

STATE ROUTE 178 DRAINAGE IMPROVEMENT  
(EA 438900)

BIOLOGICAL TECHNICAL REPORT

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## **SECTION ES** **EXECUTIVE SUMMARY**

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This Biological Resources Technical Report documents the results of United States Fish and Wildlife Service (USFWS) protocol surveys for desert tortoise (*Gopherus agassizii*) and California Department of Fish and Game (CDFG) guideline surveys for Mohave ground squirrel (*Spermophilus mohanensis*), undertaken during spring and summer 2006 in San Bernardino County for the California Department of Transportation – District 8 (Caltrans) in support of Task Order 45, State Route 178 (SR–178) Drainage Improvement Project (proposed project).

The proposed project is located in northwestern San Bernardino County, on U.S. Geological Survey (USGS) 7.5-minute series Westend and Lone Butte topographic quadrangles. The proposed project is located adjacent to State Route 178 between post mile 5.0 to post mile 14.4, approximately 10 miles east of Ridgecrest, California (Kern County) and 12 miles west of Trona, California (San Bernardino County).

As a result of USFWS protocol surveys, desert tortoise was present within the boundary of the proposed project. Three live desert tortoise, two desert tortoise carcasses, one desert tortoise burrow, one desert tortoise scat, and one drinking depression were observed as a result of protocol surveys. As a result of the confirmed presence of desert tortoise within the boundary of the proposed project site, Caltrans shall conduct Section 7 consultation with USFWS in conjunction with the Bureau of Land Management (BLM) to determine appropriate avoidance and minimization measures.

As a result of CDFG guideline surveys, Mohave ground squirrel was present within the boundary of the proposed project. Twenty-five Mohave ground squirrels were present within the proposed project boundary. As a result of the confirmed presence of Mohave ground squirrel within the proposed project boundary, Caltrans shall consult with CDFG and BLM to determine appropriate avoidance and minimization measures.

During the undertaking of protocol surveys, ephemeral dry washes, potentially under the jurisdiction of CDFG, were identified within the proposed project boundary.

More than 3,200 staff hours were dedicated to USFWS desert tortoise protocol and CDFG Mohave ground squirrel guideline surveys in support of Task Order 45.

## **SECTION 1.0 INTRODUCTION**

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This Biological Resources Technical Report documents the results of United States Fish and Wildlife Service (USFWS) protocol surveys for desert tortoise<sup>1</sup> (*Gopherus agassizii*) and California Department of Fish Game (CDFG) guideline surveys for Mohave ground squirrel<sup>2</sup> (*Spermophilus mohavensis*) conducted between March 13 and July 15, 2006, in northwestern San Bernardino County, California (Figure 1-1, *Regional Vicinity Map*). Biological surveys were conducted in support of the California Department of Transportation–District 8 (Caltrans) Task Order 45 (EA 438900) State Route 178 (SR–178) Drainage Improvement Project (proposed project).

### **1.1 Project Location**

The proposed project is located along SR–178 from post mile (PM) 5.0 to PM 14.4, approximately 10 miles east of Ridgecrest (Kern County), California and 12 miles west of Trona (San Bernardino County), California (Figure 1.1-1, *Local Vicinity Map*), within the United States Geological Survey (USGS) 7.5-minute series Lone Butte and Westend topographic quadrangles (Figure 1.1-2, *Topographic Map*).

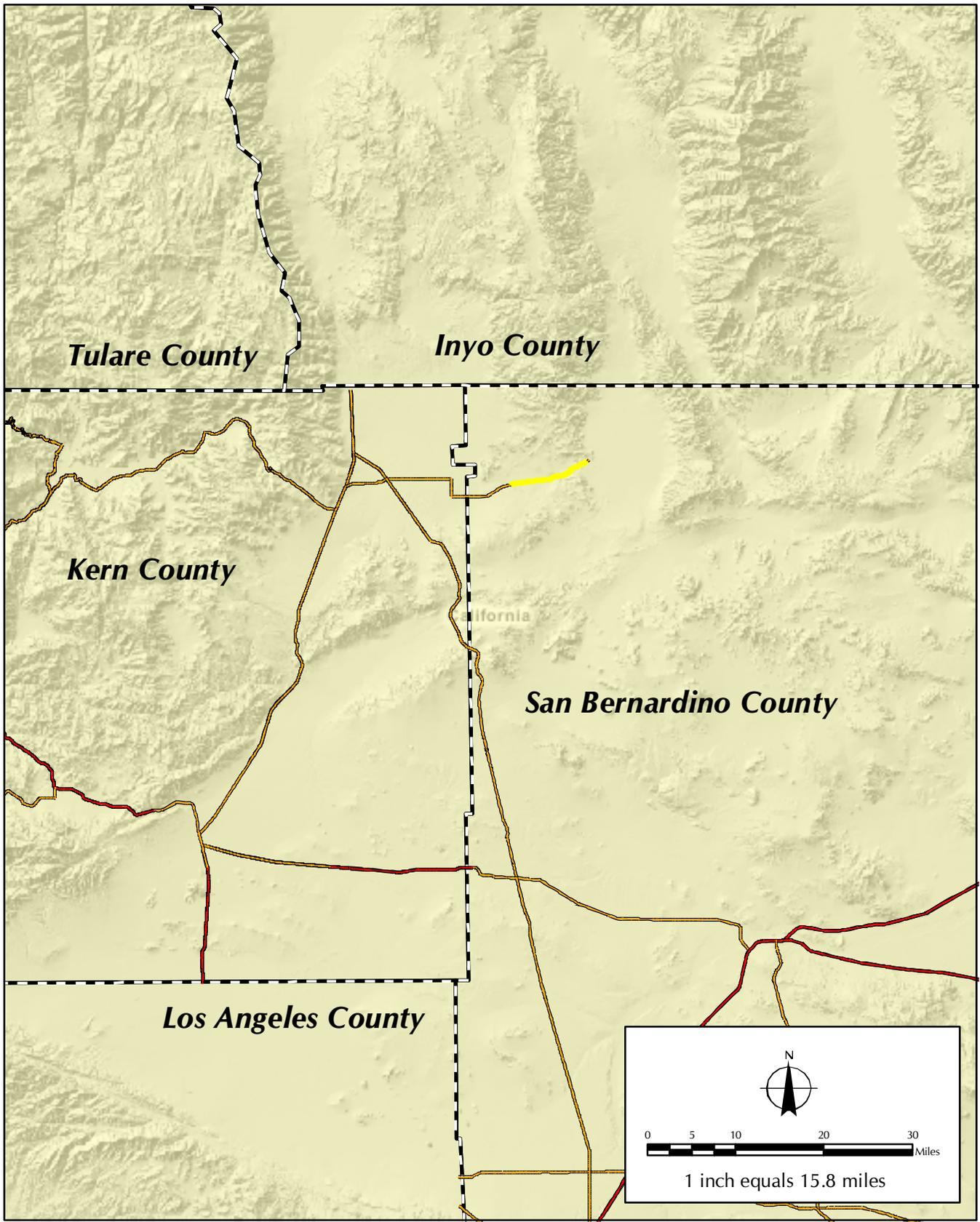
### **1.2 Project Description**

Caltrans has proposed the rehabilitation of 25 drainages along SR–178 to prevent the deposition of sand and sediment materials on the road surface near these locations. Proposed actions include replacement and/or rehabilitation of each culvert to allow the free flow of sand and sediment materials during seasonal storm events. Construction activities include work within and adjacent to the ephemeral dry washes associated with each culvert location, in an area defined by a 60-meter radius on either side of each culvert location.

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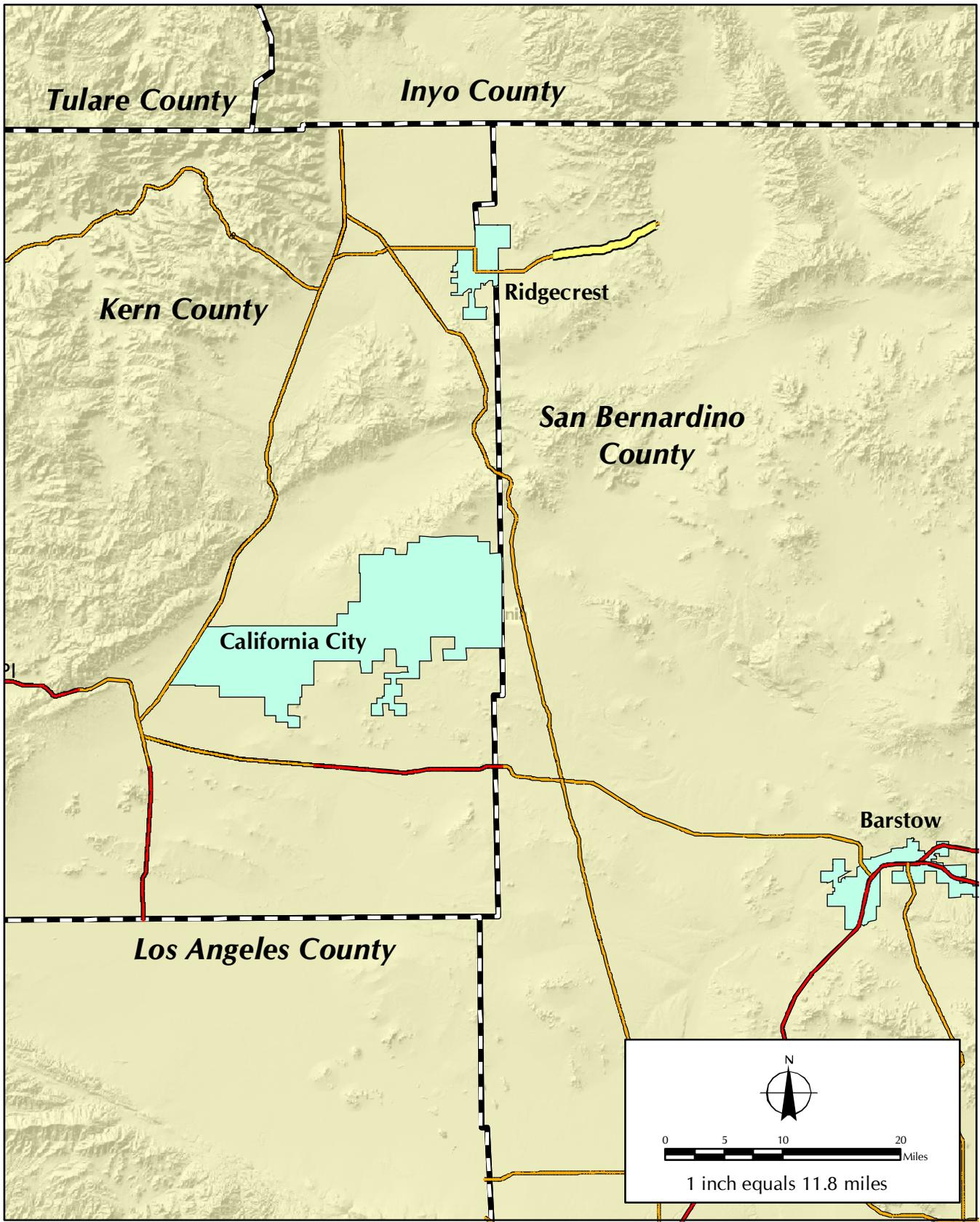
<sup>1</sup> Federally and California Threatened

<sup>2</sup> California Threatened



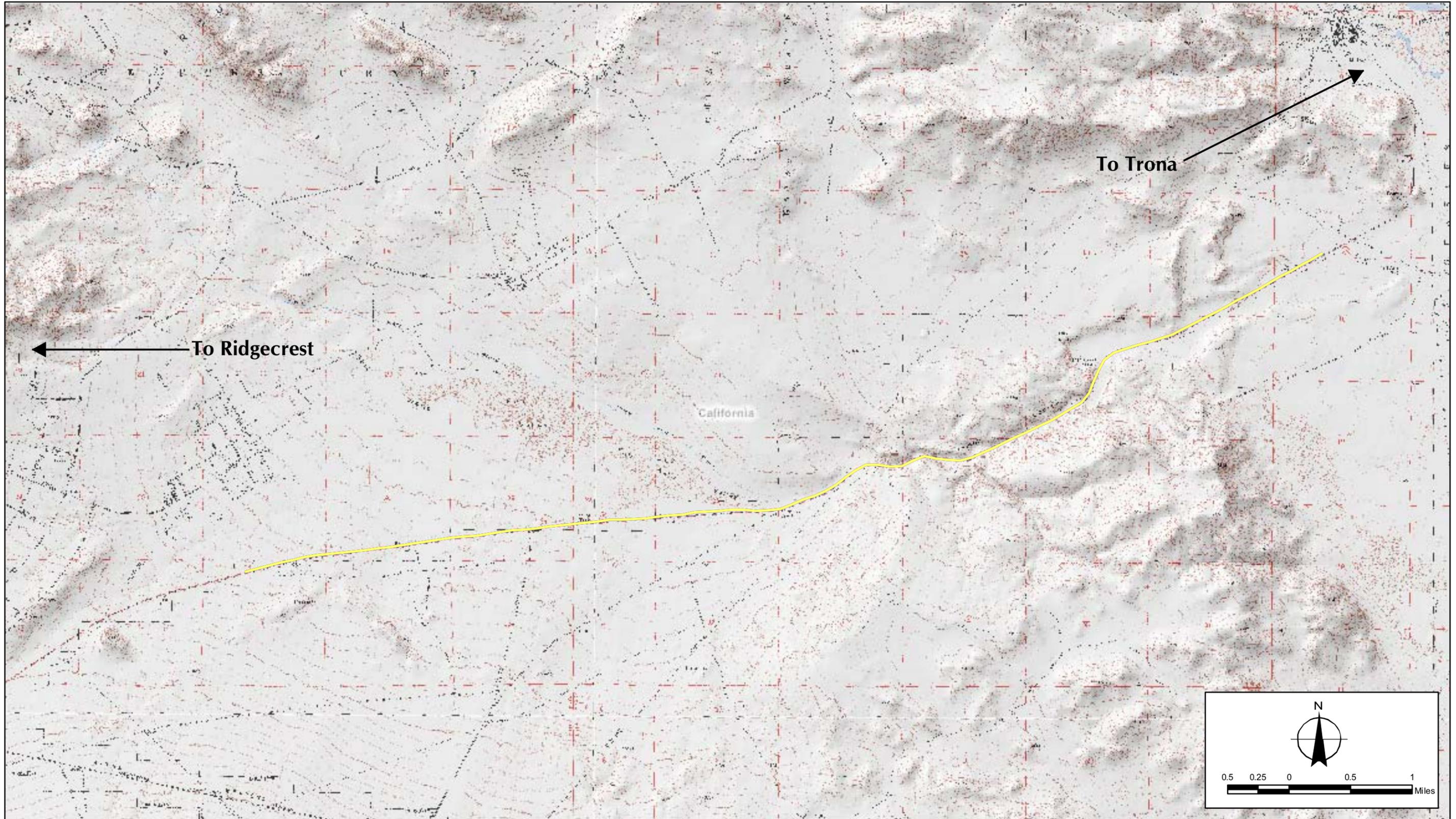
 Proposed Project Location

**FIGURE 1-1**  
Regional Vicinity Map



-  Proposed Project Location
-  Municipalities

**FIGURE 1.1-1**  
Local Vicinity Map



 Proposed Project Location

**FIGURE 1.1-2**  
Topographic Map

## SECTION 2.0 METHODS

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The following section describes methods employed to determine the presence/absence of habitat suitable to support the target species, the presence/absence of target species, as well as brief descriptions of each species surveyed.

### 2.1 IDENTIFICATION OF THREATENED WILDLIFE SPECIES FOR HABITAT ASSESSMENTS AND DIRECTED SURVEYS

Two listed wildlife species (desert tortoise<sup>1</sup> and Mohave ground squirrel<sup>2</sup>) were identified as potentially occurring within the Lone Butte and Westend USGS 7.5-minute series topographic quadrangles as a result of coordination with the United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG), and a query of the California Natural Diversity Database (CNDDDB).<sup>3</sup>

The State Route 178 (SR-178) Drainage Improvement Project (proposed project) was determined to be within the historic range of both desert tortoise and Mohave ground squirrel (Figure 2.1-1, *Nearest Occurrences of Desert Tortoise and Mohave Ground Squirrel*). Separate habitat assessments and surveys were conducted for each listed species, in accordance with established protocols and guidelines for desert tortoise (USFWS) and Mohave ground squirrel (CDFG), respectively.

### 2.2 DESCRIPTION OF THREATENED WILDLIFE SPECIES SUBJECT TO HABITAT ASSESSMENTS AND DIRECTED SURVEYS

The following species descriptions are based on the Draft West Mojave Plan<sup>4</sup> and other published references as noted.

#### Desert Tortoise

The desert tortoise is a large, herbivorous reptile found in portions of California, Arizona, Nevada, and Utah deserts. In California, the desert tortoise occurs primarily within the creosote, shadscale, and Joshua tree series of Mojave Desert scrub, and the lower Colorado River Valley subdivision of the Sonoran Desert scrub. Optimal habitat has been characterized as creosote bush scrub in which precipitation ranges from 2 to 9 inches, with a relatively high diversity of perennial plants and production of ephemeral streams. Soil must be friable enough for digging burrows and firm enough to prevent collapse. In California, the desert tortoise is typically associated with gravelly flats or sandy soils with some clay but is occasionally found in windblown sand or rock terrain. Live desert tortoises have been found at an elevation of 2,225 meters (7,300 feet) above mean sea level (MSL), but the most favorable habitat occurs at elevations of 305 meters to 915 meters (1,000 to 3,000

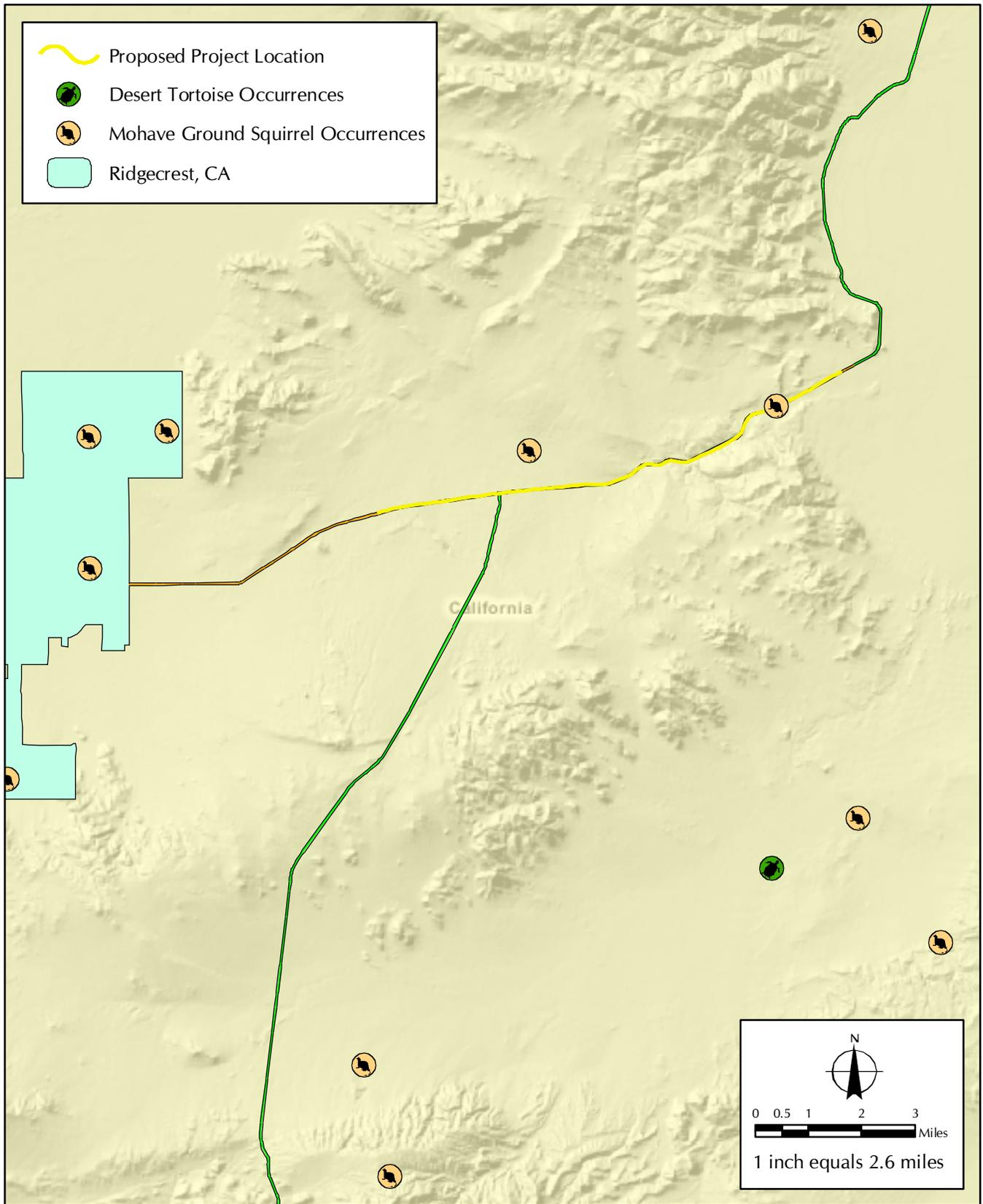
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<sup>1</sup> Federally Threatened and California Threatened.

<sup>2</sup> California Threatened.

<sup>3</sup> California Department of Fish and Game. 2001. *RareFind 2: A Database Application for the Use of the California Department of Fish and Game's Natural Diversity Database (CNDDDB)*. Sacramento, CA: California Department of Fish and Game.

<sup>4</sup> Bureau of Land Management. 2000. *Draft West Mojave Plan, Volume 1*. Moreno Valley, CA: Bureau of Land Management.



**FIGURE 2.1-1**  
 Nearest Occurrences of Desert Tortoise  
 and Mohave Ground Squirrel

feet) above MSL. The desert tortoise is most active in California during spring and early summer when annual plants are most common. Additional activity occurs during warmer fall months and occasionally after summer rainstorms. The desert tortoise spends the remainder of the year in burrows, escaping the extreme condition of the desert. Desert tortoise reproduction typically begins in late March or early April when copulation is likely to occur. Eggs are laid in early summer (late May to July). Clutches average five eggs (range 2 to 9) and take three to four months to hatch. Nests are often constructed at burrow entrances. Lack of rainfall and consequent scarcity of annual plants may result in reproductive failure. In addition, desert tortoise are undergoing a population decline due to off-road vehicle use, competition with livestock, disease (including upper respiratory tract disease), predation (an estimated 50 percent by ravens), deliberate killing, and general forms of harassment such as collecting without a permit. This species is also experiencing habitat loss and degradation.<sup>5</sup>

### **Mohave Ground Squirrel**

The Mohave ground squirrel is characterized as a pink-brown ground squirrel of rather small size, without distinctive stripes or spots. The tail is moderately furred but flattened. Mohave ground squirrels have been recorded in all habitat types of the Mojave Desert, with record being proportional to habitat. The Mohave ground squirrel hibernates during cold months and generally emerges in March in the southern Mojave Desert or as late as May in the northern Mojave Desert.<sup>6</sup> Mohave ground squirrel reproduction occurs shortly after emergence from the winter burrow, with litters averaging 2 young (range 1 to 8). The Mohave ground squirrel is thought to forgo breeding in years when production of primary food sources are limiting, in favor of establishing enough fat reserves for aestivation and hibernation (> 185 grams). The primary threat to the Mohave ground squirrel is degradation of habitat, predation by domestic and feral cats and dogs, urbanization, mortality on paved and dirt roads, agricultural development, and sheep and cattle grazing.<sup>7</sup>

## **2.3 IDENTIFICATION OF POTENTIALLY SUITABLE HABITAT**

The evaluation of plant communities present within the proposed project is based on the field identification of regional assemblages of vegetation characterized by the presence of dominant plant species.<sup>8</sup>

The plant community descriptions that follow are based on descriptions by Holland<sup>9</sup> and are consistent with those found in Sawyer and Keeler-Wolf.<sup>10</sup> All plant communities within the proposed project area provide potentially suitable habitat for both desert tortoise and Mohave ground squirrel.

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<sup>5</sup> Bureau of Land Management. 2000. *Draft West Mojave Plan, Volume 1*. Moreno Valley, CA: Bureau of Land Management.

<sup>6</sup> James, E.W., Jr., and H.J. Peeters. 2000. *Mammals of California*. Berkeley, CA: University of California Press.

<sup>7</sup> Bureau of Land Management. 2003. *Draft West Mojave Plan*. Moreno Valley, CA: Bureau of Land Management.

<sup>8</sup> Munz, P.A., and D.D. Keck. 1949. "California Plant Communities." *El Aliso*, 2(1): 87-105.

<sup>9</sup> Holland, R.F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Sacramento, CA: California Department of Fish and Game.

<sup>10</sup> Sawyer, J.O., and T. Keeler-Wolf. 1995. *A Manual of California Vegetation*. Sacramento, CA: California Native Plant Society.

**Mojave Creosote Bush Scrub (CNDDDB Element Code 34100):** Mojave creosote bush scrub is typically characterized as having a widely spaced community with shrubs of 1.5 feet to 9.75 feet in height, with bare ground present between individual plants. Mojave creosote bush scrub is dominated by creosote bush (*Larrea tridentata*) and burro-bush (*Ambrosia dumosa*). Multiple species of ephemeral herbs and wildflowers may flower if sufficient winter rainfall occurs. Mojave creosote bush scrub is typically found on well-drained secondary soils with low water holding capacity on slopes, fans, and valleys rather than upland sites with thin residual soils or sites with high soil salinity.

Mojave creosote bush scrub is distributed throughout the Mojave Desert from Death Valley (Inyo County) southward to the Little San Bernardino Mountains (San Bernardino County) and eastward to northwestern Arizona and southern Nevada. Within the region, this is the dominant plant community below 3,000 feet above MSL.

Mojave creosote bush scrub as described by Holland<sup>11</sup> can be cross-referenced to three community series as described by Sawyer and Keeler-Wolf.<sup>12</sup>

The creosote bush series is described as having creosote bush as the sole or dominant species in the canopy. This series is distributed throughout the Mojave Desert and found on well-drained soils that may have a pavement surface, generally located in alluvial fans, bajadas, and upland slopes. Plant species associated with this series include desert-holly (*Atriplex hymenelytra*), prickly-pear (*Opuntia* sp.), cholla (*Opuntia echinocarpa*), ephedra (*Ephedra* sp.), hop-sage (*Grayia spinosa*), indigo bush (*Psoralea arborescens*), and/or white bursage (*Ambrosia dumosa*). Shrubs in this community are generally less than 9.75 feet in height and annuals present seasonally.

The creosote bush-white bursage series is described as having creosote bush and white bursage as important or conspicuous in the canopy. This series is distributed throughout the Mojave Desert and found on well-drained soils that may have a pavement surface, generally located in alluvial fans, bajadas, and upland slopes. Plant species associated with this series include box-thorn (*Lycium* sp.), cholla, desert-holly, ephedra, prickly-pear, and/or saltbushes (*Atriplex* sp.). Shrubs in this community are generally less than 9.75 feet in height and annuals present seasonally.

The white bursage series is described as having white bursage as the sole or dominant species in the canopy. This series is distributed throughout the Mojave Desert and found on well-drained soils that may have a pavement surface; this series is located on alluvial fans, bajadas, partially stabilized and stabilized sand fields, and upland slopes. Plant species associated with this series include cholla, creosote bush, and saltbushes. Shrubs in this series are generally less than 9.75 feet in height with a two-tiered canopy over the lower white bursage. The ground layer is open with annuals present seasonally.

## 2.4 SURVEY METHODS

All survey personnel were either experienced in, or supervised by persons experienced in, the undertaking of field surveys for desert tortoise and Mohave ground squirrel, as well as knowledgeable about the identification and ecology of all subject species. All survey personnel

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<sup>11</sup> Holland, R.F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Sacramento, CA: California Department of Fish and Game.

<sup>12</sup> Holland, R.F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Sacramento, CA: California Department of Fish and Game.

were familiar with both federal and state statutes related to listed and sensitive wildlife species, in addition to being experienced with analyzing impacts of development on listed and sensitive wildlife species. Surveyors were knowledgeable about the wildlife of the area, including rare, threatened, and endangered species. In addition, field teams were knowledgeable about the habitat requirements for each of the target species and about the locations of such habitats within the proposed project area, with an in-depth knowledge of the physical characteristics and vegetative habitat of each target species. Each team of surveyors was equipped with a standardized field notebook on which field annotations were compiled, as well as global positioning system (GPS) units, digital cameras, USGS topographic maps, and aerial photographs of the survey area.

## ***Field Methods***

### Desert Tortoise

U. S. Fish and Wildlife Service desert tortoise protocols (Attachment A) were followed to determine presence/absence of desert tortoise within the proposed project area. Protocol surveys included 100 percent coverage of the proposed project area, edge of paving to Caltrans ultimate right-of-way (32.5 feet from paving) on both sides of SR-178. Zone of influence surveys were conducted at the following intervals from the ultimate right-of-way, 300 meters, 600 meters, 1,200 meters, and 2,400 meters (Figure 2.4-1, *Desert Tortoise 100 Percent Coverage and Zone of Influence Surveys*). Zone of influence transects on the northern portion of the propose project area were modified to accommodate the property boundary of the China Lake Naval Air Weapons Station.

Protocol surveys for desert tortoise were conducted by Sapphos Environmental, Inc. biologists (Mr. Charles J. Randel and Ms. Angela Peace), Sunrise Consultants biologist (Ms. Kathy Simon), Kent Hughes Biological Consultants biologist (Mr. Kent Hughes), and Caltrans Associate Environmental Planner (Mr. Aaron Burton) from March 13 to 16, 2006.

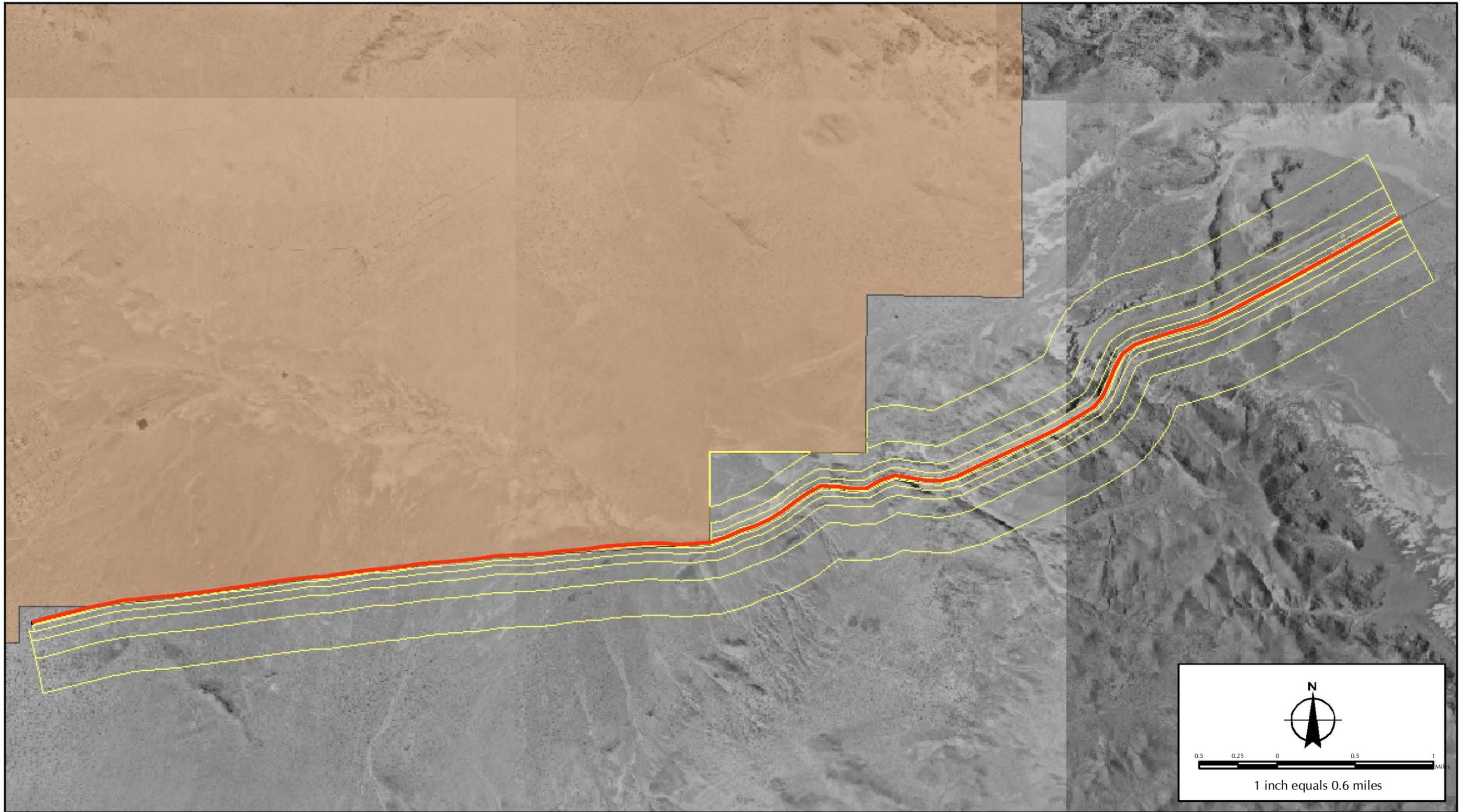
### Mohave Ground Squirrel

Mohave ground squirrel surveys were conducted in accordance with guidelines established by CDFG (Attachment B). The CDFG guideline stipulates that surveys for Mohave ground squirrel must be conducted in three sessions: session one (March 15 to April 30), session two (May 1 to May 31), and session three (June 15 to July 15). Due to the linear nature of the proposed project and consultation with CDFG (Ms. Becky Jones), Mohave ground squirrel grids were aligned in a 4 × 25 array (Figure 2.4-2, *Example of MGS Trapping Grid*). In order to obtain information on Mohave ground squirrel within the proposed project area, CDFG and Caltrans agreed to conduct trapping efforts through all three sessions regardless of when presence was confirmed.<sup>13</sup>

Guideline surveys for Mohave ground squirrel were conducted by Sapphos Environmental, Inc. biologists (Mr. Charles J. Randel and Ms. Angela Peace), Caltrans Associate Environmental Planner (Mr. Aaron Burton), Sunrise Consultants biologist (Ms. Kathy Simon), Ecorp biologists (Mr. Don Mitchell and Mr. Brad Haley), H.T. Harvey Associates biologist (Mr. Howard Clark, Ms. Colleen Lenihan, and Ms. Mary Orland), and Kent Hughes Biological Consultants biologist (Mr. Kent Hughes) from March 20 to July 15, 2006.

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<sup>13</sup> Jones, Becky, California Department of Fish and Game. 14 April 2006. E-mail correspondence with Mr. Aaron Burton, California Department of Transportation, District 8.



-  100 Percent Coverage
-  Zone of Influence Transects
-  China Lake Naval Air Weapons Station

**FIGURE 2.4-1**  
Desert Tortoise 100 Percent Coverage  
and Zone of Influence Surveys



● Trap Locations

**FIGURE 2.4-2**  
Example of MGS Trapping Grid

## SECTION 3.0 RESULTS

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United States Fish and Wildlife (USFWS) protocol surveys for desert tortoise confirmed the presence of desert tortoise within the proposed project site boundary. Desert tortoise presence within the proposed project site was confirmed through sightings of three live desert tortoise, two carcasses, one burrow, one scat, and one drinking depression. Desert tortoise and desert tortoise sign were observed in Mojave creosote bush scrub. All desert tortoise and desert tortoise sign (e.g., burrows, scat, and carcasses) were recorded with a global positioning system (GPS) (UTM NAD 83, Zone 11) and plotted on a map (Figure 3-1, *Location of Desert Tortoise Sign*). Proposed project activities would affect 220 acres of desert tortoise habitat.

More than 300 staff-hours were dedicated to USFWS protocol surveys for desert tortoise in support of the proposed project (Appendix A, *Field Survey Protocol for Any Federal Action that May Occur within the Range of the Desert Tortoise*).

California Department of Fish and Game (CDFG) guideline surveys for Mohave ground squirrel confirmation the presence of Mohave ground squirrel within the proposed project site boundary. During the survey, 25 Mohave ground squirrels were trapped in accordance with CDFG guidelines; their age, gender, body condition, and locations of capture were recorded (Figure 3-2, *Mohave Ground Squirrel Capture Locations*). Of the 25 Mohave ground squirrels captured, there was 1 adult male, 8 adult females, 12 juvenile males, and 4 juvenile females.

More than 2,900 staff-hours were dedicated to Mohave ground squirrel CDFG protocol surveys (Appendix B, *California Department of Fish and Game Mohave Ground Squirrel Survey Guidelines*).

In addition to the presence of desert tortoise and Mohave ground squirrel, the following California Species of Special Concern were observed on the proposed project site: burrowing owl (*Athene cunicularia*),<sup>1</sup> Swainson's hawk (*Buteo swainsonii*),<sup>2</sup> Vaux's swift (*Chaetura vauxi*),<sup>3</sup> and loggerhead shrike (*Lanius ludovicianus*).<sup>4</sup>

Of the four special status species that were not the subject of the protocol surveys, only the loggerhead shrike was observed in the areas of proposed construction activities. Burrowing owls were observed along the 2,400-meter transect of the USFWS protocol surveys for desert tortoise. Vaux's swift and Swainson's hawk were observed singly on one occasion each, and were thought to be migrating through the area to their summer grounds. All species observed in the execution of this task order have been compiled in Appendix C, *Floral and Fauna Compendium*.

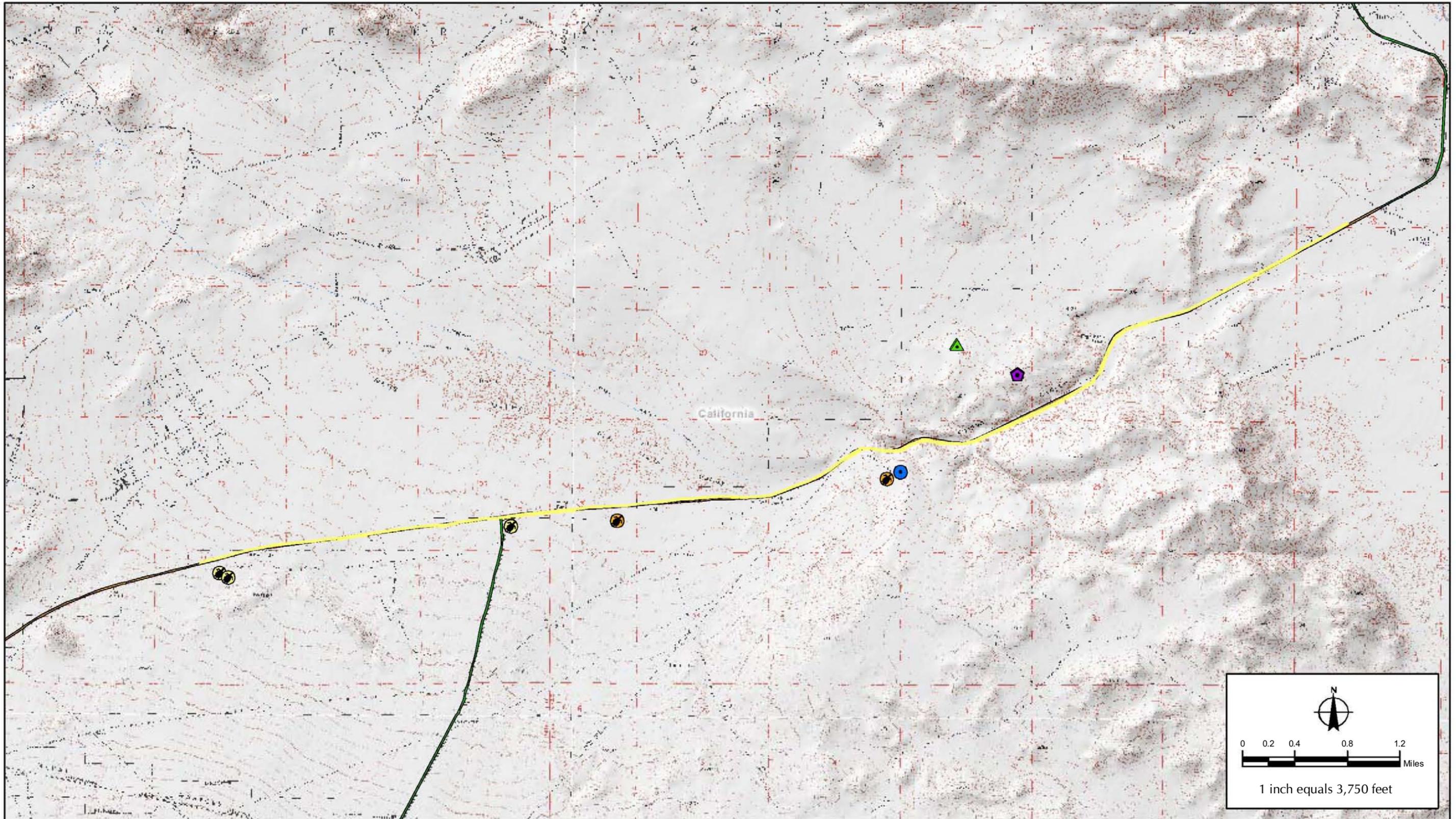
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<sup>1</sup> BLM Sensitive and California Species of Special Concern

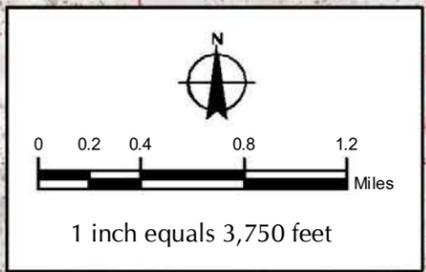
<sup>2</sup> California Threatened

<sup>3</sup> California Species of Special Concern

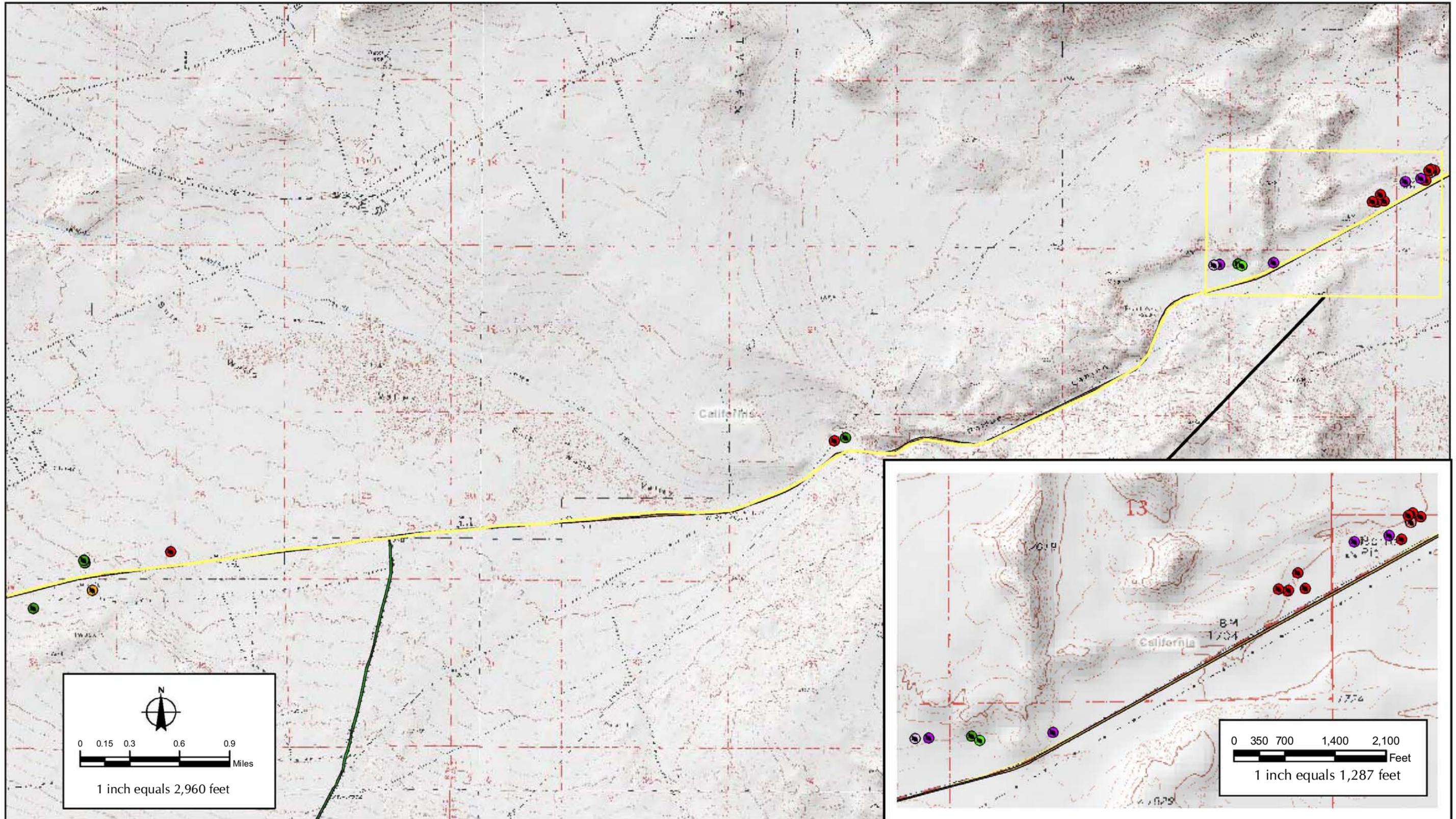
<sup>4</sup> California Species of Special Concern



- |   |                 |   |        |   |                           |
|---|-----------------|---|--------|---|---------------------------|
|  | Desert Tortoise |  | Burrow |  | Drinking Depression       |
|  | Carcass         |  | Scat   |  | Proposed Project Location |



**FIGURE 3-1**  
Location of Desert Tortoise Sign



**FIGURE 3-2**

Mohave Ground Squirrel Capture Locations

## **SECTION 4.0**

### **RECOMMENDATIONS**

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Desert tortoises were observed within the proposed project boundary as a result of United States Fish and Wildlife Service (USFWS) protocol surveys. Due to the presence of the desert tortoise, it is recommended that Caltrans conduct Section 7 consultation with USFWS (Ventura Field Office) in conjunction with the Bureau of Land Management (BLM; Ridgecrest Field Office) to determine appropriate minimization and mitigation measures. Section 7 consultation shall include measures for the minimization of take of desert tortoise during proposed construction activities. Additional consultation shall be conducted with the California Department of Fish and Game (CDFG) to determine appropriate endowment and enhancement fees associated with take of desert tortoise and associated habitats.

Mohave ground squirrels were observed within the proposed project boundary as a result of CDFG guideline surveys. Due to the presence of the Mohave ground squirrel, it is recommended that Caltrans conduct consultation with CDFG to obtain an Incidental Take Permit, pursuant to Section 2081 of the California Fish and Game Code, for both desert tortoise and Mohave ground squirrel. Through consultation, Caltrans, CDFG, and BLM shall establish avoidance measures for the prevention of take of Mohave ground squirrel. In addition to avoidance measures, CDFG will likely establish mitigation measures for the take of habitat for Mohave ground squirrel. Mitigation measures may include endowment and enhancement fees to be paid to CDFG.

Additional permits that may be required prior to initiation of proposed construction may include a Lake and Streambed Alteration Agreement, pursuant to Section 1603 of the California Fish and Game Code, as construction activities have the potential to have an impact on ephemeral washes. It is recommended that Caltrans provide the U.S. Army Corps of Engineers with documentation that the dry washes present within the proposed project area are isolated and non-navigable features, which do not exhibit substantial interstate commerce to support a concurrence of non-jurisdiction.<sup>1</sup>

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<sup>1</sup> U.S. Supreme Court. 9 January 2001. Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers. No. 99-1178, 531 U.S. 159.

## **SECTION 5.0 CONCLUSIONS**

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Sapphos Environmental, Inc. determined the presence of both desert tortoise and Mohave ground squirrel, as well as associated habitats, in accordance with established protocols and guidelines within the proposed project area. Although potential impacts to both species exist, Sapphos Environmental, Inc. is of the opinion that proposed construction activities do not present an imminent threat to the short- or long-term survival of either species within the region. Caltrans shall conduct consultation and coordination with the United States Fish and Wildlife Service (USFWS), Bureau of Land Management (BLM), and the California Department of Fish and Game (CDFG) to establish measures to avoid or minimize the take of desert tortoise and Mohave ground squirrel, as well as the associated habitat that support these species within the proposed project area. In addition to the establishment of avoidance and minimization measures for the two listed species, Caltrans shall consult with CDFG to determine appropriate measures to minimize the effect of proposed construction activities on hydrological resources (ephemeral streams) within the proposed project's construction footprint and downstream resources. If possible, proposed construction activities should be conducted during periods when desert tortoise and Mohave ground squirrel are inactive (hibernating), thus reducing the potential for take of live animals.

## **SECTION 6.0 REFERENCES**

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- U.S. Supreme Court. 9 January 2001. *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*. No. 99-1178, 531 U.S. 159.

***APPENDIX A  
FIELD SURVEY PROTOCOL FOR ANY FEDERAL ACTION THAT  
MAY OCCUR WITHIN THE RANGE OF THE DESERT TORTOISE***

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January 1992

**FIELD SURVEY PROTOCOL FOR ANY FEDERAL ACTION THAT MAY  
OCCUR  
WITHIN THE RANGE OF THE DESERT TORTOISE**  
(Please view Desert Tortoise Monitor and Biologist Responsibilities and Qualifications for  
additional Information)

The Mojave population of the desert tortoise (*Gopherus agassizii*) was listed as a federally endangered species on August 4, 1989 by emergency rule and as a threatened species by final rule on April 2, 1990. Section 7(a) regulations of the Endangered Species Act (Federal Register Vol. 51, No. 106, pp. 19957-19963) require each federal agency to review its actions at the earliest possible time to determine whether any action may affect listed species (Mojave population of the desert tortoise) or critical habitat. If such a determination is made, formal consultation is required with the Fish and Wildlife Service. The Service may request a federal agency to enter into consultation if it identifies any action of that agency that may affect the desert tortoise and for which there has been no consultation. Through completion of the formal Section 7 process, that is issuance of a "no jeopardy" biological opinion, the federal agency receives authorization from the Fish and Wildlife Service to incidentally take a specified number of federally threatened desert tortoises and tortoise habitat through the implementation of a proposed project. Without this authorization from the Fish and Wildlife Service, the federal agency would be in violation of Section 9 of the Endangered Species Act if the proposed project were implemented and resulted in the "take" of a desert tortoise or its habitat.

Section 9 of the Endangered Species Act prohibits the "taking" of any federally listed threatened or endangered species without first obtaining necessary authority from the Fish and Wildlife Service. "Take" includes "harming, harassing, pursuing, hunting, shooting, wounding, killing, capturing, collecting, or attempting to engage in any such conduct" (Section 3(19), Endangered Species Act 1973, as amended). Harm includes "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavior patterns, including breeding, feeding, or shelter" (50 CFR 17.3(c)). "Take" also includes modification of habitat that would result in harm to the desert tortoise.

In response to a demand for information and/or guidance on compliance with Section 7 of the Endangered Species Act, the Fish and Wildlife Service has developed a protocol for surveys within the range of the federally threatened desert tortoise. The purpose of this protocol is to provide technical assistance to federal agencies to determine 1) if a proposed action "may adversely affect" the desert tortoise and thus initiate formal consultation with the Fish and Wildlife Service and 2) the incidental take of desert tortoises and tortoise habitat. Survey information would also enable the federal agency to modify the proposed project or develop an alternative project that would minimize or avoid incidental take of desert tortoises or their habitat. This latter point is relevant under Section 7(a)(1) of the Endangered Species Act which requires all federal agencies to consult with the Fish and Wildlife Service and utilize their authorities to carry out programs for the conservation of endangered and threatened species.

**We also recommend that you obtain a copy of "Procedures for Endangered Species Act Compliance for the Mojave Desert Tortoise" before you begin planning your project. This document is available from any of five Fish and Wildlife Service offices listed below and provides more information to sections 7, 9, and 10 of the Endangered Species Act.**

This survey protocol is subject to revision as new information becomes available. Before initiating the survey protocol described below, we recommend checking with the Fish and Wildlife Service to verify that you are implementing up-to-date survey methods.

In Arizona:

Fish and Wildlife Service  
Phoenix Field Office  
2321 West Royal Palm Road, Suite 103  
Phoenix, Arizona 85021  
(602) 640-2720

In California, for Inyo, Kern, Los Angeles, and San Bernardino Counties:

Fish and Wildlife Service  
Ventura Fish and Wildlife Office  
2493 Portola Road, Suite B  
Ventura, California 93003  
(805) 644-1766

In California, for Imperial and Riverside Counties:

Fish and Wildlife Service  
Carlsbad Fish and Wildlife Office  
2730 Loker Avenue West  
Carlsbad, California 92008  
(760) 431-9440

In Nevada:

Fish and Wildlife Service  
Nevada State Office  
1340 Financial Boulevard, Suite 234  
Reno, Nevada 89502-5093  
(775) 861-6300

In Utah:

Fish and Wildlife Service  
Salt Lake City Field Office  
145 East 1300 South, Suite 404  
Salt Lake City, Utah 84115  
(801) 524-5009

Survey protocol includes five parts: 1) survey need, 2) survey types, 3) survey quality, 4) survey time period, and 5) qualifications of the surveyor.

**Survey Needs:** The desert tortoise may occupy numerous habitat types within its range in the Mojave and Colorado deserts and below an elevation of 5000 feet. In these areas there is a likelihood of encountering desert tortoises or tortoise sign. If the federal agency does not know if the proposed project occurs within the range of the desert tortoise, please request a species list from the Fish and Wildlife Service office listed above that has jurisdiction over the project area. If

the Fish and Wildlife Service species list includes the Mojave population of the desert tortoises, this means the desert tortoises may be present within or near the project area.

The following criteria have been developed by the Fish and Wildlife Service to assist federal agencies in their determination of "may affect" for the desert tortoise: 1) desert tortoise habitat on the project site, 2) desert tortoise habitat adjacent to the project site such that the project area may overlap the home range of a desert tortoise, or 3) project would introduce direct or indirect disturbance to desert tortoise habitat (e.g., roads). Desert tortoise habitat is defined as areas with presence of tortoises or tortoise sign within areas likely to be home range, dispersal corridors, or habitat identified in the recovery plan. If the project area and adjacent areas meet one of these three criteria or if any tortoise sign (e.g., live tortoises, shells, bones, scutes, limbs, scats, burrows, pellets, tracks, egg shell fragments, courtship rings, drinking sites, mineral licks, etc.) is known to occur in the project area or adjacent areas, then the proposed project "may affect" the desert tortoise and consultation with the Fish and Wildlife Service should be initiated.

Please note that all free-roaming desert tortoises located north and west of the Colorado River are protected under the Endangered Species Act. For example, the desert tortoise that on occasion occurs above 5000 feet or in pinyon-juniper woodland would be protected under the Endangered Species Act.

The next step is for the federal agency to determine the likelihood of an adverse effect to the desert tortoise from implementation of the proposed project. If the proposed action may adversely affect the desert tortoise, formal consultation is required unless, as a result of the preparation of a biological assessment or as a result of informal consultation with the Fish and Wildlife Service, the federal agency determines, with the written concurrence of the Fish and Wildlife Service, that the proposed action is not likely to adversely affect the desert tortoise or critical habitat.

As mentioned above, the presence of a desert tortoise within the project boundary is not necessary for the project to result in the take of the desert tortoise. For example, a desert tortoise may be present in the Zone of Influence and may use the project site for feeding, breeding, or shelter. The Zone of Influence is defined as the area where tortoises on adjacent lands may be directly or indirectly affected by project exploration, construction, maintenance, operation, monitoring, dismantlement, enhancement, and project abandonment. Destruction of tortoise habitat used for feeding, breeding, or shelter is considered take under the Endangered Species Act.

For formal consultation, that is, projects that may adversely affect the desert tortoise, the Fish and Wildlife Service recommends the following protocols:

For a surface disturbance project that would result in the clearing or crushing of vegetation (e.g., roads, buildings, excavation or fill sites, utility towers, water improvements, driving overland for land surveying and other activities, etc.) the federal agency should conduct a Presence-or-Absence Survey (100 percent survey) for desert tortoises and tortoise sign over the entire project area and the Zone of Influence adjacent to the project area. (See Survey Types below.) The survey information would be used to develop a reliable incidental take statement as required in the biological opinion. Depending on the type of project, a Clearance Survey (see below) in occupied tortoise habitat may be necessary. The Fish and Wildlife Service requests that survey results (i.e., copies of the completed transect forms) be submitted to the appropriate Service office within 30 days of completion or with the request for formal consultation. If not included in the biological assessment or biological evaluation this information may be requested in the biological opinion.

For a management project that would result in modification of very large areas of desert tortoise habitat (e.g., grazing), the federal agency should coordinate with the Fish and Wildlife Service to develop an alternative method for surveying for desert tortoises and their sign. This method should consider variations in habitat quality within the project area, the natural history of the desert tortoise, and be statistically acceptable. The survey information would be necessary to develop a reliable incidental take statement as required in the biological opinion. Depending on the type of project, a Clearance Survey (see below) in occupied tortoise habitat may be necessary. The Fish and Wildlife Service requests that survey results be submitted to the appropriate Service office within 30 days unless the federal agency initiates formal consultation. If not included in the biological assessment or biological evaluation this information may be requested in the biological opinion.

**If (1) the federal agency has determined that the proposed project is not likely to adversely affect the desert tortoise because the project area is not considered tortoise habitat, and (2) a desert tortoise or tortoise sign (shells, bones, scutes, limbs, burrows, pellets, scats, egg shell fragments, tracks, courtship rings, drinking sites, mineral licks, etc.) are found in the project area during implementation of the proposed action, the proposed action should immediately stop and the federal agency determine whether formal consultation is necessary to comply with the Endangered Species Act.** The Fish and Wildlife Service recommends that the federal agency notify us in writing within three (3) days of the discovery. This short notification period will help ensure a prompt response by the Fish and Wildlife Service to facilitate compliance with the Endangered Species Act.

Fish and Wildlife Service Survey Protocol for Desert Tortoises and Bureau of Land Management Categories of Desert Tortoise Habitat: The Bureau of Land Management has developed category maps for desert tortoises to assist the Bureau in managing public lands for the tortoise within the Bureau's multiple use mandate. Bureau maps were not developed to provide information on how to avoid take of the desert tortoise or comply with the federal Endangered Species Act. The Bureau has assigned three categories to their maps on desert tortoise habitat. These categories reflect the quality of tortoise habitat, quantity of tortoises present, and the Bureau's ability to manage these areas for the desert tortoise while minimizing resource conflicts. For example, Category 1 is considered better for tortoises than category 2. However, category 3 areas may contain high quality tortoise habitat and high density of tortoises, but because of resource conflicts the Bureau has assigned the area to category 3.

If an area is not classified on the Bureau's maps as category 1, 2, 3, this does not mean that this area does not contain desert tortoises or is not considered desert tortoise habitat. The Bureau did not categorize lands that it does not manage such as military reservations or private lands. Also, the Bureau did not categorize lands in many areas that have densities of desert tortoises less than 20 per square mile. Thus, if a proposed project is not located in an area categorized as category 1, 2, or 3 by the Bureau, the project may still be located in desert tortoise habitat if it is in the desert and below 5000 feet.

**Survey Types:** Two types of surveys are recommended: 1) Presence-or-Absence and 2) Clearance. Neither survey utilizes the 1.5-mile triangular transect survey method developed by the Bureau of Land Management. This triangular transect method has not provided reliable information on the number of desert tortoises that would be incidentally taken as a result of implementation of the proposed project and thus is not adequate for meeting the requirements of the Endangered Species Act.

Presence-or-Absence: This survey type is recommended for all potential desert tortoise habitats. A Presence-or-Absence Survey equivalent to that described below would be requested for habitats thought to be outside suitable habitat for the desert tortoise if tortoise sign is found within these habitats located within the project area.

The purpose of this survey is to determine impacts of potential land disturbance activities or land management activities to the local tortoise population. This includes identifying the number and location of all tortoises and tortoise sign that occur within a given project area or selected area and if any tortoises occur in adjacent areas whose home range may overlap into the project area and thus be lost or harassed by the proposed action.

The project area is defined as any area that will be cleared or partially cleared, with vehicles on or adjacent to it, temporarily or permanently used for equipment or materials storage, loading or unloading, or sites where soils/vegetation is damaged, fragmented, or disturbed (e.g., driving overland).

**The entire project area is surveyed using belt transects 10 yards or 30 feet wide (100 percent coverage). In some locations, belt transects less than 30 feet wide may be appropriate (see below). In addition, the Zone of Influence is surveyed. The Zone of Influence is defined as the area where tortoises on adjacent lands may be directly or indirectly affected by project exploration, construction, maintenance, operation, monitoring, dismantlement, enhancement, and project abandonment. As a minimum, the belt transects in the Zone of Influence are located at 100, 300, 600, 1200, and 2400-foot intervals from and parallel to the edge of the project boundaries.** (See Figures 1 and 2.) All tortoise sign (live tortoises, shell, bones, scutes, limbs, scats, burrows, pellets, tracks, egg shell fragments, courtship rings, drinking sites, mineral licks, etc.) within the project area and sign located on transects within the Zone of Influence should be mapped.

The extent of the Zone of Influence is dependent on the type of habitat alteration/development and its proximity to other developments. The extent of the Zone of Influence increases as the probability of increased use by domestic predators, potential human use in the Zone, road creation and use, littering, waste disposal, etc. These uses result in increased take of desert tortoises through predation, collection as pets, vandalism, road kills, and attracting predators such as ravens, coyotes, and feral dogs to the area.

Figure 1. Example of a proposed transmission line including areas with full (100 percent) survey coverage for desert tortoises (construction area) and locations of transects within the Zone of Influence.

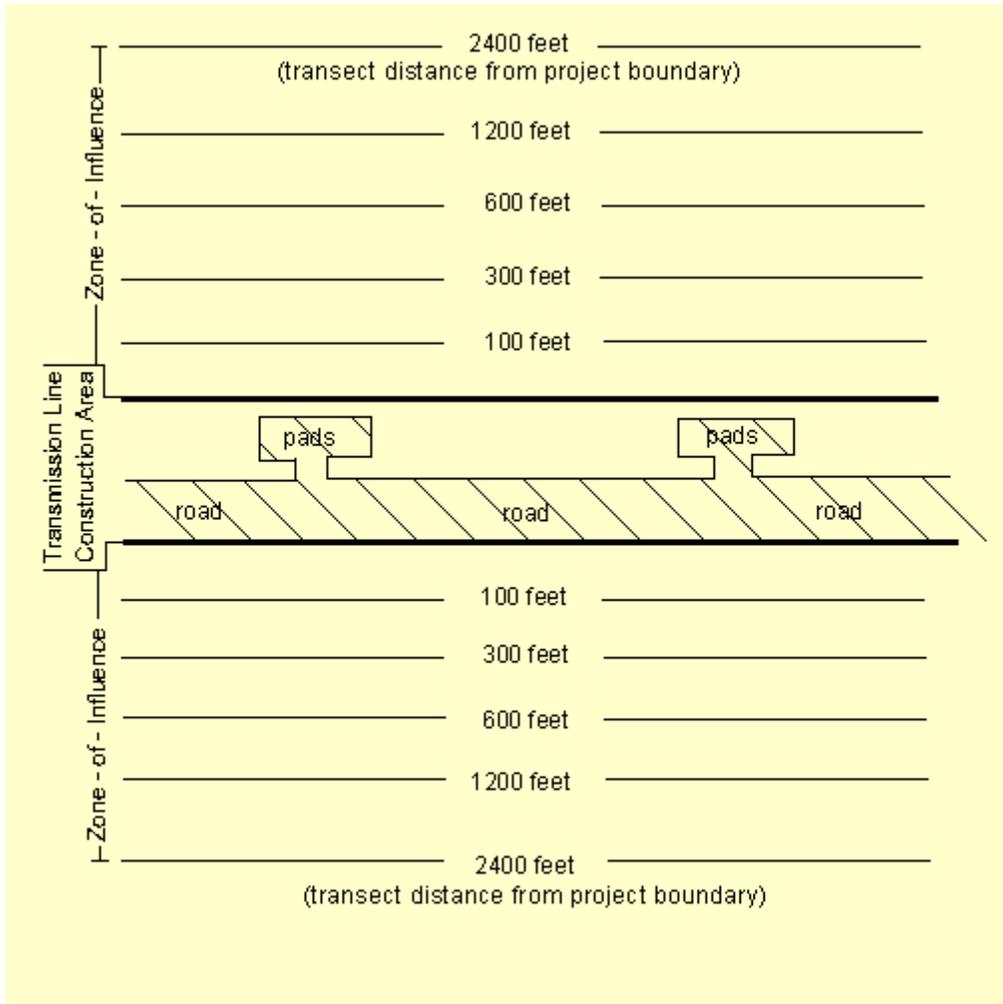
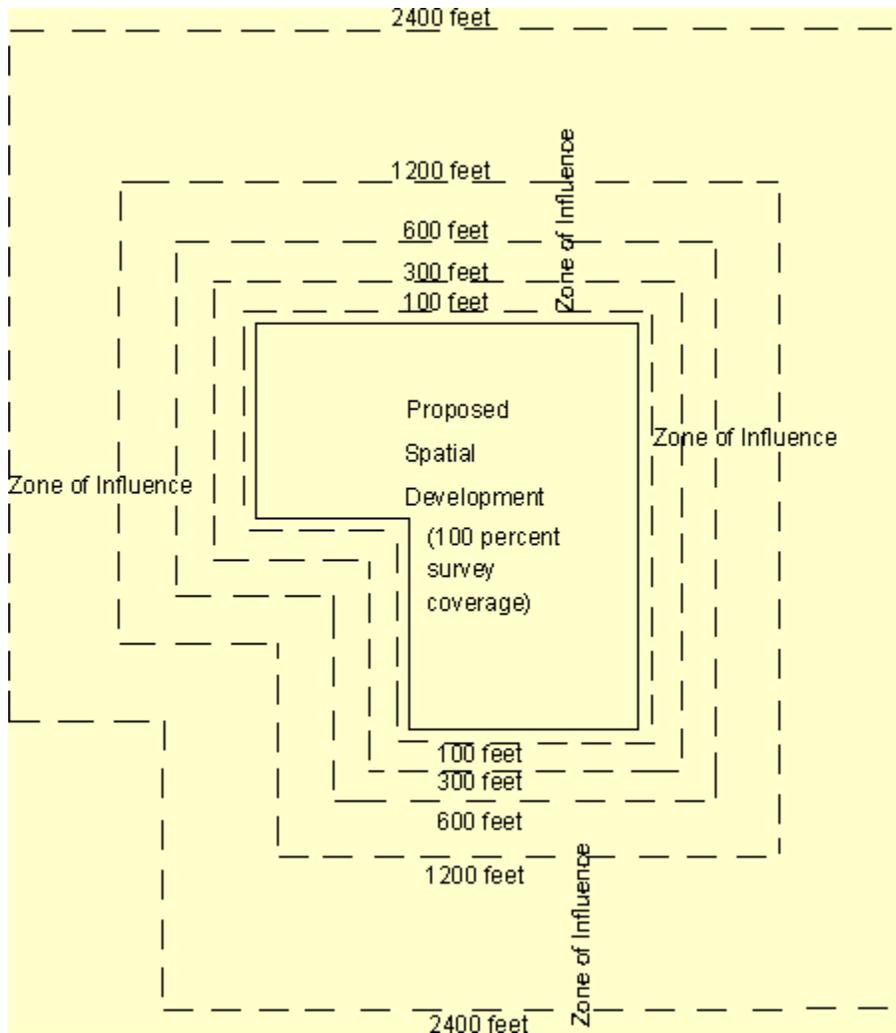


Figure 2. Example of a proposed spatial development (e.g., residential development, commercial development) with full (100 percent) survey coverage for desert tortoises and locations of transects within the Zone of Influence.



Additional transects may be recommended at 3600- and 4800- foot intervals from the perimeter of the project area for developments 1) located in or within one mile of categories 1 or 2 habitats as defined by the Bureau of Land Management or 2) associated with residential development, new or increased road use, landfills, or projects that would result in increases in human use or litter.

For example, if a project area is 640 acres or one square mile, 176 parallel transects each one mile long and 30 feet wide would be necessary to provide 100 percent coverage of the project area. Additional transects would be necessary to survey the adjacent areas or Zone of Influence.

If the project area contains locations with vegetation or topography that obscures or reduces that surveyor's ability to see tortoise sign at distances of up to 15 feet on the ground, the width of the survey should be reduced to 10 feet, that is, 5 feet on either side of the surveyor. Some examples of situations where a 10-foot wide transect should be conducted instead of a 30-foot wide transect would be: 1) foothills and slopes of mountains which contain rocks, boulders, and/or vegetation that obstruct the surveyor's view of the ground at distances greater

than 5 feet, and 2) areas in which the vegetation density is greater than that of typical creosote or creosote/bursage flats or bajadas in the Mojave Desert such as desert wash scrub or woodlands and ecotones between habitat types. In these areas the surveyor's view of the ground and tortoise sign, if present, would be obstructed and a 30-foot wide transect would not be acceptable.

When mapping tortoise sign, the recommended map scale is 1 inch=100 feet for plans involving ground disturbance and 1 inch=1000 feet for preliminary planning (master planning or specific planning). These map scales are based on those frequently required by city or county planning departments. The map should include locations and specific types of all tortoise sign found on the project area and Zone of Influence including the number live tortoises, reference to the corresponding transect form with additional information on tortoise sign found, significant landmarks, legal description of the project area, survey dates, and the range of elevation within the project boundaries. Please note that a federal Fish and Wildlife License/Permit is required before a surveyor can capture, touch, or "harass" a live desert tortoise even for the purposes of taking measurements or determining its sex. A permit may also be required from the appropriate state wildlife resource agency (e.g., Arizona Game and Fish Department, California Department of Fish and Game, Nevada Department of Wildlife, Utah Division of Wildlife Resources). **The Fish and Wildlife Service emphasizes that the surveyor should only estimate the size of all live desert tortoises encountered.**

If the surveyor wishes to use a fiber-optic scope or video camera that is placed inside a tortoise burrow instead of or in addition to a hand-held mirror to investigate desert tortoise shelter sites, you should contact the Fish and Wildlife Service at one of the offices listed above. We will need information on the type of equipment you will be using and your qualifications to use it. Improper use of such equipment may disturb or injure tortoises, damage the shelter site, and may promote the spread of disease. These actions may be considered take under the Endangered Species Act. You should refer to the Desert Tortoise Handling Protocols for information on when and how to utilize these scopes to avoid the possible transmission of disease between tortoises.

The following format is recommended for recording transect data. (See Figure 3.) This format has been modified from the Bureau of Land Management's Interim Techniques Handbook for Collecting and Analyzing Data on Desert Tortoise Populations and Habitats. One form is used for each transect where tortoise sign occurs. Pages 1, 2, and 3 of the form would be completed for each transect in the project site and the Zone of Influence where tortoise sign occurs. If additional space is needed, more forms may be used for each transect and stapled together.

If no tortoise sign is located during Presence-or-Absence Surveys, we recommend that the surveyor complete and submit summary form(s) (Figure 4) to the appropriate Fish and Wildlife Service office listed above.

**Please do not collect any desert tortoise sign.** Tortoise scats may be used by tortoises to mark or identify travel areas and shelter sites. Tortoise shells may be an important source of minerals for reptiles and mammals.

Figure 3. Desert tortoise survey form for Presence-or-Absence and Clearance Surveys (4 pages).



CONDITION OF SCATS(2) - COMMENTS (See below)

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CONDITION OF SHELL REMAINS(3) - COMMENTS (See below)

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SIGNS OF HUMAN DISTURBANCE-COMMENTS

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- (1) Burrows and Dens:
  - 1. currently active, with tortoise or recent tortoise sign
  - 2. good condition, definitely tortoise; no evidence of recent use
  - 3. deteriorated condition (please describe); definitely tortoise
  - 4. deteriorated condition; possibly tortoise (please describe)
  - 5. good condition; possibly tortoise (please describe)
- (2) Scats:
  - 1. wet (not from rain or dew) or freshly dried; obvious odor
  - 2. dried with glaze; some odor; dark brown
  - 3. dried; no glaze or odor; signs of bleaching (light brown), tightly packed material
  - 4. dried; light light brown to pale yellow, loose material; scaly appearance
  - 5. bleached, or consisting only of plant fiber
- (3) Shell Remains:
  - 1. fresh or putrid
  - 2. normal color; scutes adhere to bone
  - 3. scutes peeling off bone
  - 4. shell bone is falling apart; growth rings on scutes are peeling
  - 5. disarticulated and scattered

Show locations of types of tortoise sign on transect line below:

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Drawing: Scale 1 in = \_\_\_\_ft      Drawing or Map Reference No. \_\_\_\_\_      Transect No. \_\_\_\_\_  
 Recorder \_\_\_\_\_      Date \_\_\_\_\_      Parcel No. \_\_\_\_\_      Location \_\_\_\_\_



Vegetation \_\_\_\_\_

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Corrected Sign	TOTAL		NUMBER		OF		Shell Remains(3)
	Live Tortoises Adult/Juv.		Shelter Sites Pallet/Burrow/Den Active/Inactive(1)		Scats(2)		
A=	J=			M=	F=	J=	Unk=
						Unk=	

Tracks	Eggshell Fragments	Drinking Sites	Courtship Rings	Other	Neotoma :w/ sign	Middens :w/o sign
					:	

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SIGNS OF HUMAN DISTURBANCE - NUMBER AND TYPES SEEN

Tire Tracks	Human Footprints	Dog Sign	Trash	Dump Sites	Shotgun/ Rifle Shells	Blading	Ravens	Other

SUMMARY FORM (CONTINUED)  
 FOR PRESENCE-OR-ABSENCE AND CLEARANCE SURVEYS  
 FOR DESERT TORTOISE SIGN

Comments/Drawings

INFORMATION INDEX FOR DESERT TORTOISE SIGN  
Burrows and Dens, Scats, and Shell Remains

- (1) Burrows and Dens:
1. currently active, with tortoise or recent tortoise sign
  2. good condition, definitely tortoise; no evidence of recent use
  3. deteriorated condition (please describe); definitely tortoise
  4. deteriorated condition; possibly tortoise (please describe)
  5. good condition; possibly tortoise (please describe)
- (2) Scats:
1. wet (not from rain or dew) or freshly dried; obvious odor
  2. dried with glaze; some odor; dark brown
  3. dried; no glaze or odor; signs of bleaching (light brown), tightly packed material
  4. dried; light light brown to pale yellow, loose material; scaly appearance
  5. bleached, or consisting only of plant fiber
- (3) Shell Remains:
1. fresh or putrid
  2. normal color; scutes adhere to bone
  3. scutes peeling off bone
  4. shell bone is falling apart; growth rings on scutes are peeling
  5. disarticulated and scattered

**Clearance Survey:** For projects located in areas with habitat used by desert tortoises, especially those projects with a linear band of disturbance (e.g. pipelines, roads, transmission lines), a Clearance Survey may be required as part of the Terms and Conditions of a biological opinion to reduce incidental take of the desert tortoise. The purpose of the survey would be to temporarily relocate or salvage tortoises from the area of construction and any other area deemed necessary to avoid or minimize the death of desert tortoises that may be caused by the project. A Clearance Survey would require full coverage of the project area, and would focus on locating all desert tortoises above and below ground within the project area. This survey would be conducted immediately prior to surface disturbance at each site within the project area. The survey period may be stipulated in the Terms and Conditions of the biological opinion to reduce the incidental take of desert tortoises.

**Survey Quality:** To determine the accuracy of the surveyor in locating desert tortoise sign during Presence-or-Absence Surveys for each project area, the Fish and Wildlife Service recommends that the surveyor conduct an intensive survey in a portion of the project area following completion of the 100 percent survey. The size of the intensive survey area is 5 percent of the size of the project area. The intensive survey area would also receive 100 percent coverage using transects 10 feet wide rather than 30 feet or 5 feet wide rather than 10 feet wide. The location of the intensive survey would be plotted on the map and a comparison made between the sign recorded in this area during the 100 percent survey effort and the intensive survey effort. The quality or accuracy of the survey for the project area will be determined by comparing these two data sets for this area.

If the surveyor does not meet the minimal qualifications stated below or if there is a major difference in number of sign recorded between the intensive survey effort and the 100 percent survey effort, the survey may not be deemed adequate by the Fish and Wildlife Service.

If the survey results do not include the Zone of Influence, the Fish and Wildlife Service may not concur with the survey results.

**Qualifications of Surveyor:** The Fish and Wildlife Service does not endorse any individual or company with respect to their abilities to conduct satisfactory surveys. We recommend the following criteria for selecting someone to conduct surveys to determine presence or absence of desert tortoises in a given area or recent use of the area by the desert tortoise.

As a general rule, a qualified desert tortoise surveyor is a biologist with a bachelors degree or graduate degree in biology, ecology, wildlife biology, herpetology, or related fields. He/she must have demonstrated prior field experience using accepted resource agency techniques to survey for desert tortoises. Field experience may mean a minimum of 60 days field experience searching for desert tortoises and tortoise sign.

**The surveyor should have the following qualifications for the survey results to be accepted by the Fish and Wildlife Service: 1) ability to recognize and accurately identify all types of desert tortoise sign listed above, and 2) ability to carefully, legibly, and completely record all sign including size of shelter sites, shells, and estimated size of live tortoises.**

**Survey Time Period:** Survey time for determination of "may affect" is not limited. Survey time for Presence-or-Absence Surveys is limited to the following approximate activity period of the desert tortoise, March 25 to May 31. This survey time may be extended by the Fish and Wildlife Service if tortoises on or near the project area have been observed above ground prior to March 25 or after May 31.

This survey window is based on the activity period for the desert tortoise throughout its range during a typical year and equates to the period of time when a tortoise is not brumating or aestivating. During dry years this activity period may be shorter and in wet years it may be longer. Desert tortoises may also become active during and after summer rains.

Surveys conducted outside this window will be subject to close scrutiny by the Fish and Wildlife Service. The Service may consider the results of these surveys as under-representing the number of tortoises on and use of the project site by desert tortoises.

Presence-or-Absence or Clearance surveys should only be conducted during daylight hours.

The Fish and Wildlife Service considers the results of a Presence-or-Absence Survey, including the Zone of Influence, to be valid for no more than one year. This time period of survey data reliability may be significantly reduced depending on project size, location, or proximity to other land disturbance.

**APPENDIX B**  
**CALIFORNIA DEPARTMENT OF FISH AND GAME**  
**MOHAVE GROUND SQUIRREL SURVEY GUIDELINES**

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## CALIFORNIA DEPARTMENT OF FISH AND GAME

### MOHAVE GROUND SQUIRREL SURVEY GUIDELINES (January 2003)

Unless a certain circumstance<sup>(1)</sup> applies, the Department of Fish and Game (Department) requires a survey to be undertaken for the Mohave ground squirrel (*Spermophilus mohavensis*) on a project site, if the proposed site has potential habitat of this species and the presence of the species on the project site is unknown. Potential habitat is land supporting desert shrub vegetation<sup>(2)</sup> within or adjacent to the geographic range<sup>(3)</sup> of the species. A project is an action that results in temporary or permanent removal or degradation of potential habitat. The Department considers a project site to be an area of land controlled by the project proponent, including but not limited to the portion proposed for removal or degradation of potential habitat. The Department considers a project site to be occupied by the Mohave ground squirrel, if an individual of this species is observed, or is captured on any sampling grid, on the project site.

The Department intends for these survey guidelines to apply to projects that would negatively affect  $\leq 180$  acres or to linear projects  $\leq 5$  miles in length. For projects of larger scale, the Department requires special survey protocol(s) to be developed through its consultation with either the project proponent or the local lead agency (if appropriate) or both entities.

For projects of the appropriate scale, each survey shall adhere to the following conditions:

1. Studies that include trapping for the Mohave ground squirrel shall be authorized by a Memorandum of Understanding (MOU) with the Habitat Conservation Planning Branch of the Department, or by other permit as determined by the Department, and shall be undertaken only by a qualified biologist. A qualified biologist is a biologist who has demonstrated pertinent field experience in capturing and handling ground squirrels or other small mammals in desert/arid communities and who has been permitted by the Department to work without supervision. Each biologist setting traps, opening traps containing captured animals, or handling captured animals must be named in the MOU as an authorized person, whether qualified or not to work without supervision. (For information on the procedure to obtain an MOU, see page 3.)
2. Visual surveys to determine Mohave ground squirrel activity and habitat quality shall be undertaken the period of 15 March through 15 April. All potential habitat on a project site shall be visually surveyed during daylight hours by a biologist who can readily

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(1) A survey is not necessary in the circumstance that the project proponent prefers to assume that the Mohave ground squirrel is present on the project site and applies for a California Endangered Species Act incidental-take permit (Fish and Game Code Section 2081b) requiring mitigation and compensation.

(2) Examples of desert shrub vegetation that is known to provide habitat for the Mohave ground squirrel include (but are not limited to) Mojave Creosote Bush Scrub, Mojave Mixed Woody Scrub, and Desert Saltbush Scrub as described in Holland 1986.

(3) Since the limits of the geographic range are not known precisely, surveys may be required in areas up to five miles from currently-documented boundaries.

- identify the Mohave ground squirrel and the white-tailed antelope squirrel (*Ammospermophilus leucurus*).
3. If visual surveys do not reveal presence of the Mohave ground squirrel on the project site, standard small-mammal trapping grids shall be established in potential Mohave ground squirrel habitat. The number of grids will depend on the amount of potential habitat on the project site, as determined by the guidelines presented in paragraphs 4 and 5 of these guidelines.
  4. For linear projects (for example, highways, pipelines, or electric transmission lines), each sampling grid shall consist of 100 Sherman live-traps (or equivalent; the minimum length of any trap is 12 inches) arranged in a rectangular pattern, 4 traps wide by 25 traps long, with traps spaced 35 meters apart along each of the four trap lines. At a minimum, one sampling grid of this type shall be established in each linear mile, or fraction thereof, of potential Mohave ground squirrel habitat along the project corridor.
  5. For all other types of projects, one sampling grid consisting of 100 Sherman live-traps (or equivalent; the minimum length of any trap is 12 inches) shall be established for each 80 acres, or fraction thereof, of potential Mohave ground squirrel habitat on the project site. The traps shall be arranged in a 10 x 10 grid, with 35-meter spacing between traps.
  6. Each sampling grid shall be trapped for a minimum five consecutive days, unless a Mohave ground squirrel is captured before the end of the five-day term on the grid or on another grid on the project site. If no Mohave ground squirrel is captured on a sampling grid on the project site in the first five-consecutive-day term, each sampling grid shall be sampled for a SECOND five-consecutive-day term. Trapping may be stopped before the end of the second term if a Mohave ground squirrel is captured on any sampling grid on the project site. If no Mohave ground squirrel is captured during the second five-consecutive-day term, each sampling grid shall be sampled for a THIRD five-consecutive -day term. The FIRST trapping term shall begin and be completed in the period of 15 March through 30 April. If a SECOND term is required, it shall begin at least two weeks after the end of the first term, but shall begin no earlier than 01 May, and shall be completed by 31 May. If a THIRD term is required, it shall begin at least two weeks after the end of the second term, but shall begin no earlier than 15 June, and shall be completed by 15 July. All trapping shall be conducted during appropriate weather conditions, avoiding periods of high wind, precipitation, and low temperatures (<50°F or 10°C).
  7. For projects requiring two or more sampling grids, capture of a Mohave ground squirrel on any grid will establish presence of the species on the project site. Trapping may be stopped on all grids on the project site at that time. For linear projects, very large project sites, project sites characterized by fragmented or highly-heterogeneous habitats, or in other special circumstances, continued trapping may be necessary.

8. A maximum 100 traps shall be operated by each qualified biologist. Each trap shall be covered with a cardboard A-frame or equivalent non-metal shelter to provide shade. Trap and shelter orientation shall be on a north-south axis. All traps shall be opened within one hour of sunrise and may be closed beginning one hour before sunset. Traps shall be checked at least once every four hours to minimize heat stress to captured animals. When traps are open, temperature shall be measured at a location within the sampling grid, in the shade, and one foot (approx. 0.3 meters) above the ground at least once every hour. Traps shall be closed when the ambient air temperature at one foot above the ground in the shade exceeds 90°F (32°C). Trapping shall resume on the same day after the ambient temperature at one foot (approx. 0.3 meters) above the ground in the shade falls to 90°F (32°C) and shall continue until one hour before sunset. Suggested baits are mixed grains, rolled oats, or bird seed, with a small amount of peanut butter.
9. A qualified biologist shall complete the Survey and Trapping Form, which is found on page 5 of these guidelines. This biologist, or the lead agency for the project, shall submit the completed form to the appropriate Department office (see page 4) with the biological report on the project site.
10. The Department may allow variation on these guidelines, with the advance written approval of the appropriate regional habitat conservation planning office (see page 4). Such variations could include biologically-appropriate modification of the trapping dates or changes in grid configuration that would enhance the probability of detecting Mohave ground squirrels. Any variation which concerns trapping or marking methods must be incorporated into the MOU or permit that authorizes the work.
11. If a survey conducted according to these guidelines results in no capture or observation of the Mohave ground squirrel on a project site, this is not necessarily evidence that the Mohave ground squirrel does not exist on the site or that the site is not actual or potential habitat of the species. However, in the circumstance of such a negative result, the Department will stipulate that the project site harbors no Mohave ground squirrels. This stipulation will expire one year from the ending date of the last trapping on the project site conducted according to these guidelines.

literature cited in footnote <sup>(1)</sup>

Holland, R. F. 1986. Preliminary descriptions of the terrestrial natural communities of California. Dep of Fish and Game (Sacramento), Nongame Heritage Program report, 156 pages.

CONTACTS

- A. For information on obtaining an MOU or on the type of experience that a qualified biologist must have, contact the following:

John Gustafson	tele: (916) 654-4260
Habitat Conservation Planning Branch	fax: (916) 653-2588
Department of Fish and Game	e-mail: JGustafs@dfg.ca.gov
1416 Ninth Street, Suite 1260	
Sacramento, California 95814	

- B. For information on project review and conservation planning by the Department, as these activities regard the Mohave ground squirrel, contact the following:

(for Kern County)  
Habitat Conservation Planning  
San Joaquin Valley and Southern Sierra Region  
Department of Fish and Game  
1234 E. Shaw Avenue  
Fresno, California 93710  
tele: (559) 243-4014

(for Los Angeles County)  
Habitat Conservation Planning  
South Coast Region  
Department of Fish and Game  
4949 View Ridge Avenue  
San Diego, California 92123  
tele: (805) 491-3571

(for Inyo and San Bernardino counties)  
Habitat Conservation Planning  
Eastern Sierra and Inland Deserts Region  
Department of Fish and Game  
407 West Line Street  
Bishop, California 93514  
tele: (760) 872-1171

Mohave Ground Squirrel (MGS) Survey and Trapping Form (photocopy as needed)

**PART I - PROJECT INFORMATION** (use a separate form for each sampling grid)

Project name: \_\_\_\_\_ Property owner: \_\_\_\_\_

Location: Township \_\_\_\_\_; Range \_\_\_\_\_; Section \_\_\_\_\_; ¼ Section \_\_\_\_\_

Quad map/series: \_\_\_\_\_ UTM coordinates: \_\_\_\_\_  
GPS coordinates of trapping-grid corners

Acreage of Project Site: \_\_\_\_\_ Acreage of potential MGS habitat on site: \_\_\_\_\_

Total acreage visually surveyed on project site: \_\_\_\_\_ Date(s): \_\_\_\_\_  
visual surveys

Visual surveys conducted by: \_\_\_\_\_  
names of all persons by date (use back of form, if needed)

Total acres trapped: \_\_\_\_\_ Number of sampling grids: \_\_\_\_\_

Trapping conducted by: \_\_\_\_\_  
names of all persons by sampling term and sampling grid (use back of form, if needed)

Dates of sampling term(s): FIRST \_\_\_\_\_ SECOND \_\_\_\_\_ THIRD \_\_\_\_\_  
if required if required

**PART II - GENERAL HABITAT DESCRIPTION** (use back of form, if needed)

Vegetation: dominant perennials: \_\_\_\_\_

other perennials: \_\_\_\_\_

dominant annuals: \_\_\_\_\_

\_\_\_\_\_

other annuals: \_\_\_\_\_

\_\_\_\_\_

Land forms (mesa, bajada, wash): \_\_\_\_\_

Soils description: \_\_\_\_\_

Elevation: \_\_\_\_\_ Slope: \_\_\_\_\_

**PART III - WEATHER** (report measurements in the following categories for each day of visual survey and each day of trapping; using 24-hour clock, indicate time of day that each measurement was made; use a separate blank sheet for each day)

Temperature: AIR minimum and maximum; SOIL minimum and maximum; Cloud Cover: % in AM and % in PM; Wind Speed: in AM and in PM



Family	Scientific Name	Common Name
<b>Reptiles</b>		
Colubridae	<i>Mastocophis flagellum piceus</i>	red coachwhip
Colubridae	<i>Salvadora hexalepis mojavensis</i>	Mojave patch-nosed snake
Crotaphytidae	<i>Gambelia wislizenii</i>	long-nosed leopard lizard
Iguanidae	<i>Dipsosaurus dorsalis</i>	desert iguana
Iguanidae	<i>Sauromalus obesus</i>	chuckwalla
Phrynosomatidae	<i>Callisaurus draconoides rhodostictus</i>	western zebra-tailed lizard
Phrynosomatidae	<i>Phrynosoma platyrhinos calidiarum</i>	southern desert horned lizard
Phrynosomatidae	<i>Sceloporus occidentalis</i>	western fence lizard
Phrynosomatidae	<i>Uta stansburiana</i>	common side-blotch
Scindidae	<i>Eumeces skiltonianus skiltonianus</i>	Skilton's skink
Teiidae	<i>Cnemidophorus tigris tigris</i>	Great Basin whiptail
Testudinidae	<i>Gopherus agassizii</i>	desert tortoise
Viperidae	<i>Crotalus cerastes cerastes</i>	Mojave desert sidewinder
Viperidae	<i>Crotalus scutulatus scutulatus</i>	northern Mohave rattlesnake
<b>Birds</b>		
Accipteridae	<i>Buteo jamaicensis</i>	red-tailed hawk
Accipteridae	<i>Buteo swainsonii</i>	Swainson's hawk
Alaudidae	<i>Eremophila alpestris ammophila</i>	desert horned lark
Apodidae	<i>Chaetura vauxi</i>	Vaux's swift
Caprimulgidae	<i>Chordeiles acutipennis</i>	lesser nighthawk
Cathartidae	<i>Cathartes aura</i>	turkey vulture
Charadriidae	<i>Charadrius vociferous</i>	killdeer
Columbidae	<i>Zenaida macroura</i>	mourning dove
Corvidae	<i>Corvus corax</i>	common raven
Cuculidae	<i>Geococcyx californianus</i>	greater roadrunner
Emberizidae	<i>Amphispiza belli</i>	sage sparrow
Emberizidae	<i>Amphispiza bilineata</i>	lark sparrow
Emberizidae	<i>Chondestes grammacus</i>	black-throated sparrow
Emberizidae	<i>Melospiza melodia heermanni</i>	song sparrow
Emberizidae	<i>Pipilo crissalis</i>	California towhee
Emberizidae	<i>Zonotrichia leucophrys</i>	white crown sparrow
Falconidae	<i>Falco sparverius</i>	American kestrel
Fringillidae	<i>Carpodacus mexicanus</i>	house finch
Hirundinidae	<i>Petrochelidon pyrrhonota</i>	cliff swallow
Hirundinidae	<i>Tachycineta thalassina</i>	violet-green swallow
Laniidae	<i>Lanius ludovicianus</i>	loggerhead shrike
Odontophoridae	<i>Callipepla californica</i>	California quail
Phasianidae	<i>Alectoris chukar</i>	chukar
Strigidae	<i>Athene cunicularia</i>	burrowing owl
Thraupidae	<i>Piranga ludoviciana</i>	western tanager
Troglodytidae	<i>Salpinctes obsoletus</i>	rock wren
Tyrannidae	<i>Sayornis nigricans</i>	black phoebe
Tyrannidae	<i>Tyrannus vociferans</i>	Cassin's kingbird
Tytonidae	<i>Tyto alba</i>	barn owl

## Mammals

Canidae	<i>Canis latrans</i>	coyote
Canidae	<i>Vulpes macrotis arsupis</i>	desert kit fox
Felidae	<i>Felis rufus</i>	bobcat
Leporidae	<i>Lepus californicus</i>	black-tailed jack rabbit
Leporidae	<i>Sylvilagus audobonii</i>	Audubon's cottontail
Muridae	<i>Chaetodipus formosus</i>	long-tailed pocket mouse
Muridae	<i>Dipodomys merriami</i>	Merriam's kangaroo rat
Muridae	<i>Dipodomys microps</i>	chisel-toothed kangaroo rat
Muridae	<i>Neotoma lepida</i>	desert wood rat
Muridae	<i>Perognathus longimembris</i>	little pocket mouse
Sciuridae	<i>Ammospermophilus leucurus</i>	antelope ground squirrel
Sciuridae	<i>Spermophilus mohavensis</i>	Mohave ground squirrel

## Plants

Asteraceae	<i>Acamptopappus sphaerocephalus</i>	goldenhead
Asteraceae	<i>Ambrosia dumosa</i>	burro-bush
Asteraceae	<i>Atrichoseris platyphylla</i>	gravel-ghost
Asteraceae	<i>Chaenactis fremontii</i>	desert pincushion
Asteraceae	<i>Encelia farinose</i>	brittlebush
Asteraceae	<i>Eriophyllum pringlei</i>	Pringle's woolly sunflower
Asteraceae	<i>Eriophyllum wallacei</i>	woolly easterbonnets
Asteraceae	<i>Gerea canescens</i>	desert sunflower
Asteraceae	<i>Hymenoclea salsola</i> var. <i>salsola</i>	cheesebush
Asteraceae	<i>Lasthenia californica</i>	goldfields
Asteraceae	<i>Malacothrix glabrata</i>	desert dandelion
Asteraceae	<i>Monoptilon bellidiforme</i>	desert star
Asteraceae	<i>Rafineskia neomexicana</i>	parachute plant
Boraginaceae	<i>Amsinckia tessalata</i>	fiddleneck
Boraginaceae	<i>Cryptantha</i> sp.	cryptantha
Brassicaceae	<i>Brassica nigra</i>	black mustard
Brassicaceae	<i>Lepidium appelianum</i>	white-tops
Brassicaceae	<i>Lepidium capestre</i>	pepper grass
Brassicaceae	<i>Lepidium flavum</i>	yellow pepper-grass
Brassicaceae	<i>Lepidium fremontii</i>	desert pepperweed
Cactaceae	<i>Echinocactus polycephalus</i>	cottontop cactus
Cactaceae	<i>Ferocactus cylindraceus</i>	barrel cactus
Cactaceae	<i>Opuntia basilaris</i>	beavertail cactus
Cactaceae	<i>Opuntia bigelovii</i>	teddy-bear cholla
Cactaceae	<i>Opuntia echinocarpa</i>	silver cholla
Chenopodiaceae	<i>Atriplex confertifolia</i>	shadscale
Chenopodiaceae	<i>Atriplex hymenelytra</i>	desert holly
Chenopodiaceae	<i>Atriplex phyllostegia</i>	arrowscale
Chenopodiaceae	<i>Atriplex serenana</i>	bractscale
Chenopodiaceae	<i>Kochia americana</i>	molly
Convolvulaceae	<i>Cuscuta californica</i>	California dodder
Fabaceae	<i>Astragalus lentiginosus</i> var. <i>fremontii</i>	Fremont's milk-vetch
Fabaceae	<i>Astragalus lentiginosus</i> var. <i>micans</i>	shining milk-vetch
Fabaceae	<i>Lupinus</i> sp.	lupine
Fabaceae	<i>Psoralethamnus arborescens</i> var. <i>minutifolius</i>	indigo bush
Fabaceae	<i>Senna armata</i>	spiny senna
Geraniaceae	<i>Erodium cicutarium</i>	red-stem filaree
Geraniaceae	<i>Erodium texanum</i>	Texas stork's bill

Hydrophyllaceae	<i>Phacelia tanacetifolia</i>	lacy phacelia
Lamiaceae	<i>Salvia carduacea</i>	thistle sage
Loasaceae	<i>Eucnide urens</i>	rock nettle
Loasaceae	<i>Mentzelia reflexa</i>	blazing star
Nyctaginaceae	<i>Abronia villosa</i>	sand verbena
Onagraceae	<i>Camissonia boothii</i>	Booth's evening primrose
Onagraceae	<i>Camissonia brevipes</i>	yellow cups
Onagraceae	<i>Camissonia</i> sp.	sun cups
Papaveraceae	<i>Eschschoizia californica</i>	California poppy
Plantaginaceae	<i>Plantago ovata</i>	plantain
Poaceae	<i>Achnatherum hymenoides</i>	Indian rice grass
Poaceae	<i>Bromus rubens</i>	red brome grass
Poaceae	<i>Bromus tectorum</i>	cheat grass
Poaceae	<i>Distichlis spicata</i>	saltgrass
Poaceae	<i>Elymus elymiodes</i> ssp. <i>elymiodes</i>	squirreltail
Poaceae	<i>Erioneuron pulchellum</i>	fluff grass
Poaceae	<i>Hordeum</i> sp.	barley
Poaceae	<i>Schismus</i> sp.	Mediterranean grass
Poaceae	<i>Vulpia myuros</i>	desert five-spot
Polemoniaceae	<i>Eriastrum</i> sp.	woollystar
Polemoniaceae	<i>Gilia latiflora</i>	broad-flowered gilia
Polygonaceae	<i>Chorizanthe brevicornu</i>	brittle spineflower
Polygonaceae	<i>Chorizanthe rigida</i>	devil's spineflower
Polygonaceae	<i>Eriogonum inflatum</i> var. <i>inflatum</i>	desert trumpet
Solanaceae	<i>Lycium cooperi</i>	Cooper's box thorn
Tamariceae	<i>Tamarix ramosissima</i>	salt cedar
Zygophyllaceae	<i>Larrea tridentate</i>	creosote bush