietalis	Coronado Skink	XT	CSC, CSDS Group II
Cnemidophorus hyperythrus	Orange-throated Whiptail	XT	CSC, MSCP, CSDS Group II
Cnemimdophorus tigris stejnegeri	Coastal Western Whiptail	XT	CSDS Group II
Lampropeltis getula	Common Kingsnake	X	
Rhinocheilus lecontei	Longnose Snake	XT	
Crotalus ruber	Red Diamond Rattlesnake	X	CSC, CSDS Group II
BIRDS			
Callipepla californica	California Quail	X	
Ardea alba	Great Egret	X	
Elanus leucurus	White-tailed Kite	X	CFP, CSDS Group I
Circus cyaneus	Northern Harrier	X	CSC, MSCP, CSDS Group I
Accipiter cooperii	Cooper's Hawk	X	MSCP, CSDS Group I
Buteo jamaicensis	Red-tailed Hawk	X	
Falco sparverius	American Kestrel	X	
Charadrius vociferus	Killdeer	X	
Zenaida macroura	Mourning Dove	X	
Geococcyx californianus	Greater Roadrunner	X	
Tyto alba	Barn Owl	X	CSDS Group II
Bubo virginianus	Great Horned Owl	X	
Chordeiles acutipennis	Lesser Nighthawk	X	
Phalaenoptilus nuttallii	Common Poorwill	X	
Archilochus alexandri	Black-chinned Hummingbird	X	
Calypte anna	Anna's Hummingbird	X	
Calypte costae	Costa's Hummingbird	X	
Picoides nuttallii	Nuttall's Woodpecker	X	
Colaptes auratus	Northern Flicker	X	
Sayornis nigricans	Black Phoebe	X	
Sayornis saya	Say's Phoebe	X	
Myiarchus cinerascens	Ash-throated Flycatcher	X	
Tyrannus vociferans	Cassin's Kingbird	X	
Vireo gilvus	Warbling Vireo	X	

Scientific Name	Common Name	Method of Detection	Special Status
Aphelocoma californica	Western Scrub-Jay	X	
Corvus brachyrhynchos	American Crow	X	
Corvus corax	Common Raven	X	
Stelgidopteryx serripennis	Northern Rough-winged Swallow	X	
Petrochelidon pyrrhonota	Cliff Swallow	X	
Psaltriparus minimus	Bushtit	X	
Thryomanes bewickii	Bewick's Wren	X	
Troglodytes aedon	House Wren	X	
Polioptila californica californica	Coastal California Gnatcatcher	X	FT, CSC, MSCP, CSDS Group I
Chamaea fasciata	Wrentit	X	
Mimus polyglottos	Northern Mockingbird	X	
Toxostoma redivivum	California Thrasher	X	
**Sturnus vulgaris*	European Starling	X	
Phainopepla nitens	Phainopepla	X	
Vermivora celata	Orange-crowned Warbler	X	
Geothlypis trichas	Common Yellowthroat	X	
Wilsonia pusilla	Wilson's Warbler	X	
Pipilo maculatus	Spotted Towhee	X	
Pipilo crissalis	California Towhee	X	
Aimophila ruficeps canescens	Southern California Rufous-crowned Sparrow (=California Rufous-crowned Sparrow)	X	MSCP, CSDS Group I
Melospiza melodia	Song Sparrow	X	
Zonotrichia leucophrys	White-crowned Sparrow	X	
Pheucticus melanocephalus	Black-headed Grosbeak	X	
Passerina caerulea	Blue Grosbeak	X	
Passerina amoena	Lazuli Bunting	X	
Agelaius phoeniceus	Red-winged Blackbird	X	
**Molothrus ater*	Brown-headed Cowbird	X	
Icterus cucullatus	Hooded Oriole	X	
Icterus bullockii	Bullock’s Oriole	X	
Carpodacus mexicanus	House Finch	X	
Carduelis psaltria	Lesser Goldfinch	X	
MAMMALS			

Scientific Name	Common Name	Method of Detection	Special Status
Myotis ciliolabrum	Small-footed Myotis	X	CSDS Group II
Myotis evotis	Long-eared Myotis	X	CSDS Group II
Myotis yumanensis	Yuma Myotis	X	CSDS Group II
Parastrellus hesperus	Canyon Bat	X	
Eptesicus fuscus	Big Brown Bat	X	
Lasiurus blossevillii	Western Red Bat	X	CSC, CSDS Group II
Nyctinomops femorosaccus	Pocketed Free-tailed Bat	X	CSC, CSDS Group II
Tadarida brasiliensis	Mexican free-tailed bat	X	
Sylvilagus audubonii	Desert Cottontail	XS	
Spermophilus beecheyi	California Ground Squirrel	XS	
Thomomys bottae	Botta's Pocket Gopher	ST	
Chaetodipus californicus femoralis	Dulzura Pocket Mouse	T	CSC, CSDS Group II
Dipodomys simulans	Dulzura Kangaroo Rat	T	
Peromyscus californicus	California Mouse	T	
Peromyscus fraterculus	Northern Baja Mouse	T	
Peromyscus maniculatus gambelii	American Deer Mouse	T	
Neotoma macrotis	Large-eared Woodrat	T	
Neotoma lepida intermedia	San Diego Desert Woodrat	T	CSC, CSDS Group II
**Canis familiaris*	Domestic Dog	XS	
Canis latrans	Coyote	XSC	
Procyon lotor	Common Raccoon	SC	
Lynx rufus [*Felis rufus*]	Bobcat	SC	
**Equus caballus*	Domestic Horse	X	
Odocoileus hemionus fuliginata	Southern Mule Deer	XSC	MSCP, CSDS Group II

Legend:

*=non-native or invasive species

Observed or Detected: X = detected, T = trapped or captured, C = camera station, S = sign

Special Status: FE= Federally Endangered, FT=Federally Threatened, SE= State Endangered, CSC= California Species of Special Concern, CFP= California Fully Protected, MSCP= Multiple Species Conservation Program Covered Species, CSDS=County of San Diego Sensitive Animal

Appendix C
Photographs

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Photo 1. Lusardi Creek

Photo 2. Upland habitat

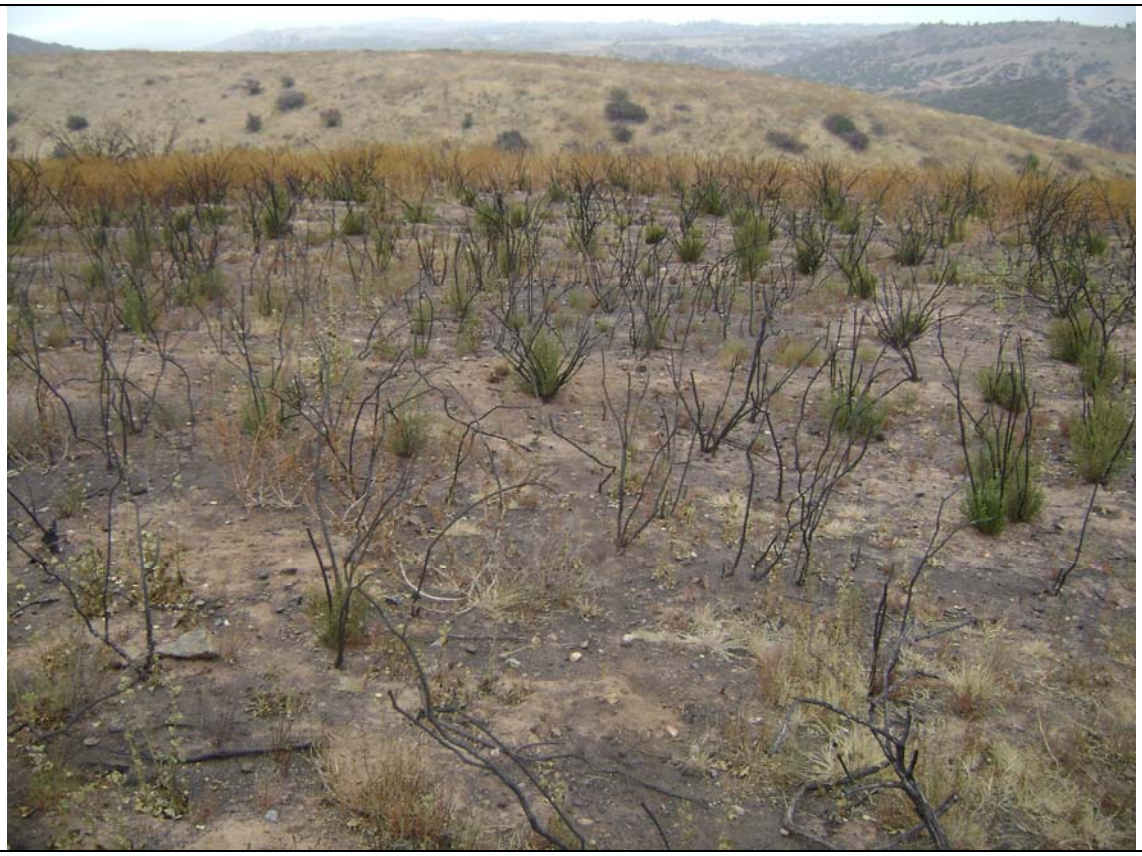

Photo 3. Burned chamise chaparral (crown sprouting)

Photo 4. Juvenile Bobcat crossing Lusardi Creek

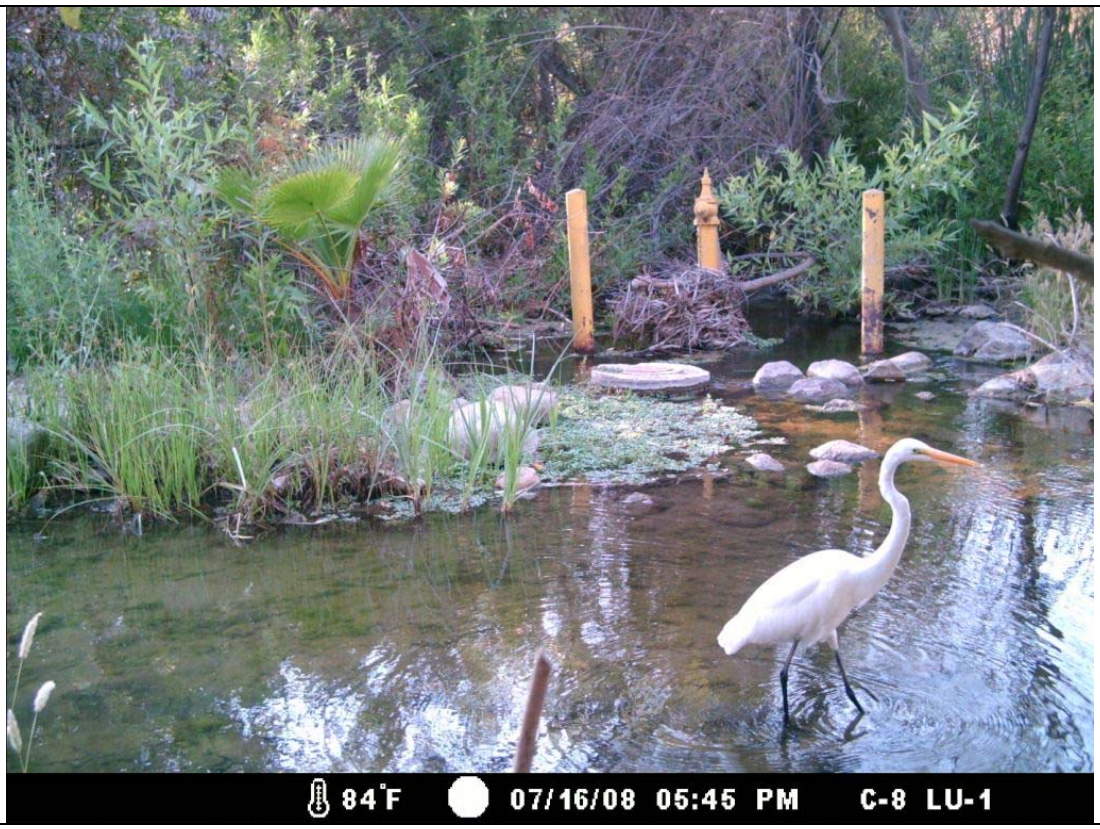

Photo 5. Great Egret foraging in the creek

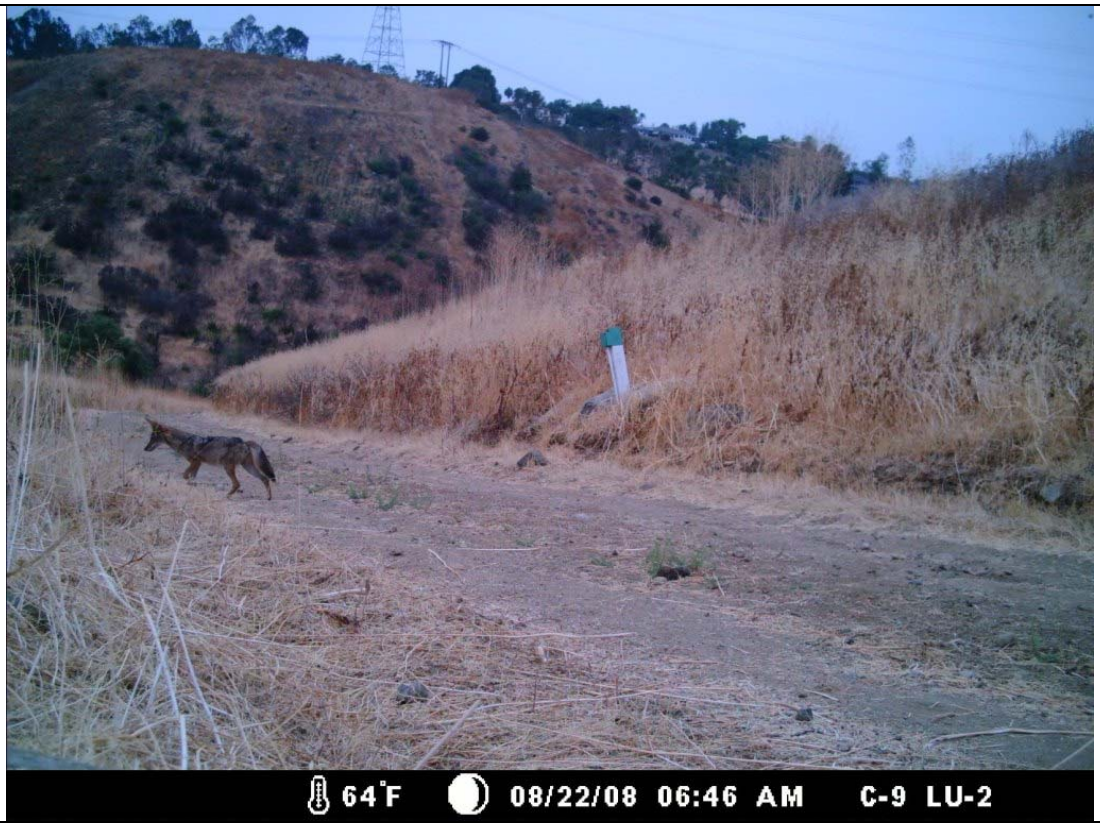

Photo 6. Coyote traveling along an access road in the central part of the Preserve

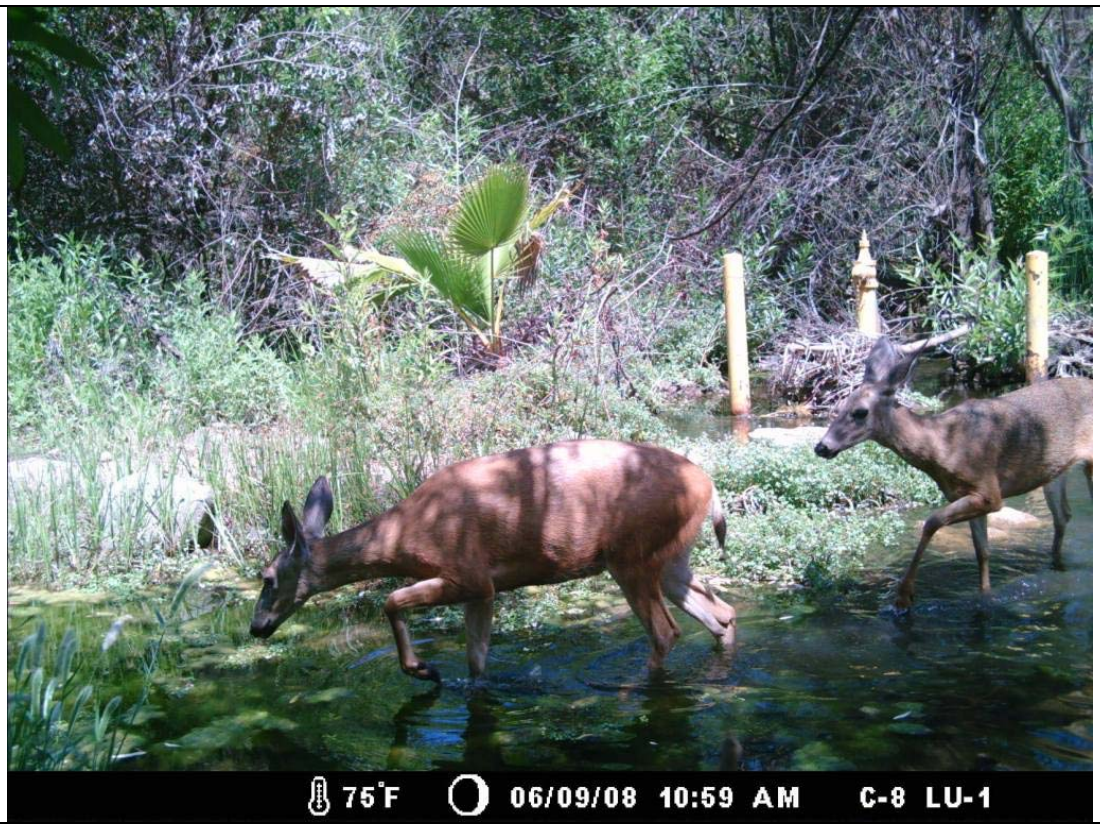

Photo 7. Two Southern Mule Deer crossing Lusardi Creek

Photo 8. Common Raccoon foraging within Lusardi Creek