

**San Bernardino Kangaroo Rat Trapping Surveys
Paradise Hills Development
San Bernardino, California**

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CERTIFICATION

I hereby certify that the statements furnished below and in the attached exhibits present data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

This report was prepared in accordance with professional requirements and recommended protocols for small mammal trapping studies.



Karen Kirtland
Natural Resources Assessment, Inc.

October 20, 2005

Date

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Executive Summary

Natural Resources Assessment, Inc. (NRA, Inc.) conducted a San Bernardino kangaroo rat trapping study for the proposed Paradise Hills development project in the city of San Bernardino. The purpose of the survey was to identify the presence or absence of SBKR on site.

The Paradise Hills development is located in the Verdumont area of the city of San Bernardino. The property is in the foothills and alluvial fan of the San Bernardino Mountains northeast of the California State University at San Bernardino.

The site was assessed by a walking survey. Notes were taken on the condition of the site, the habitats present, soil types and other factors. This information was used to determine the location of traplines and placement of traps. Site photographs were taken with a digital camera.

Three sensitive mammal species were identified as potentially present in the vicinity of the project site: the San Bernardino kangaroo rat, northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*), and Los Angeles pocket mouse (*Perognathus longimembris brevinasus*). Focused trapping surveys for the San Bernardino kangaroo rat (SBKR) were conducted in areas containing potential SBKR habitat.

Trapping surveys for SBKR were conducted according to U.S. Fish and Wildlife Service (USFWS) protocols established for SBKR. The current protocol calls for five nights of trapping, conducted when the species is active aboveground at night and preferably during a new moon phase. One trapping session was conducted from July 11 through 16, 2005.

No SBKR were trapped on site, and no direct impacts to SBKR are expected to occur. However, the northwestern part of the site is located within designated Critical Habitat for the SBKR, and impacts to this area will occur. Due to drainage permitting requirements, the project site will require federal permitting and therefore will require evaluation of impacts to Critical Habitat. In the absence of animals on site, it is not clear what mitigation, if any, will be required for impacts to unoccupied Critical Habitat.

The only sensitive biological resources found on site is the Los Angeles pocket mouse (LAPM). Twelve LAPM were captured on the property. Impacts to the LAPM will need to be evaluated as part of the environmental review.

The northwestern San Diego pocket mouse was also captured (85 captures). Impacts to this species are not considered to be significant.

No other sensitive mammal species were caught on site.

1.0 Introduction

Natural Resources Assessment, Inc. (NRA, Inc.) conducted a San Bernardino kangaroo rat trapping study for the proposed Paradise Hills development project in the city of San Bernardino. The purpose of the survey was to identify the presence or absence of SBKR on site.

2.0 Site Location and Project Description

The Paradise Hills development is located in the Verdemon area of the city of San Bernardino (Figure 1). The property is in the foothills and alluvial fan of the San Bernardino Mountains north of the California State University at San Bernardino.

The property is in Sections 8 and 9 (estimated), Township 1 north, Range 4 west, on the San Bernardino North (1996) 7.5' U.S. Geological Survey (USGS) topographic quadrangle, San Bernardino base and meridian (Figure 1).

The proposed project is mixed residential development and conserved open space.

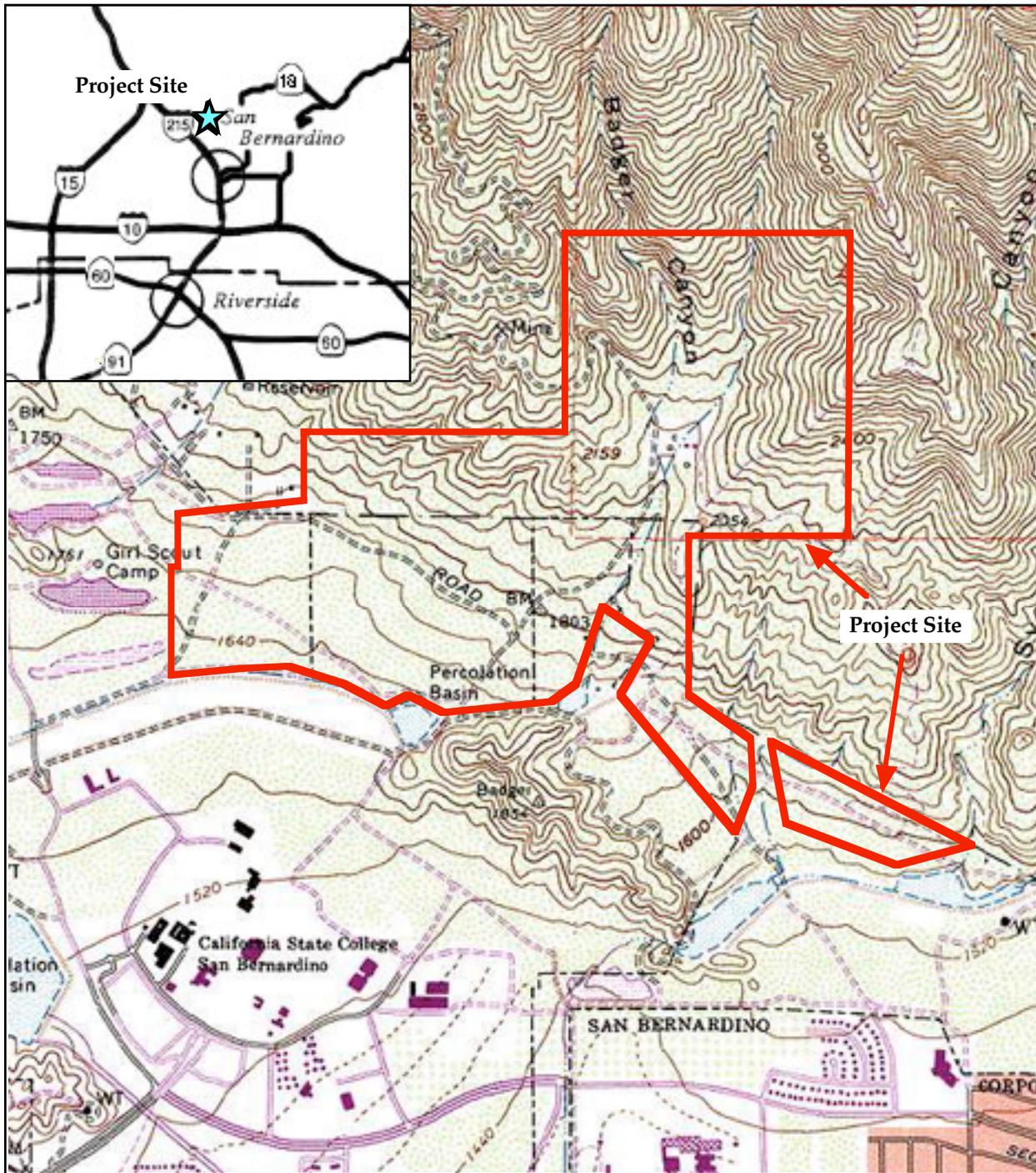
3.0 Methods

3.1 Data Review

A data review was conducted to provide information on plant and wildlife species known occurrences within the vicinity. This review included biological texts on general and specific biological resources, including those resources considered to be sensitive by various wildlife agencies, local governmental agencies and interest groups.

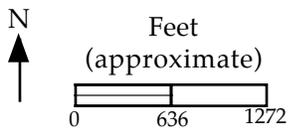
- List of sensitive biological resources provided by the California Natural Diversity Data Base (CNDDDB).
- General texts and other documents identifying potential resources on the property
- *The Status and Known Distribution of the San Bernardino Kangaroo Rat (Dipodomys merriami parvus). Field surveys conducted between 1987 and 1996 (McKernan 1997).*
- *Endangered and Threatened Wildlife and Plants; Final Rule to List the San Bernardino Kangaroo Rat as Endangered; and Notice of Public Hearing (U. S. Fish and Wildlife Service 1998).*

NRA, Inc. also reviewed other available technical information on the biological resources of the site. We used the information to focus our survey efforts in the field.



Source: San Bernardino 1996 7.5' USGS topographic quadrangle

Figure 1 Regional Vicinity and Project Site Map



Paradise Hills Development
San Bernardino Kangaroo Rat Trapping Assessment
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3.2 Habitat Evaluation Surveys

Wildlife biologists Ms. Karen Kirtland and Mr. Philippe Vergne (U. S. Fish and Wildlife Permit No. TE831207-2), inventoried and evaluated the condition of the soils and plant communities on site to assess the potential trapping locations for SBKR or other sensitive species.

An intensive search was conducted in all potential habitat areas for such diagnostic kangaroo rat sign as habitat, scat, tracks, dust bowls and burrows. All species identified by sight, call or sign (burrows, scat, tracks, etc.) and visual observation were recorded.

3.3 San Bernardino Kangaroo Rat Trapping Surveys

Trapping surveys for SBKR were conducted according to USFWS protocols established for SBKR. The current protocol calls for five nights of trapping, conducted when the species is active aboveground at night and preferably during a new moon phase. One trapping session was conducted from July 13 to 18, 2005.

Seven areas were trapped. Trapping lines of variable numbers of traps, set 12 meters apart, were set in trapping areas A through H (Figure 2). Traps were placed in areas containing sandy loam soils showing sign of small mammal use.

Each trap was baited with birdseed placed at the back of the traps. The traps were left in place and opened at dusk each night and inspected once during the night and at dawn each morning. All animals were identified and released at the point of capture.

Notes were taken on the habitat conditions where the traps were placed. Weather conditions at the time of the trapping were also noted.

4.0 Results

4.1 Data Review

Three sensitive mammal species were identified as potentially present in the vicinity of the project site. They are the San Bernardino kangaroo rat (*Dipodomys merriami parvus*), the northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*), and the Los Angeles pocket mouse (*Perognathus longimembris brevinasus*).

Of the animal species potentially present, only the San Bernardino kangaroo rat requires specific survey protocols to establish presence or absence. These specific survey protocols are required for areas where impacts may occur to the sensitive species or their occupied habitat. The remaining species are usually identified through casual observation or as part of the overall trapping effort.

The proposed project site is located within the USFWS Final Critical Habitat area (Unit 1) for the SBKR.

4.1.1 San Bernardino Kangaroo Rat

The San Bernardino kangaroo rat (*Dipodomys merriami parvus*) is described as being confined to primary and secondary alluvial fan scrub habitats, with sandy soils deposited by fluvial (water) rather than aeolian (wind) processes (McKernan 1997, U. S. Fish and Wildlife Service 1998a and 1998b). Burrows are dug in loose soil, usually near or beneath shrubs. In recent years, they have been found in highly disturbed habitats adjacent to otherwise suitable habitat. Burrows are dug in loose soil, usually near or beneath shrubs.

The San Bernardino kangaroo rat is one of three subspecies of the Merriam kangaroo rat (*Dipodomys merriami*). The Merriam kangaroo rat is a widespread species that can be found from the inland valleys to the deserts (Hall 1981 and Ingles 1965). The subspecies known as the San Bernardino kangaroo, however, is confined to inland valley scrub communities, and more particularly, to scrub communities occurring along rivers, streams and drainage.

Like all kangaroo rats, the San Bernardino kangaroo rat is primarily a seed eater, feeding on the seeds of both annual and shrub species. It also feeds on green vegetation and insects when these are available. Being primarily a desert species, the San Bernardino kangaroo rat obtains nearly all of its water from the food it eats, and can subsist indefinitely on water extracted from dry seeds. It forages in open ground and underneath shrubs. Burrows are dug in loose soil, usually near or beneath shrubs.

The breeding season extends primarily from January through late November, with peak reproduction occurring in late June. Usually, only one litter is produced per year with an average of only two to three young.

Most of the original drainages used by this species have been historically altered as a result of flood control efforts. The resulting increased use of river resources, including mining, off road vehicle use and road and housing development. This increased use of river resources has resulted in a reduction in both the amount and quality of habitat available for the San Bernardino kangaroo rat. The past habitat losses and potential future losses prompted the emergency listing of the San Bernardino kangaroo rat as an endangered species (U. S. Fish and Wildlife Service, 1998a).

4.1.2 Northwestern San Diego Pocket Mouse

The northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*) is one of five subspecies of the San Diego pocket mouse. The San Diego pocket mouse is a large species of pocket mouse, and is characterized by long spine-like hairs on rump and hips. This characteristic differentiates this species from the silky pocket mice of the genus *Perognathus*.

The San Diego pocket mouse is a common resident of open, sandy herbaceous areas, usually in association with rocks or coarse gravel in southwestern California. It occurs mainly in arid coastal and desert border areas in San Diego Co., Riverside Co., and San Bernardino Co. The subspecies designated as the northwestern San Diego pocket mouse occurs in open scrub, chamise-redshank chaparral, mixed chaparral, sagebrush, desert wash, desert scrub, desert succulent shrub, pinyon-juniper, and annual grassland in the valleys and foothills of southwestern California (Hall 1981; Lackey 1996). This

species is reported in high numbers in rocky and gravelly areas (Zeiner, et al 1990). Burrows can be found in sandy or gravelly soils. Higher densities in rocky and graveled areas are attributed to the greater availability of cover from visually oriented predators (Lackey 1996).

The northwestern San Diego pocket mouse primarily is a granivore (seed eater). Like other pocket mice, this species possess external, fur-lined cheek pouches for collecting and caching seeds. They eat grass seeds from summer to early winter, switching to shrub seeds and annual weed seeds for the rest of the year. They are nocturnal, active all year round (although surface activity is reduced during cold spells) and tend to forage under shrub and tree canopies, or around rock crevices (Lackey 1996).

Typical of desert adapted rodents, the northwestern San Diego pocket mouse likely has a relative low reproductive output. The typical litter size is four young.

The range of the species extends from Orange County to San Diego County, and includes Riverside and San Bernardino counties out into the desert border areas. The northwestern San Diego pocket mouse subspecies is confined to Orange County and the coastal habitats of San Diego, Riverside and San Bernardino counties.

The northwestern San Diego pocket mouse appears to be sensitive to habitat fragmentation and degradation, and its historical range has been reduced by urban development and agriculture (California Department of Fish and Game 2004). As a result, the subspecies has been designated as a California Species of Special Concern by the California Department of Fish and Game (CDFG 2004; Lackey 1996).

4.1.3 Los Angeles Pocket Mouse

The Los Angeles pocket mouse (*Perognathus longimembris brevinasus*) is one of two pocket mice found in this area of Riverside County (Williams 1986). Both the Los Angeles pocket mouse and the northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*) occupy similar habitats, but the northwestern San Diego pocket mouse has a wider range extending south into San Diego County. The habitat of the Los Angeles pocket mouse is described as being confined to lower elevation grasslands and coastal sage scrub habitats, in areas with soils composed of fine sands (Williams 1986). This species prefers habitat similar to that of the SKR and SBKR. It occurs in open sandy areas in the valley and foothills of southwestern California (Hall 1981).

Los Angeles pocket mouse, like other subspecies of *Perognathus longimembris*, are granivorous rodents and specialize on grass and scrub seeds, but will take insects when available (French 1999; Meserve 1976). Pocket mice possess external, fur-lined cheek pouches used in collecting and caching of seeds. Seeds are cached for use during the colder months of the year.

They spend most of their foraging time in or near bushes, scrubs, rock crevices, or other sources of cover. The Los Angeles pocket mouse is primarily nocturnal and exhibits a distinct seasonal pattern in surface activity. During colder months the pocket mouse may enter into torpor (dormancy) and not engage in surface activity. This species may enter torpor as early as the end of September; the exact date may depend on the nightly low temperatures, and the availability of food.

At some point when surface conditions are very cold and food is scarce, the animal cannot meet its energy needs by foraging and thus must shut down surface activity to survive the winter. Los Angeles pocket mouse must then survive on the food they have cached (Richman and Price 1993). Los Angeles pocket mice emerge in the spring when the surface ground temperatures are higher than the surrounding ground temperature in their burrows (French 1999).

The present known distribution of this species in Riverside and San Bernardino counties extends from the San Gabriel and San Bernardino mountains south to the Temecula and Aguanga areas, and from the east side of the Santa Ana Mountains east to Cabazon (Hall 1981).

4.2 Soils and Topography

Soils on site are characterized as Tujunga gravelly loamy sand, occurring over most of the site. Hanford coarse loamy sand occurs in the northeastern corner. Soboba stony loamy sand occurs in the bottom of Badger Canyon and in the basins at the foot of the alluvial fan (Soil Conservation Service 1980).

The topography is mixed, ranging from flat roads and basins in the southwestern half to hilly and mountainous terrain in the northeastern half.

The alluvial portion in the southwestern half is gentle, rising at less than ten degrees to the northeast. Shallow drainages occur in this area.

The foothill portion is steeper, with a mixed terrain of hills and drainages. Badger Canyon is a deeply incised canyon with several smaller drainages entering into the larger mainstem section.

The basins are a stepped topography. One set flows to the northwest, and the other set flows to the southwest.

4.3 Land Uses

The property is open space. Land uses encompassed by the property include detention and flood control basins owned by San Bernardino County Flood Control, as well as maintained dirt access roads. The property is surrounded by open space on all four sides.

The campus of California State University at San Bernardino lies further to the southwest. Residential development occurs further to the southeast of the site. National Forest lands lie along the northeastern border, and other properties to the northwest.

4.4 Disturbances

Disturbances include unauthorized off-road vehicle use, wildfires, and trash dumping. In addition, San Bernardino County Flood Control District haul trucks carry dirt and debris from the Sycamore Debris Basin on the east side of the Paradise Hills Property to their stockpile area on the west side of the property. The vehicles operate continuously and cause a significant amount of disturbance on the site in terms of dust and frequency of trips.

4.5 Plant Communities

Plant communities on site include disturbed annual grasslands on the flatter portions of the alluvial fan, coastal sage scrub and soft or chamisal chaparral on the alluvial fan and lower hillsides, riparian communities in the Badger Canyon drainage and other drainages.

4.5.1 Disturbed Annual Grasslands

Disturbed annual grasslands are found primarily on the flatter portions of the site, and are typically found as an understory plant community in coastal sage scrub and chaparral scrub. Representative plant species include fiddleneck (*Amsinckia menziesii*), ripgut brome (*Bromus diandrus*), California croton (*Croton californica*), cudweed aster (*Corethrogyne filaginifolia*), mare's tails (*Conyza canadensis*), locoweed (*Astragalus pomonensis*), and short-podded mustard (*Hirschfeldia incana*).

4.5.2 Coastal Sage Scrub

Both the coastal sage scrub and the chamisal chaparral habitats were burned in the 2003 fire, making identification of plant communities boundaries difficult. In general, however, coastal sage scrub on the lower sections of the alluvial fan is usually mixed in with annual grasslands. Coastal scrub scrub intermingles with the chaparral plant community at higher elevations.

Representative species include cudweed aster, California sagebrush (*Artemisia californica*), black sage (*Salvia mellifera*), deerweed (*Lotus scoparius*), and California buckwheat (*Eriogonum fasciculatum*).

4.5.3 Chamisal Chaparral

Chamisal chaparral on the hillsides and steeper slopes is dominated by chamise (*Adenostoma fasciculatum*). Other shrub species found include white sage (*Salvia apiana*), black sage, saw-toothed goldenbush (*Hazardia squarrosa*), sugar bush (*Rhus ovata*), and hoary-leaved ceanothus (*Ceanothus crassifolius*). Herbaceous species include chaparral beard's tongue (*Penstemon spectabilis*), white snapdragon (*Antirrhinum coulterianum*), and branching phacelia (*Phacelia ramosissima*).

4.5.4 Riparian

Riparian habitat were severely affected by the 2003 fire, and only now are beginning to recover. Different drainages support different mixes of riparian plant species. In drainages with running water or a high water table, herbaceous species such as yellow monkey flower (*Mimulus guttatus*), scarlet monkey flower (*Mimulus cardinalis*), stinging lupine (*Lupinus hirsutissimus*), and silver wormwood (*Artemisia ludoviciana*) are common, along with arroyo willow (*Salix lasiolepis*), mulefat (*Baccharis salicifolia*), California walnut (*Juglans californica*), and western sycamore (*Platanus racemosa*).

In drier, relatively incised drainages, no herbaceous growth was found at the time of the surveys, and arroyo willow, mulefat, western sycamore are less common, and California walnut is absent. In shallow, flat drainages on the alluvial fan, there are no riparian species present.

4.6 Wildlife

Wildlife species included the small mammals trapped, as well as larger mammal species such as coyote (*Canis latrans*), Audubon's cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californica*), and Botta's pocket gopher (*Thomomys bottae*).

Common bird species observed include mourning dove (*Zenaida macroura*) in the grasslands, California towhee (*Pipilo crissalis*) and wrentit (*Chamaea fasciata*) in the coastal sage scrub and chaparral, and Anna's hummingbird (*Calypte anna*) and other bird species throughout the site.

No amphibian species were observed. However, the Pacific chorus frog (*Pseudacris regilla*), western toad (*Bufo boreas*) may be present.

Reptile species observed are limited to side-blotched lizard (*Uta stansburiana*). Red diamond rattlesnake (*Crotalus ruber*), western diamondback (*Crotalus atrox*), common kingsnake (*Lampropeltis getula*), and striped racer (*Masticophis lateralis*) may also be present.

4.7 San Bernardino Kangaroo Rat Trapping Surveys

4.7.1 Weather Conditions

Weather conditions during the trapping surveys included morning temperatures in the mid to high sixties, degrees Fahrenheit, with clear to overcast skies and no wind. No fog or rain occurred during the survey period. The moon was in the first quarter during the protocol survey. Daily weather conditions for each day are summarized in Table 1 below.

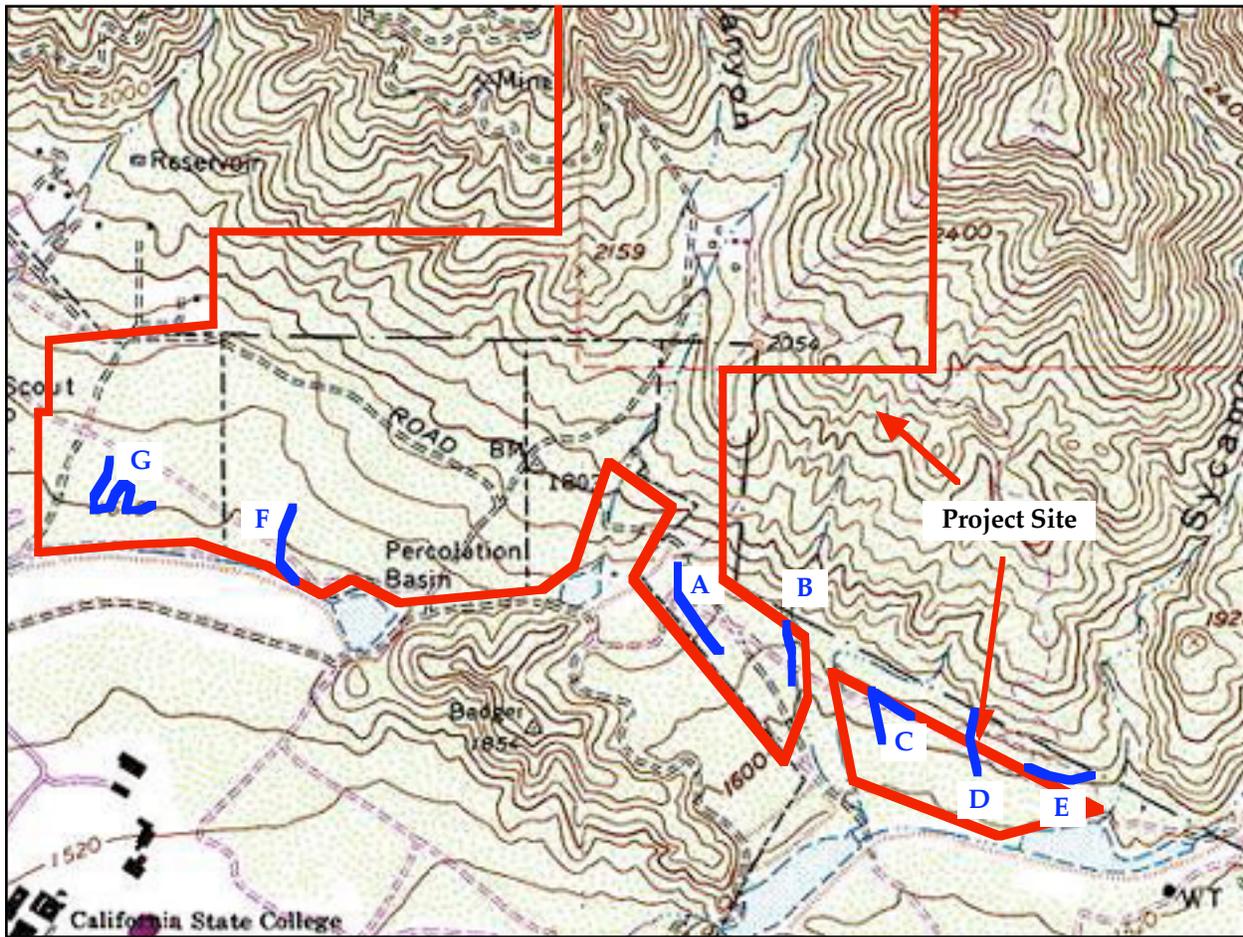
Table 1. Weather Conditions

Date	Cloud Cover	Temperatures (°F)	Wind Speed (miles per hour)
July 12, 2005	Clear	mid 60s	0
July 13, 2005	Clear	mid 60s	0
July 14, 2005	40 percent	high 60s	0
July 15, 2005	Overcast, thin	mid 60s	0
July 16, 2005	Clear	mid 60s	0

4.7.2 Trap Site Descriptions

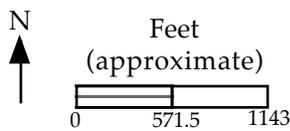
Seven areas were trapped for SBKR (Figure 2). The traplines were placed in suitable habitat on site and in nearby areas off-site.

Trapline A was placed in upland habitat in an annual grassland and coastal sage scrub mix (Photo 1). Cover was approximately 30 percent at the time of the survey. Soils are a loamy sand.



Source: San Bernardino (1996) 7.5' USGS topographic quadrangle

Figure 2 Trapline Location



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Trapline B was placed in a drainage that supports a small flow of water (Photo 2). Cover is less than five percent at the time of the survey, and the soils are sandy.

Trapline C was placed in upland habitat in soft chaparral (Photos 3 and 4). The trapline was placed along a road and down a small drainage. Cover along the edge of the road was approximately 50 percent at the time of the survey. The soils in the roadbed are hardpacked loam. Cover in the drainage was less than five percent at the time of the survey, and the soils are sandy.

Trapline D was placed along a drainage extending from the basins up toward the foothills (Photo 5). Cover was absent at the time of the survey. Soils range from sandy in the wash to hardpacked loam in the bottom of the basin.



Photo 1. Trapline A.



Photo 2. Trapline B.



Photo 3. Road segment of Trapline C.



Photo 4. Drainage segment of Trapline C.



Photo 5. Trapline D. Drainage and basin.

Trapline E was placed in upland habitat along and extending away from a dirt road (Photos 6 and 7). Cover ranged from near zero at the time of the survey near the road edge to approximately 10 percent away from the road. Soils are a sandy loam.

Trapline F was placed in a broad shallow drainage on the alluvial fan (Photo 8). Cover at the time of the survey ranged from zero along the wash to more than eight percent at the downstream end. Soils range from sandy to a hardpacked loam.

Trapline G was placed in a disturbed upland habitat area with only sparse cover at the time of the survey (Photo 9). Soils are a sandy loam.

4.7.3 Trapping Survey Results

Trapping success was moderate over the entire trapping period. A total of five small mammal species, and one large mammal species were trapped during the survey period. Table 2 provides summary information on the species trapped per site.



Photo 6. Road section of Trapline E.



Photo 7. Drainage segment of Trapline F.



Photo 8. Scrub section of Trapline F.



Photo 9. Trapline G.

5.0 Discussion

No SBKR were trapped on site, and no direct impacts to SBKR are expected to occur. However, the northwestern part of the site is located within designated Critical Habitat for the SBKR, and impacts to this area will occur. Due to drainage permitting requirements, the project site will require federal permitting and therefore will require evaluation of impacts to Critical Habitat. In the absence of animals on site, it is not clear what mitigation, if any, will be required for impacts to unoccupied Critical Habitat.

The only sensitive biological resources found on site is the Los Angeles pocket mouse (LAPM). Twelve LAPM were captured on the property. Impacts to the LAPM will need to be evaluated as part of the environmental review.

The northwestern San Diego pocket mouse was also captured (85 captures). Impacts to this species are not considered to be significant.

No other sensitive mammal species were caught on site.

Table 2. Trapping Results for the Paradise Hills Development

Trap Site	Number of Trap Nights	Dulzura Kangaroo Rat <i>Dipodomys simulans</i>	Los Angeles Pocket Mouse <i>Perognathus longimembris brevinasus</i>	Northwestern San Diego Pocket Mouse <i>Chaetodipus fallax fallax</i>	Deer Mouse <i>Peromyscus maniculatus</i>
A	150	4	5	8	4
B	150	0	5	7	18
C	150	7	0	21	9
D	150	0	0	7	2
E	150	0	0	22	18
F	150	3	0	14	24
G	150	13	2	6	26
Totals	1050	27	12	85	101

Table 2. Trapping Results for the Paradise Hills Development

Trap Site	Number of Trap Nights	Western Harvest Mouse <i>Reithrodontomys megalotis</i>	Beechey Ground Squirrel <i>Spermophilus beecheyi</i>
A	150	0	0
B	150	0	0
C	150	0	0
D	150	0	0
E	150	1	0
F	150	0	0
G	150	2	1
Totals	1050	3	1

It should be noted that the USFWS considers small mammal trapping surveys as valid for one year from the date of the trapping.

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