

***Appendix B-2***  
***Desert Tortoise Surveys***

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**SOUTHERN CALIFORNIA EDISON  
ELDORADO-IVANPAH  
TRANSMISSION LINE PROJECT**

***DESERT TORTOISE SURVEYS***

**DRAFT**

Prepared By:

Alice E. Karl, Ph.D.  
P.O. Box 74006  
Davis, California 95617

Submitted To:

Environmental Planning Group, Inc.  
4141 North 32<sup>nd</sup> Street, Suite 102  
Phoenix, Arizona 85018

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## EXECUTIVE SUMMARY

Southern California Edison (SCE) is proposing to develop the Eldorado-Ivanpah Transmission Project (Project) in order to provide transmission of power generated by several solar power projects proposed for Ivanpah Valley. The Project will include replacement of the existing Eldorado-Coolwater-Dunn Siding 115kV transmission line with a new double-circuit 220kV line between a new substation at the existing Eldorado Substation (Nevada) and another new substation, Ivanpah Substation (California) ("Proposed Route"). Until Project design is finalized, several alternative routes remain under examination, as well as several telecommunications routes and supporting fiberoptic placement. The Proposed Route was surveyed in 2008. In 2009, following further Project engineering, alternatives to the Proposed Route, the proposed Ivanpah Substation, some access roads, and the telecommunications' (telecom) alternatives, including a microwave tower location, were surveyed. Results for both year's surveys are presented in this report.

Tortoise sign was observed on the Proposed Route and all alternatives. On the Proposed Route, most of the sign was observed in three areas in Nevada: on the east side of the McCullough Mountains; on the northern edge of the Lucy Gray Mountains; and southeast of Roach Lake. The greatest amount of sign observed on any Project alternatives was on Alternatives A and B, along Telecom Path 2: Section 2 and Section 3: Alternatives 1 and 2 (Nipton Road and north along Interstate 15) and at the Microwave tower for Telecom Path 2: Section 3A.

Based on survey results demonstrating the presence of desert tortoises in the Project area, construction and operation of the EITP Project would result in permanent and temporary, as well as direct and minor indirect, impacts to desert tortoise. The loss of generalized foraging and coversite habitat that would be removed on the already-disturbed transmission line may not create a biologically significant impact. With the exception of possible re-grading of access and spur roads, no additional habitat would be removed for the overhead installation of telecom facilities on any alternatives or underground installation of telecom facilities in the Nipton Road shoulder. Several alternatives partially intersect both Desert Wildlife Management Areas (DWMAs) and designated critical habitat.

# **SOUTHERN CALIFORNIA EDISON ELDORADO-IVANPAH TRANSMISSION LINE PROJECT**

## ***DESERT TORTOISE SURVEY***

### **1.0 INTRODUCTION**

Southern California Edison (SCE) is proposing to develop the Eldorado-Ivanpah Transmission Project (Project) in order to provide transmission of power generated by several solar power projects proposed for Ivanpah Valley. The Project will include replacement of the existing Eldorado-Coolwater-Dunn Siding 115kV transmission line with a new double-circuit 220kV line between a new substation at the existing Eldorado Substation (Nevada) and another new substation, Ivanpah Substation (California) (“Proposed Route”). Until Project design is finalized, several alternative routes remain under examination, as well as several telecommunications routes and supporting fiberoptic placement.

The Proposed Route was surveyed in 2008 (Karl 2008) to provide initial data for the analysis of Project effects on the desert tortoise (*Gopherus agassizii*), a federally listed Threatened species through California and Nevada, a California state-listed Threatened species, a Nevada state-protected reptile, and a U.S. Bureau of Land Management (BLM) “sensitive” species. In 2009, following further Project engineering, alternatives to the Proposed Route, the proposed Ivanpah Substation, some access roads, and the telecommunications’ (telecom) alternatives, including a microwave tower location, were surveyed. Results for both year’s surveys are presented in this report. Environmental Planning Group [EPG] (2008) also surveyed the Proposed Route for other special-status biological resources.

### **2.0 PROJECT SETTING AND DESCRIPTION**

#### **2.1 Project Location**

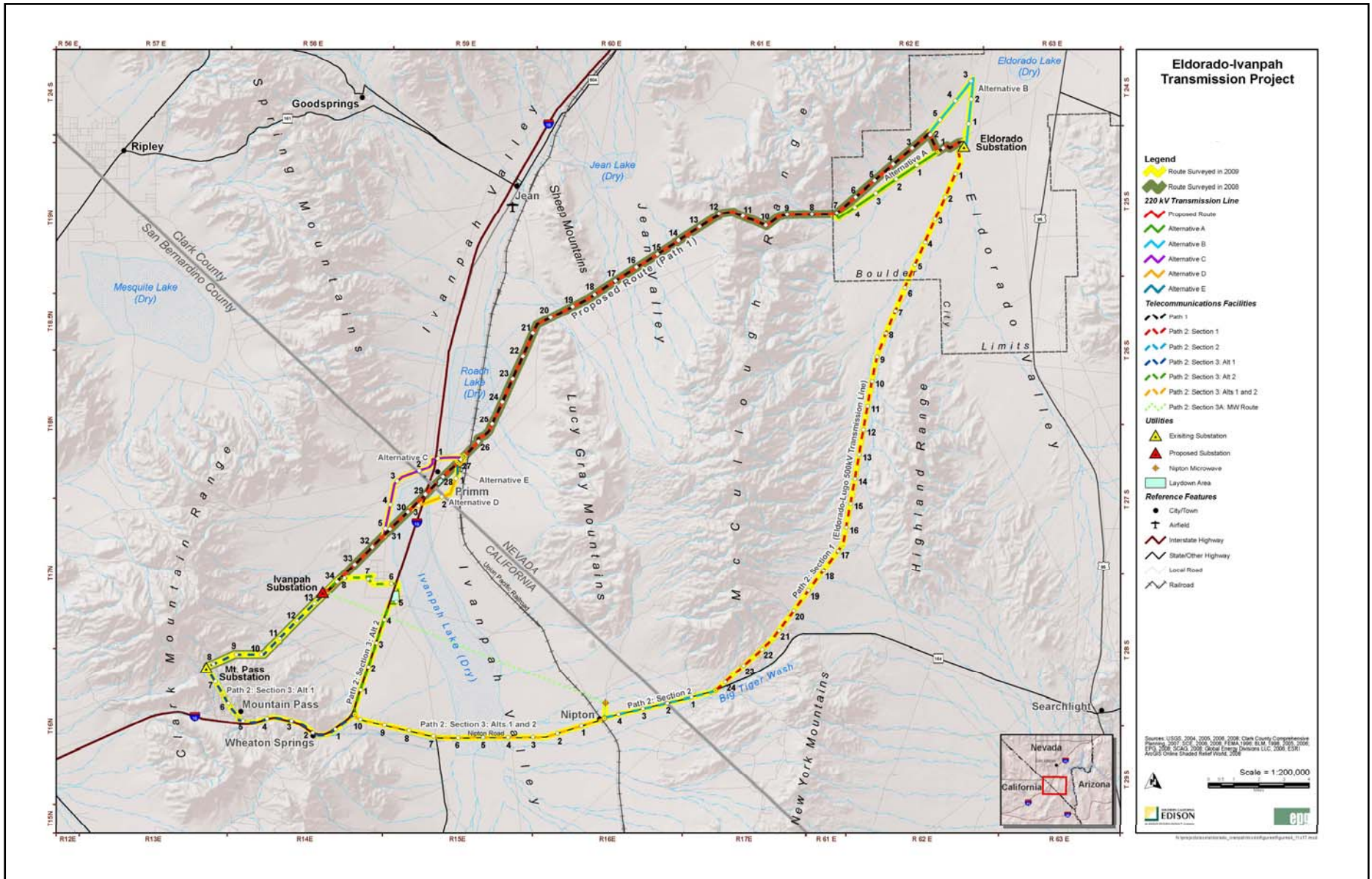
The Proposed Route extends for approximately 35 miles from the Eldorado Substation in Clark County, Nevada, to the proposed Ivanpah Substation in San Bernardino County, California. The Project and the alternatives that were surveyed in 2008 and 2009 are shown in Figure 1.

#### **2.2 Project Description**

Each of the Project alternatives identified in Figure 1 is described below<sup>1</sup>:

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<sup>1</sup> Information supplied by SCE



**FIGURE 1.** Routes surveyed for desert tortoise in 2008 and 2009. See text for explanation of Project elements.



- **Proposed Route** - This would involve removing the existing 115kV line and replacing it with a 220 kV line. The existing 115kV line is composed primarily of steel lattice H-frame structures with three conductors, although there are also two- and three-pole wooden structures near the Eldorado Substation and at other locations along the line where some of the original steel structures have been replaced. The new 230kV line will be constructed of steel lattice towers or steel poles. Due to the increased tower heights and span lengths it is likely that the majority of the new towers will be placed in new locations that will require construction of new temporary or permanent spur roads from the existing main access road. The new transmission line will deviate from the existing SCE right-of-way at several locations either to provide a more efficient route, to cross other transmission lines, or to avoid resources.
- **Alternative Routes A, B, C, D, and E** - Alternatives to the Proposed Route.
- **Ivanpah Substation** - A new, approximately 18-acre substation at the western terminus of the Proposed Route, adjacent to the existing 115kV line.
- **Telecom Path 1** – The optical ground wire (OPGW) would be installed on the new 220 kV transmission line.
- **Telecom Path 2: Section 1** – This telecom path is along the existing 500 kV Eldorado-Lugo Transmission Line. An OPGW would be installed on fewer than 45 towers, requiring tower reinforcement. The existing stub roads and access road would be used for the upgrades.
- **Telecom Path 2: Section 2** - From the intersection of Nipton Road with the Eldorado-Lugo Transmission Line, to Nipton, the OPGW would be installed underground along the northern road shoulder.
- **Telecom Path 2: Section 3: Alternatives 1 and 2 (Nipton Road)**- From Nipton west to Interstate-15 (I-15), the OPGW would be installed underground along the northern road shoulder, except for an approximately one-mile segment from Nipton west, where it would be overhead on the existing Nipton 33 kV distribution line.
- **Microwave Tower for Telecom Path 2: Section 3A** - A new microwave tower would be constructed northeast of Nipton, with microwave communication to Ivanpah Substation. An access road for construction and maintenance would extend approximately 0.6 miles north from Nipton Road to the microwave tower.
- **Telecom Path 2, Section 3: Alternative 2 (I-15 at the Nipton exit to Primm golf course, and west)** - From the Nipton exit at I-15, the OPGW would be installed overhead on the existing distribution line to the Yates Well exit, then would run west along the south side of the Primm golf course to the Proposed Route, and south to the Ivanpah Substation.
- **Telecom Path 2:, Section 3: Alternative 1 (I-15 at the Nipton exit to the Mountain Pass Substation, and northeast)** – From the Nipton exit for one mile south, the OPGW would be underground, but the exact location is unknown. From this point to the Mountain Pass Substation, the OPGW would be overhead on the existing 33 kV distribution line, and then overhead on the existing 115 kV transmission line to Ivanpah Substation.

## 2.3 Environmental Setting

The reader is referred to EPG (2008) for a detailed habitat description of the Project area.

## 3.0 SURVEY METHODS

In 2008, surveys were completed between 13 and 23 May, inclusive. In 2009, they were conducted between 14 and 29 May, inclusive; additional surveys on some spur and access roads were conducted on 2 November. Pedestrian transects were completed consistent with the U.S. Fish and Wildlife Service (USFWS) “protocol” desert tortoise transects (USFWS 1992)<sup>2</sup>. The basic method was to survey 100% of the ROWs, or the potential disturbance area in the case of the non-linear facilities (microwave tower site and Ivanpah Substation), using parallel, 30-foot-wide belt transects. In addition, 30-foot-wide, “Zone-of-influence” (ZOI) transects were walked on both sides of the ROWs and around the non-linear facilities at 100, 300, 600, 1200, and 2400 feet from the outer edges of the ROW. The rare exceptions were those locations where no tortoise habitat existed – e.g., on unvegetated portions of Ivanpah and Roach Dry Lakes, on the Primm golf course, and on paved roads (e.g., Interstate-15 [I-15], Nipton Road).

On all transects, all tortoise sign (e.g., individuals, dens, burrows, scat, tracks, pellets, skeletal remains) observed was measured, mapped and described relative to condition, size, and (where applicable) gender. Current and recent weather conditions were recorded to identify the potential for tortoise activity and the topography, drainage patterns, soils, substrates, plant cover, anthropogenic disturbances, and aspect-dominant, common and occasional plant species were described and mapped. Mapping sign and habitat features was achieved using Global Positioning System (GPS) units. All transect data were recorded on specially-designed forms (Appendix 2). Every mile of ROW was photographed, as well as zone-of-influence transects.

In 2008, six very experienced surveyors conducted the surveys (Appendix 5). Each had between six and 30 years experience searching for and studying tortoises on many types of surveys, including tortoise mark-recapture plots, telemetry studies, behavioral studies, and linear surveys. Environmental Planning Group (EPG) also supplied three biologists who were familiar with conducting field surveys and knew many of the species. These less experienced surveyors were familiarized with desert tortoise sign and only walked the ROW initially, in order to learn about desert tortoises and where to look for sign. In the ROW they were always adjacent to experienced surveyors.

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<sup>2</sup> The 1992 USFWS protocols were used in 2008, so were also used in 2009 for consistency, even though the USFWS had established a new set of protocols in 2009 (USFWS 2009).

Inexperienced personnel conducted some ZOI transects after the initial learning period, but their transects were always adjacent to those of more experienced surveyors.

In 2009, ten people walked the surveys, eight of whom were very experienced, as identified above (Appendix 5). Of the remaining two surveyors, one had between a year's experience (on the same project in 2008 as well as several tortoise projects since then) and the other was an experienced field geologist who had been conducting tortoise surveys all spring with the more experienced crew.

In 2008, the weather was clear, warm, and calm during the surveys, with maximum daily air temperatures of approximately 100° F. In May 2009, similar conditions occurred, with daily air temperature maxima between 87 and 104 ° F. During Fall 2009, daily maximum air temperatures were 84-85 ° F, with overnight lows of 44 to 54 ° F.

Although the primary goal of the survey was to search for desert tortoise, other special-status species known to be in the survey area were also sought. An inventory was also kept of all species observed. This inventory and a discussion of special-status species observed are presented in a separate document (Karl 2009).

Because of the variety of elements surveyed, variations in the above methods were applied to ensure a comprehensive survey. Each is described below.

### **Proposed Route**

The Proposed Route assumed a 200-foot-wide right-of-way (ROW) (seven, 30-foot-wide transects). The entire Proposed Route ROW, including the segment from the proposed Ivanpah Substation to Mountain Pass Substation that was originally part of the Proposed Route, was surveyed in 2008. ZOI transects were completed on this originally Proposed Route in 2008 from Eldorado Substation to slightly past the proposed Ivanpah Substation site; the 100-foot ZOI was also completed to Mountain Pass Substation. In 2009, the remaining ZOI transects, from the proposed Ivanpah Substation site to Mountain Pass Substation, were completed. Because the segment of the Project (Ivanpah Substation to Mountain Pass Substation) is currently part of Telecom Path 2: Section 3: Alternative 1, all results will be discussed in that section.)

Ancillary construction sites considered for surveying included laydown and staging areas and pulling, tensioning, and splicing sites. Laydown/staging areas were assumed to be in previously disturbed sites (R. Overstreet, SCE, pers. comm.. to A. Karl). The remaining construction facilities were scattered to clustered and appeared to be mostly inside the 200-foot ROW. Because the locations of these small, individual sites were both imprecise and subject to change, SCE determined that these would best be surveyed at a later date, when the locations were finalized (R. Overstreet, SCE, pers. comm.. to A. Karl).

Four access roads in Eldorado Valley and 18 spur roads in the McCullough Mountains that had not previously been identified were surveyed on 2 November 2009 because

they partly or fully fell outside the 200-foot-wide ROW previously surveyed (Appendix 3). A sixty-foot ROW was assumed for these roads; no ZOIs were conducted because ZOIs for the Proposed Route completely overlapped those for these access roads and spur roads.

#### **Alternative Routes A, B, C, D, and E**

All ROWs were assumed to be 200 feet wide to accommodate new spur roads and some flexibility in tower placement. Again, laydown/staging areas were assumed to be in previously disturbed sites and most pulling, tensioning and splicing sites were too imprecise or inside the surveyed 200-foot ROW. However, because there was a large cluster of these sites in the Alternative B triangle tip, 100% percent of this cluster was surveyed, plus 100 feet outside the 200-foot Alternative B ROW.

All ZOI transects were walked unless they had been covered by transects for other alternatives or the Proposed Route.

#### **Ivanpah Substation**

One-hundred percent of the proposed substation, plus ZOI's parallel to the northwest side at 100, 300, 600, 1200, and 2400 feet, were surveyed. The ZOIs on the remaining sides of the proposed substation site were covered by those walked for the Proposed Route.

#### **Telecom Path 2: Section 1 (Eldorado-Lugo 500 kV Transmission Line)**

Forty-five tower pads were surveyed for potential retrofitting (Appendix 4), with 1-4 towers surveyed in nearly every mile of transmission line between Nipton Road and Eldorado Substation. A 200 by 200-foot rectangle was surveyed, centered on the existing pad. Generally, the stub road was completely or nearly completely surveyed in this square.

#### **Telecom Path 2: Section 2, and Section 3: Alternatives 1 and 2 (Nipton Road)**

The ROW was 60 feet wide, with 30 feet in the road and road shoulder and 30 feet north of the shoulder. The latter 30 feet plus all ZOI transects on both sides of Nipton Road were walked.

#### **Microwave Tower for Telecom Path 2: Section 3A**

A 60-foot access road ROW was surveyed (100%), plus a 100 by 100-foot microwave tower site. All ZOI transects along the access road and around the tower site were conducted, except near Nipton Road, where ZOIs for the Nipton Road telecom path overlapped those for the microwave tower.

#### **Telecom Path 2: Section 3: Alternative 2 (I-15 at the Nipton exit to Primm golf course, and west)**

The surveyed ROW was 30 feet wide, centered on the existing distribution line from the Nipton Road exit to the Yates Well exit. ZOIs were conducted only on the east side of the ROW in this section, as the west side was I-15. From the Yates Well exit, west along the south side of the Primm golf course to the Proposed Route, the 30 foot ROW

was walked, as well as all ZOIs to the south. ZOIs to the north were conducted from the golf course, west. Both the north and south ZOIs stopped at 2400 feet from the Proposed Route, where ZOIs for the Proposed Route overlapped the telecom path ZOIs.

### **Telecom Path 2: Section 3:Alternative 1 (I-15 at the Nipton exit to the Mountain Pass Substation, and northeast)**

Where the OPGW was underground, a general habitat reconnaissance and assessment for potential tortoise presence was made. Where the OPGW was overhead, the surveyed ROW was 30 feet wide, centered on the existing distribution line. All ZOIs were conducted adjacent to the Proposed Route except where they intersected the freeway. (No ZOIs were conducted on the opposite side of I-15 from the ROW.) No surveys were conducted between Molycorp Mine and Mountain Pass Substation because there is no tortoise habitat in that segment.

## **4.0 SURVEY RESULTS**

### **Proposed Route**

Tortoise sign was seen along the entire Proposed Route, except for Ivanpah Dry Lake (Figure 2 – Panels A-D; Appendix 1). A total of 305 tortoise sign was observed, including 18 tortoises, 180 burrows, 74 scat, 20 carcasses or shell parts and 12 other types of sign (e.g., tracks, drinking depressions). Most of the sign was observed in three areas in Nevada: on the east side of the McCullough Mountains; on the northern edge of the Lucy Gray Mountains; and southeast of Roach Lake.

### **Alternative Routes A, B, C, D, and E**

Most of the tortoise sign seen in Eldorado Valley (see “Proposed Route”) was on Alternatives A and B, in contrast to the Proposed Route (Figure 2 – Panel A; Appendix 1). A total of 49 sign, including 27 burrows and one tortoise, was observed on Alternative A; 32 sign, including 16 burrows and three tortoises, were observed on Alternative B.

Tortoise sign was observed on Alternatives C and D, mostly in the Nevada segments (Figure 2 – Panel C; Appendix 1). A total of 18 sign was observed. No sign was observed on Alternative E.

### **Ivanpah Substation**

Three tortoise sign were seen on the Ivanpah substation and associated ZOIs (Figure 2 – Panel D; Appendix 1).

### **Telecom Path 2: Section 1 (Eldorado-Lugo 500 kV Transmission Line)**

Seven tortoise sign were observed on tower surveys associated with the Eldorado-Lugo 500 kV Transmission Line (Figure 2 – Panels A, F and G; Appendix 1). All of the sign were located in Eldorado Valley, between approximately Milepost (MP) 9 and the Eldorado Substation. Not surprisingly, none was observed in the McCullough Mountains portion of the line, where tortoise habitat is largely absent (Karl 1983). The

vegetation there is characterized by a diverse Mojave mixed woody scrub (*sensu* Holland 1986) and Joshua tree forest communities, dominated by blackbrush (*Coleogyne ramosissima*), buckhorn cholla (*Cylindropuntia acanthocarpa*), and Joshua tree (*Yucca brevifolia*), needle-and-thread grass (*Achnatherum speciosum*), and buckwheat (*Eriogonum fasciculatum*); Spanish bayonet (*Yucca baccata*) and Apache plume (*Fallugia paradoxica*) are common to occasional. Creosote bush (*Larrea tridentata*) enters the shrub community in approximately Mile 14, but remains a subdominant until approximately Mile 10, where it becomes dominant. Elevations reach approximately 4900 ft, decreasing toward Eldorado Valley (they are approximately 3700 ft near MP 11). Marginal tortoise habitat begins at approximately MP 11, with increasing habitat quality to the north.

### **Telecom Path 2: Section 2, and Section 3: Alternatives 1 and 2 (Nipton Road)**

The greatest relative amount of sign was found along Nipton Road - 105 sign, including 39 burrows, 21 carcasses or shell parts, 29 scat, 1 tortoise, and 5 sets of tracks (Figure 2 – Panels D, E, and F; Appendix 1). The amount of sign is especially notable given the short length of the route (approximately 10 mi), narrow width of the surveyed ROW (30 ft) and the absence of habitat for about two miles where the route crosses Ivanpah Lake.

### **Microwave Tower for Telecom Path 2: Section 3A**

Similar to the Nipton Road surveys (see above), a high relative quantity of sign was observed on the microwave tower site and ZOI surveys, 22 sign (Figure 2 – Panel F; Appendix 1).

### **Telecom Path 2: Section 3: Alternative 2 (I-15 at the Nipton exit to Primm golf course, and west)**

As with the Nipton Road surveys (see above) a high relative amount of sign was observed on this alternative, 16 total sign (Figure 2 – Panel D; Appendix 1). Because 14 of these sign were along the 5 mi adjacent to I-15, where the ZOIs were only completed on one side of the narrow (30 ft) ROW, this area has a relatively high tortoise abundance.

### **Telecom Path 2: Section 3: Alternative 1 (I-15 at the Nipton exit to the Mountain Pass Substation, and northeast)**

Seven definite tortoise sign and an additional seven potential burrows were observed (Figure 2 – Panel D; Appendix 1). All sign were seen from the edge of the mountains to the adjoining bajadas. Not surprisingly, none was observed higher in the mountains, where the habitat is characterized by a mixed pinyon-juniper/Mojave woody scrub dominated by blackbrush, buckwheat, buckhorn cholla, and matchweed (*Gutierrezia sarothrae*). Common species include Spanish bayonet, Joshua tree, Mojave yucca (*Yucca schidigera*), spiny menodora (*Menodora spinescens*), juniper (*Juniperus* sp.), pinyon pine (*Pinus monophylla*), Nevada ephedra (*Ephedra nevadensis*), green ephedra (*E. viridis*), and thamnosma (*Thamnosma montana*).

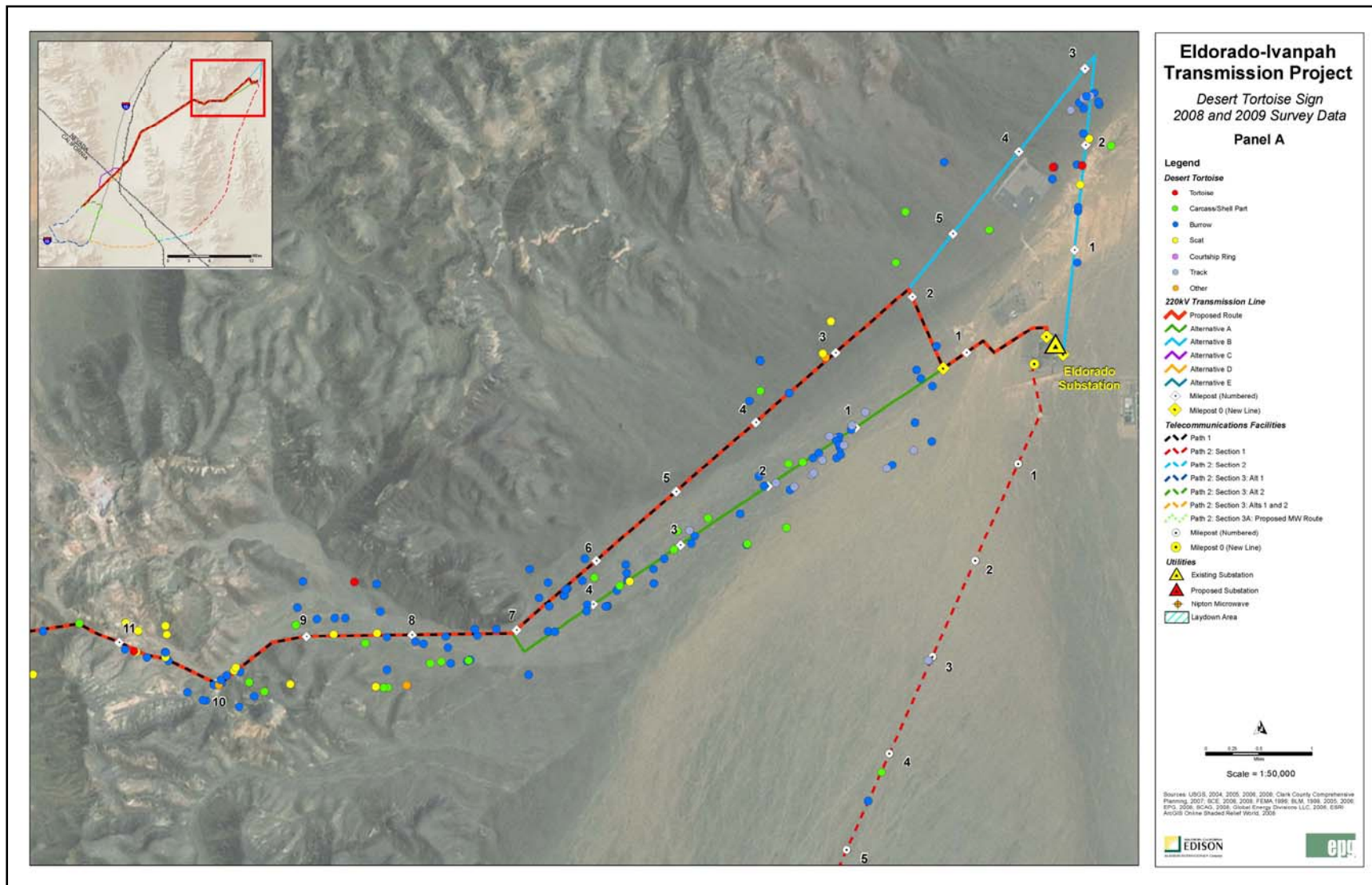


FIGURE 2. Desert tortoise sign observed in 2008 and 2009.

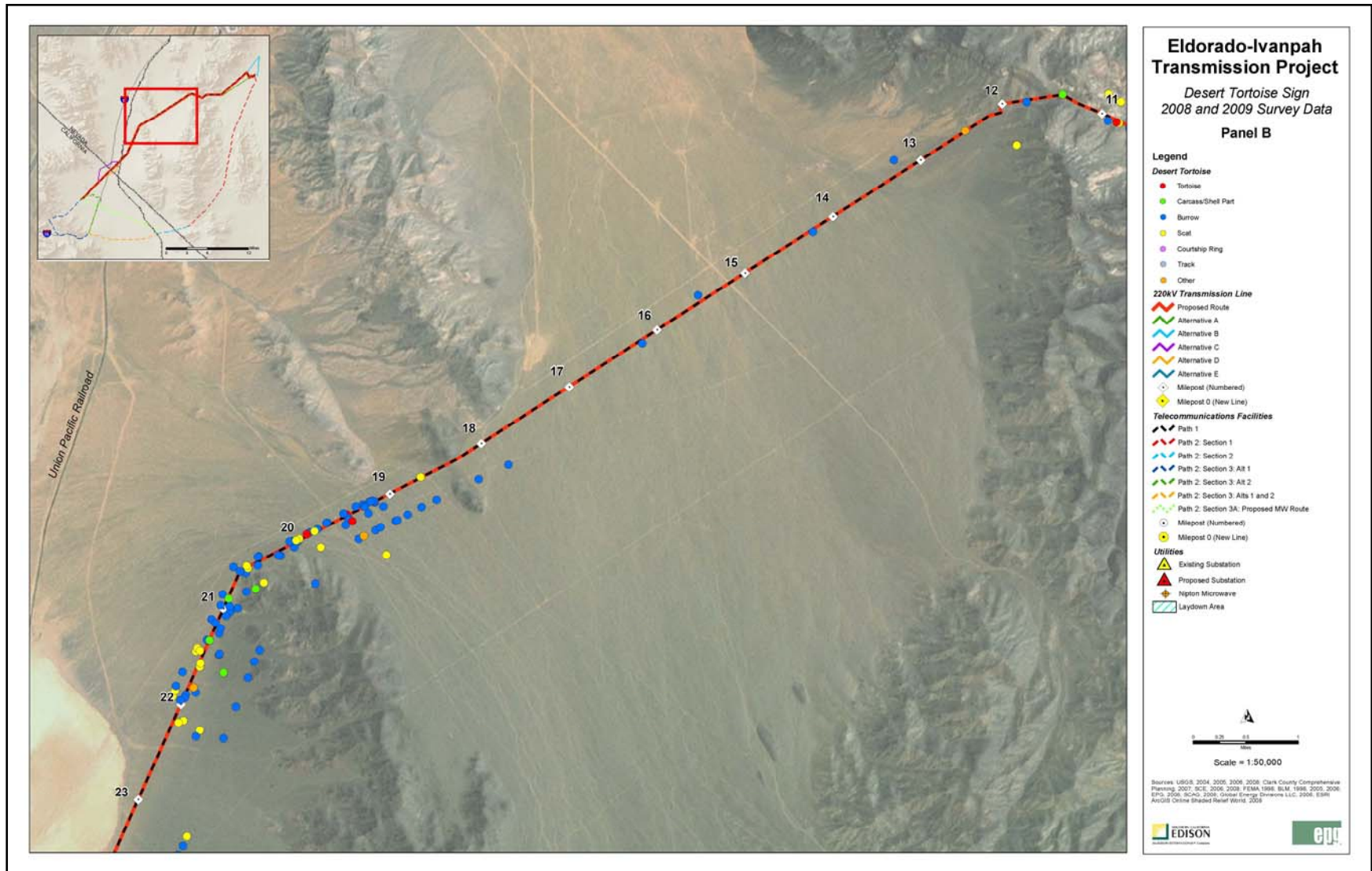


FIGURE 2, continued.





FIGURE 2, continued.

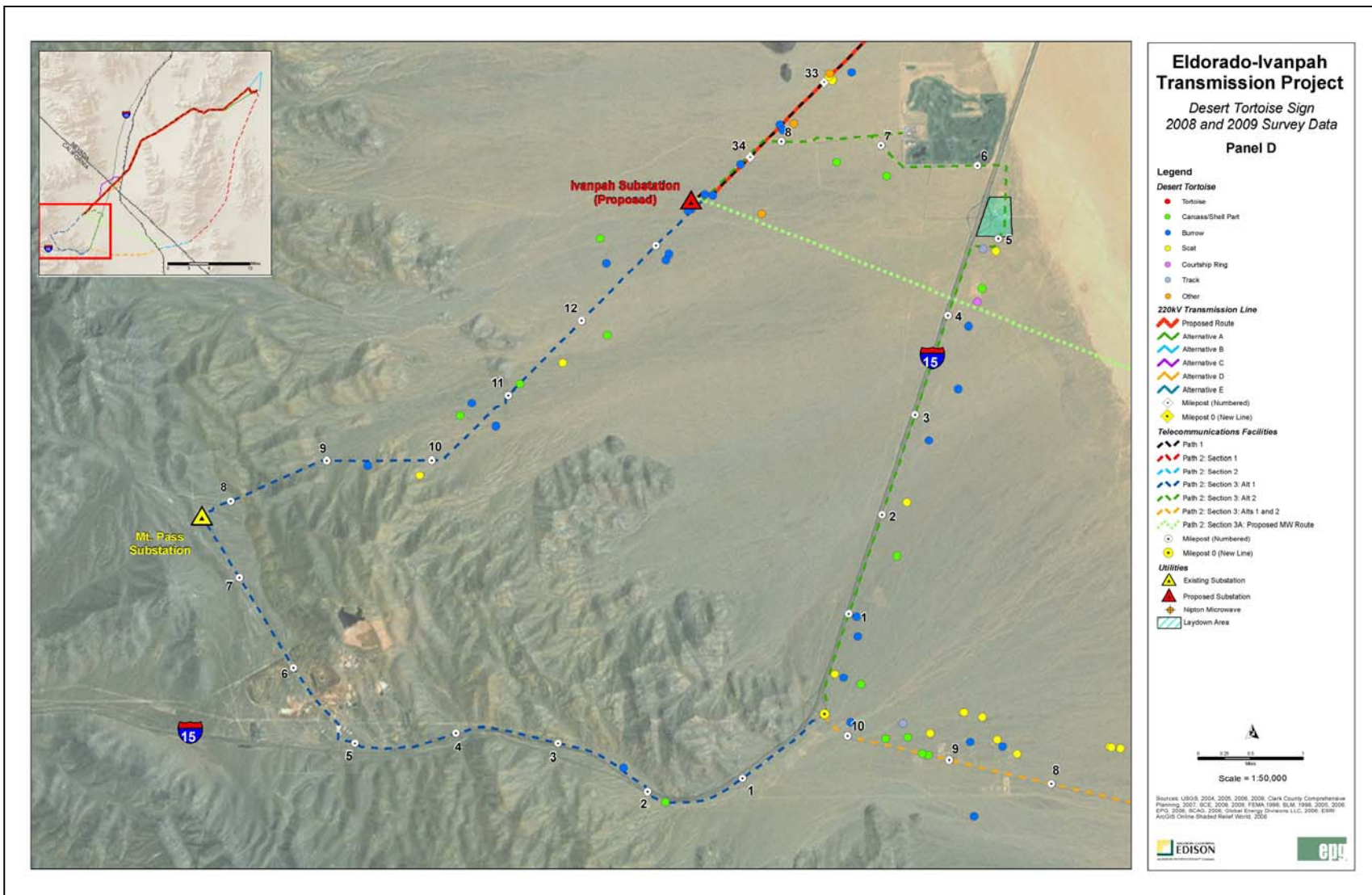


FIGURE 2, continued.

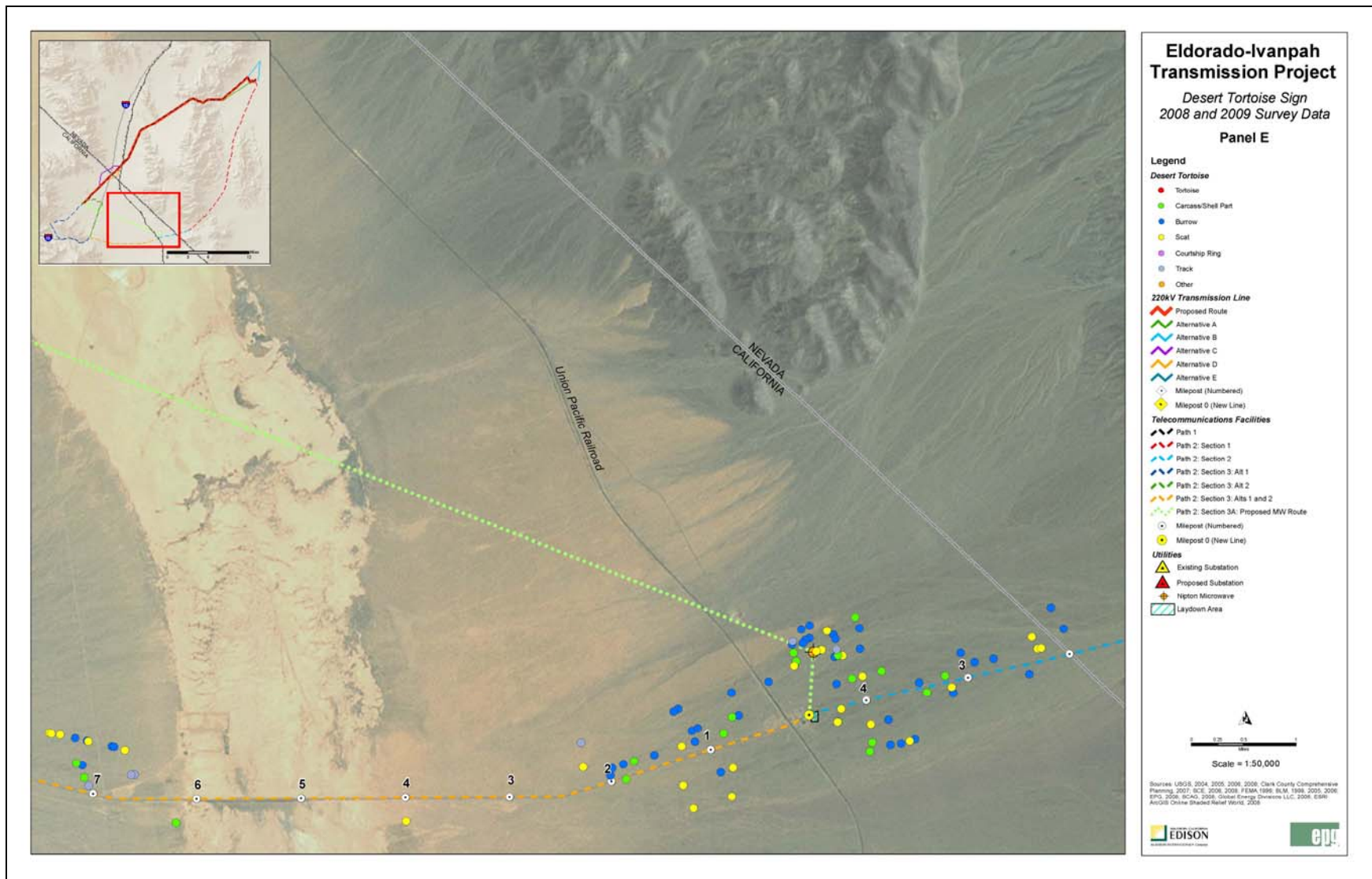


FIGURE 2, continued.

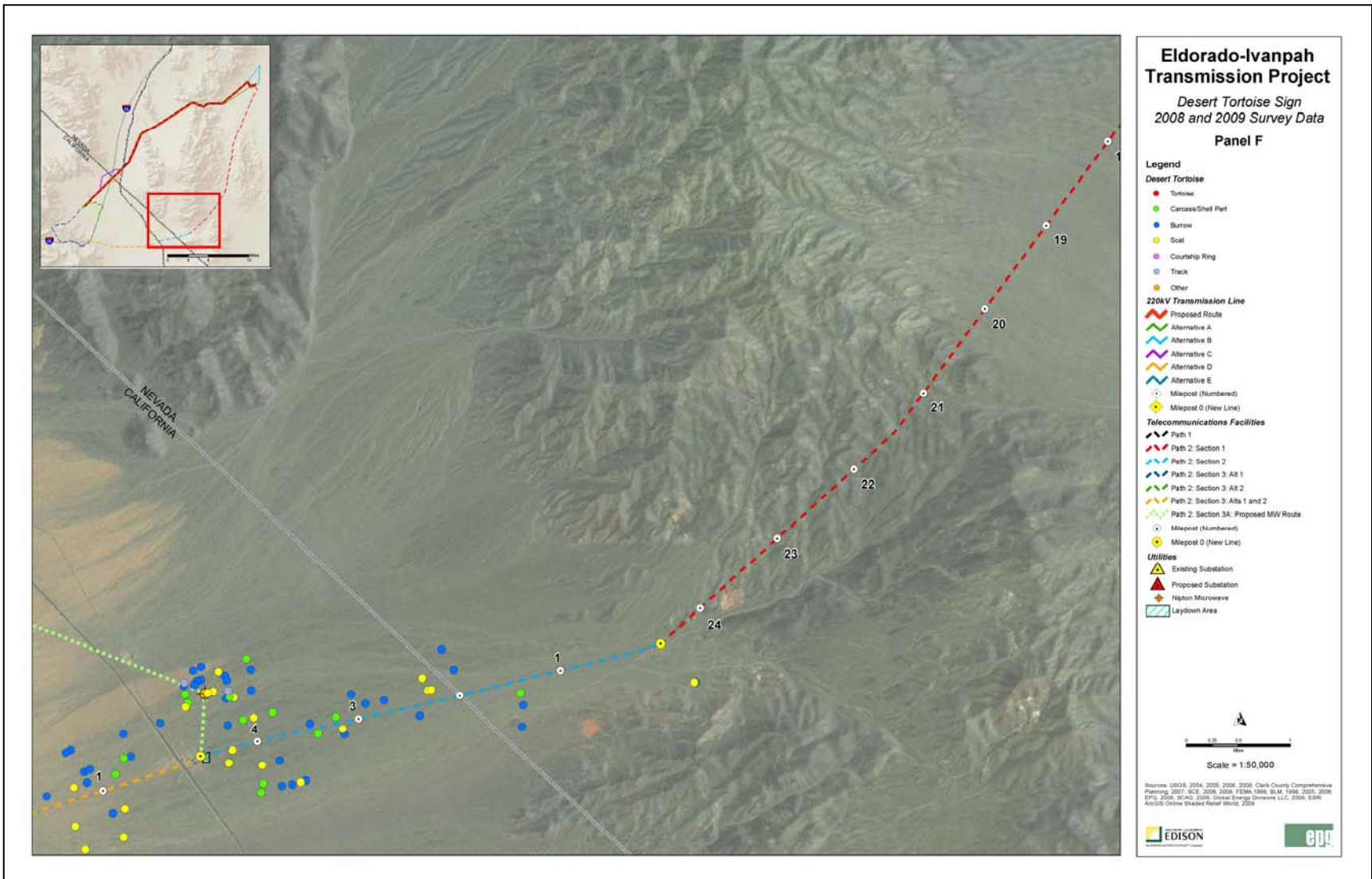
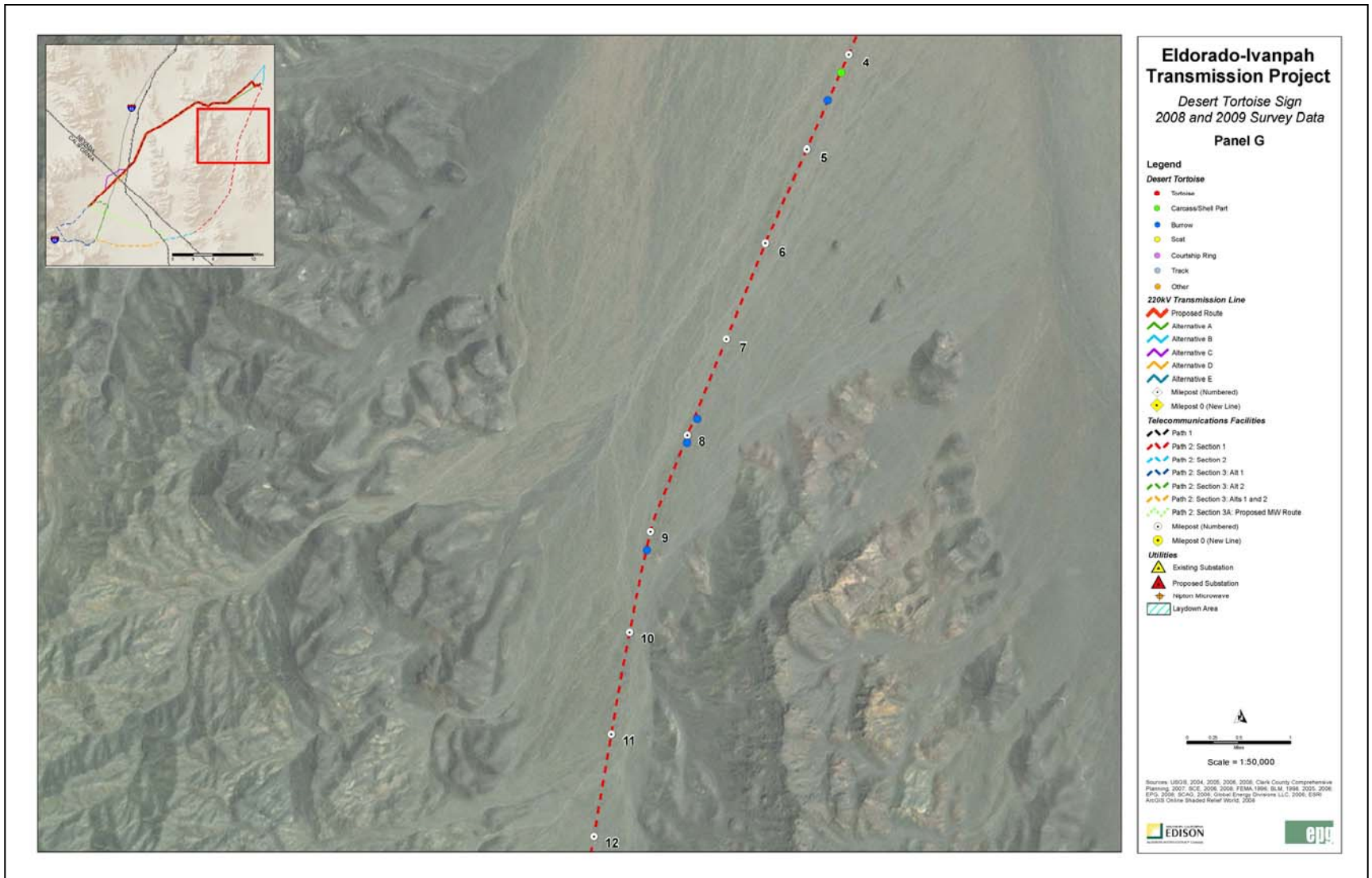


FIGURE 2, continued.



**FIGURE 2, continued.**

## **5.0 DISCUSSION AND RECOMMENDATIONS**

### **5.1 Anticipated Impacts**

#### **5.1.1 General Project Impacts**

Based on survey results demonstrating the presence of desert tortoises in the Project area, construction and operation of the EITP Project would result in permanent and temporary, as well as direct and minor indirect, impacts to desert tortoise. A detailed analysis of impacts and potential mitigation measures is somewhat premature at this time because Project design is not finalized. This technical report on survey results will provide input to facilitate final Project design and choice of alternatives. Final Project design can be followed by a detailed assessment of the Project's impacts and mitigation. However, a preliminary summary of impacts and mitigation is provided here based on what is known about current Project alternatives and reasonable expectations for construction and operation the Project.

The Project will include the following:

- Removal and disturbance of vegetation on an unknown amount of acreage for transmission line tower pads and stub roads, plus the upgrade of the existing access road; vegetation will also be removed or disturbed for pulling and tensioning sites;
- Removal of vegetation on an unknown amount of acreage for two new substation sites plus permanent removal of these sites from use by desert tortoises;
- Potential removal of vegetation on an unknown amount of acreage for construction of a microwave tower and access road;
- No additional habitat removal for the overhead installation of OPGWs or underground installation of an OPGW in the Nipton Road shoulder, with the possible exception of re-grading of access and spur roads;
- A construction period with increased workers and traffic to construction areas for at least one to two years; and
- Maintenance of the facilities, including, at a minimum, access and spur road grading , as needed, to facilitate maintenance.

In general, direct impacts to desert tortoises from construction and operation of the Project would include loss of habitat and could include the loss of individuals. Loss of habitat, even in temporary disturbance areas for construction purposes, would be considered permanent based on slow recovery time of habitats in desert ecosystems. Special habitat resources, such as specific burrowing or nesting sites, could be lost during project construction, especially in the mountains and associated washes. This would largely apply to fossorial animals, such as the desert tortoise, because of site fidelity and unidentified factors that foster continued use of specific sites. While the loss of specialized resources could be biologically important, the loss of generalized

foraging and coversite habitat that would be removed on most of the transmission line is unlikely to create a biologically significant impact because: (1) the transmission line is already disturbed habitat; (2) the loss and/or degradation of habitat is anticipated to be a relatively small amount of total acreage that would be split into discontinuous, small patches that would still be usable by desert tortoises; (3) there is ample, similar habitat surrounding the Project area; and (4) this loss would not impede connectivity within the population. Similarly, the substations would not block connectivity because of their small size and the similar habitat surrounding the substation sites.

Indirect impacts that could result from Project construction include the introduction and/or spread of exotic plant species. With appropriate mitigation however, indirect impacts resulting from Project operation are likely to be negligible. Upgrading the transmission line and installing the OPGW would not create a new type of subsidy in the area that could attract tortoise predators, specifically ravens. Also, there are existing recreational routes through the Project area, so new recreational access would not be provided by the Project.

During Project operation, direct impacts could include the loss of individuals as a result of vehicle collisions during routine maintenance activities.

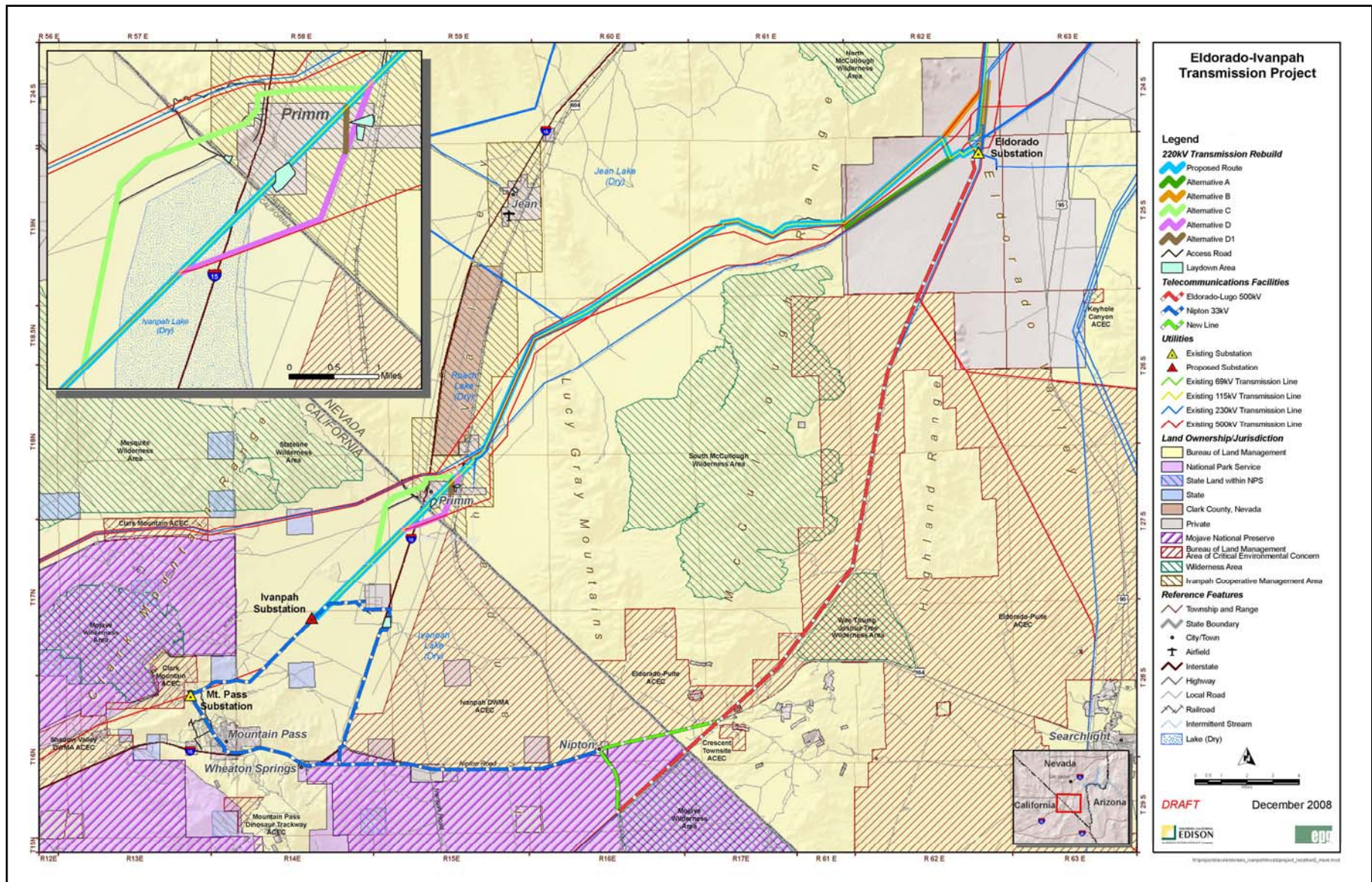
### **5.1.2 Desert Tortoise Population Impacts**

Portions of the Project intersect areas targeted by USFWS for desert tortoise recovery. Telecom Path 2: Sections 1 (Eldorado-Lugo Transmission Line), 2 and 3 (Nipton Road and approximately 1.4 miles along I-15), and 3A (Microwave Tower) intersect the Ivanpah and Piute-Eldorado Desert Tortoise Wildlife Management Area (DWMAs) (Figure 3). DWMAs, established by the land management agencies to receive reserve-level management, were recommended by the 1994 Desert Tortoise Recovery Plan (USFWS 1994a) to promote desert tortoise recovery. BLM's Northern and Eastern Mojave (NEMO) Plan (BLM 2002), the planning area of which encompasses the California portion of the Project, and the Las Vegas BLM District provide a desert tortoise conservation strategy that focuses on tortoises inside DWMAs. For the NEMO Planning area, there are no specific management prescriptions for lands outside DWMAs, where all habitats are considered to be Category III<sup>3</sup>.

The Proposed Route, Alternative A, and Telecom Path 2: Sections 1 (Eldorado-Lugo Transmission Line), 2 and 3 (Nipton Road), and 3A (Microwave Tower) also intersect designated desert tortoise critical habitat (Figure 4). Critical habitat encompasses those habitats that are deemed essential for tortoise conservation; the federal designation of critical habitat provides legal protection for these habitats.

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<sup>3</sup> BLM habitat categories (BLM 1988), ranging in decreasing importance from Category I to Category III, were designed as management tools to ensure future protection and management of desert tortoise habitat and its populations. These designations were based on tortoise density, estimated local tortoise population trends, habitat quality, and other land-use conflicts. Category I habitat areas are considered essential to the maintenance of large, viable populations.



**FIGURE 3.** Federal and state management areas and land ownership in the Eldorado-Ivanpah Transmission Line Project area.





### **5.1.3 Recommended Mitigation**

A mitigation and monitoring plan, to be approved by all of the relevant resource agencies, must be developed to minimize project effects on desert tortoises and other biological resources. The USFWS protocol survey results will provide an important data set for this plan because they identify the distribution of tortoises and areas of tortoise concentration. The level of construction monitoring and mitigation efforts in those areas will be directed by these data. The NEMO Plan also lists several standard mitigation measures for work in desert tortoise habitat that must be incorporated into the construction monitoring program.

The following are recommendations that have been accepted by resource agencies for similar projects, have been shown to be successful, and should be incorporated into the Project mitigation and monitoring plan.

#### **5.1.3.1 Onsite Mitigation – General Measures**

**Minimization of Habitat Degradation.** In general, disruption of ecological processes should be minimized. For construction of linear facilities, including access roads and stub roads, habitat degradation should be limited to essential areas only. Where practical, previously disturbed areas should be used for construction staging and laydown areas, parking areas, and driving. All construction support facilities would be delineated in the field and shown on a location plan.

**Avoidance.** Avoidance of biological resources through appropriate seasonal construction restrictions and pre-construction surveys will minimize impacts. To minimize construction-related mortalities of nocturnally active species (e.g., snakes), it is recommended that all construction activities be conducted during daylight hours.

**Construction- and Operations-related Environmental Protection.** Prior to the start of construction, all activities, contingencies, and environmental protection measures related to construction and operation must be detailed relative to environmental protection. Issues addressed should include, but not be limited to, pre-construction clearance and species presence surveys, biological monitoring, designated working areas and equipment storage, stream protection, equipment maintenance and cleaning, fueling and accidental fuel spills, and removal of hazardous waste and construction-related materials.

**Designation of a Project Biologist.** A Project biologist should be assigned to ensure successful monitoring of construction activities and successful mitigation implementation, and to implement the worker education program. The Project biologist would be approved by the resource agencies and would be responsible for approving biological monitors. The Project biologist would work with the construction foreman and Project Environmental Compliance Coordinator and would have the authority to halt construction to ensure successful mitigation. Finally, the Project biologist would be responsible for reports to the agencies.

**Raven Monitoring and Control Plan.** In order to monitor the effectiveness of Project Design Features (PDFs) to minimize the attractiveness of ravens to the Project, a monitoring plan should be developed. This plan would also address measures for control, collaboration with the USFWS range-wide raven control program (USFWS 2008), and adaptive management.

**Weed Control.** A weed control program should be developed that delineates methods to monitor and minimize the introduction and/or spread of weeds and methods for weed eradication, should populations increase in response to the Project.

**Restoration.** For all temporary surface disturbance areas, including those external to the Project due to erosion or other Project factors, a restoration program should be implemented to reclaim temporarily disturbed habitats as close to pre-disturbance conditions as possible. The restoration program would include relevant techniques, principles, and success standards in the context of desert restoration. The NEMO Plan (BLM 2002) also provides guidance for site rehabilitation and rehabilitation credits.

**Worker Environmental Awareness Program (WEAP).** A WEAP will be developed to ensure that project construction and operation occur within a framework of safeguarding environmentally sensitive resources. Although facility construction has the greatest potential to harm environmental resources, the WEAP will also address those environmental issues that pertain to Project operations, such as general conduct, repairs and maintenance.

**Reporting.** During construction, the Project biologist should provide progress reports to relevant agencies to describe the extent of construction, mitigation measures implemented, mitigation successes or difficulties, and suggestions. Any harassment or mortality take of listed species, with suggestions for mitigation improvement, would be documented.

**Adaptive Management.** When data show that alterations in the Project Design Features (PDFs) and mitigation measures are required to adequately protect wildlife and habitats, then these should be analyzed with the resource agencies and changes implemented, as feasible.

#### **5.1.3.2 Onsite Mitigation - Desert Tortoise-Specific Measures**

To minimize direct and indirect impacts to desert tortoise from the Project, a detailed suite of measures, in addition to those outlined above, must be developed and incorporated into the mitigation and monitoring plan prior to construction. The most important onsite protection measure for desert tortoises is a thorough construction-associated clearance and monitoring program to minimize tortoise injuries and loss. This program will include, at a minimum:

- Pre-construction surveys
- Clearance surveys
- Adequate monitoring of construction and maintenance activities in unfenced habitat
- Relocation/translocation plan
- Permanent desert tortoise exclusion fencing for the substations; temporary or semi-permanent exclusion fencing where needed for construction
- Methods to accommodate routine maintenance and repair activities

### **5.1.3.3 Offsite Habitat Compensation**

Onsite mitigation will strongly assist in species protection. Offsite mitigation (habitat compensation) will fully mitigate for Project-associated direct and indirect impacts to desert tortoise and other special-status species. All compensation should be scientifically supportable and based upon species impacts (Project and Project in light of other impacts), Project location, and direct as well as indirect impacts. Habitat for compensation should be acquired based on wildlife and plant values that are specifically impacted and the quality and conservation value afforded by the compensation lands. Habitat enhancement for compensation lands should be considered when analyzing compensation acreage.

Compensation ratios will be agreed upon in consultation with the resource agencies. The NEMO Plan (2002) requires habitat compensation inside DWMA's and designated critical habitat at a 5:1 ratio; habitat compensation for Category III habitat is 1:1 (BLM 2002).

## 6.0 LITERATURE CITED

- Environmental Planning Group. 2008. Eldorado-Ivanpah Transmission Project: Biological Technical Report. Prepared for Southern California Edison. 57 pp plus appendices.
- Holland, R. F. 1986. Preliminary descriptions of the terrestrial natural communities of California. California Department of Fish and Game, Nongame-Heritage Program. 155 pp.,
- Karl, A.E. 1983. The distribution, relative densities, and habitat associations of the desert tortoise, *Gopherus agassizii*, in Nevada. M.S. Thesis, California State Univ., Northridge. 111 pp.
- . 2008. Eldorado-Transmission Project, 2008 desert tortoise survey of the Proposed Route. Letter report to Dr. E. Lindwood Smith, EPG, Phoenix, AZ. 19 pp plus attachments.
- . 2009. Eldorado-Transmission Project, special-status species observed during 2008 and 2009 desert tortoise surveys. Letter report to EPG, Tucson, AZ. In prep.
- United States Department of the Interior, Bureau of Land Management. 1988. Desert tortoise management on the public lands: a rangewide plan. Unpub. doc. 24 pp.
- . 2002. Final Environmental Impact Statement. Final California Desert Conservation Area Plan Amendments for the Northern and Eastern Mojave Planning Area. California Desert District, Riverside, CA.
- United States Department of the Interior Fish and Wildlife Service. 1992. Field Survey Protocol for Any Federal Action That May Occur within the Range of the Desert Tortoise. Available online at [http://ventura.fws.gov/es/protocols/de\\_tortoise\\_fsp.pdf](http://ventura.fws.gov/es/protocols/de_tortoise_fsp.pdf)
- . 1994a. Desert Tortoise (Mojave population) Recovery Plan. Portland, OR. 73 pages plus appendices.
- . 1994b. Final rule: determination of critical habitat for the Mojave population of the desert tortoise. FR 59 (26):5820-5866.
- . 2008. Environmental assessment to implement a Desert Tortoise Recovery Plan task: reduce common raven predation on the desert tortoise. 156 pp.
- . 2009. Preparing for any action that may occur within the range of the Mojave desert tortoise (*Gopherus agassizii*). April 2009. 16 pp.

## **APPENDIX 1**

### **Eldorado-Ivanpah Transmission Project Results of 2008 and 2009 Desert Tortoise Surveys**

**APPENDIX 1**

**ELDORADO-IVANPAH TRANSMISSION PROJECT  
RESULTS OF 2008 AND 2009 DESERT TORTOISE SURVEYS**

Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
<b>2008 Surveys</b>						
<b>Proposed Route</b>						
	667507	3958333	Burrow	4	various	7-10 possible burrows in caliche. Cleaned out, no other tortoise sign. Rodent scat in some.
	654603	3952873	Burrow	5	210	
	653680	3952392	Burrow	2	370	
	642422	3937852	Burrow	2	280	
	640181	3935608	Burrow	5	280	
	678319	3963352	Burrow	5	180	
	676079	3962639	Burrow	4	310	Berm of roadside
	669796	3959727	Burrow	3	530	Caliche burrow, TY-2/3 scat outside and inside, 13mm
	668667	3959766	Burrow	4	260	
	668584	3959363	Burrow	2	290	
	669850	3959303	Burrow	4	230	Caliche burrow, bank of wash, raised 0.5m
	669316	3959207	Burrow	4	240	Caliche burrow, bank of wash, no other sign
	669156	3959204	Burrow	6	180	
	668886	3959189	Burrow	4	260-330	3 caliche burrows together rodent and canine scat, no other tort.
	651770	3949908	Burrow	3	200	
	639575	3935000	Burrow	4	230	No other sign, can't see end
	651646	3947447	Burrow	3	270	
	651728	3947580	Burrow	3	240	1 foot deep, under <i>Larrea tridentata</i>
	652351	3949241	Burrow	3	300	~5' south is another tortoise burrow - 190 mm wide
	652539	3949722	Burrow	6	220	Rocky upper bajada, next to old canid(?) burrow

Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
	650268	3945811	Burrow	4	280	Canid scat, possibly modified by canid?
	671219	3958572	Burrow	2		Caliche, scat
	671176	3958550	Burrow	2		Caliche
	670921	3958516	Burrow	2		Caliche
	670877	3958757	Burrow	2/4	340	Caliche
	670507	3958811	Burrow	2	340	
	670383	3958846	Burrow	2/4		Caliche, series of 3 caves, clean and flat, goes back at least 3m
	670844	3958925	Burrow	1	220	
	671327	3958939	Burrow	1	320	With tortoise
	667316	3958196	Burrow	1	205	2 burrows and 1 pallet(205) burrows under boulders, 1 goes back at least 1.5m another is shallow, pallet in gravelly soil.
	667433	3958223	Burrow	>2 and 4	Not Measured	With 1 scat (18mm); series of 7 caliche caves
	667711	3958393	Burrow	1	340	With tracks
	669951	3958920	Burrow	4	170	Small but goes back 0.4m
	664709	3959011	Burrow	3	215	
	666624	3958554	Burrow	4	340	Dug out under large boulder, tortoise shaped, but sloppy inside
	661421	3957017	Burrow	4	130	Very small, entrance deteriorated
	658795	3955302	Burrow	6	340	
	653498	3952257	Burrow	5	245	Now used by something else
	654274	3952619	Burrow	2	255	
	654676	3952864	Burrow	5	300	Collapsed
	651756	3949864	Burrow	5	400	Cobbly soil, slightly caved in inside
	649187	3944552	Burrow	3	260	
	649902	3945681	Burrow	3	290	
	650414	3946816	Burrow	3	180	
	639152	3934527	Burrow	4	340	Cobbly wash, has flat bottom
	638827	3934310	Burrow	6	360	Caved in and full of webs, looks like tortoise



Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
	640223	3935525	Burrow	1	310	With tortoise, fresh tracks on mound
	651619	3950044	Burrow	1	225	With tortoise; burrow is 12 m from dirt road
	651718	3950257	Burrow	2	205	
	652162	3951064	Burrow	2	230	
	652337	3951446	Burrow	3	240	
	652501	3951864	Burrow	3	200	
	652697	3951772	Burrow	2	340	In road berm under 220kV like enroute to transect
	653230	3952037	Burrow	6	320	
	653761	3951611	Burrow	3	340	Burrow is 5m off 220kV access road to a tower and has a 0.25 inch mesh fence halfway around it (photo)
	652910	3950591	Burrow	1	225	With tortoise inside
	652824	3950413	Burrow	2	255	
	652725	3950172	Burrow	1	250	
	652280	3950522	Burrow	5	245	
	652287	3950536	Burrow	3	260	
	652569	3951233	Burrow	3	240	
	652699	3951485	Burrow	2	245	
	652879	3951888	Burrow	1	155	
	653193	3952046	Burrow	1	250	With tortoise, dirt bike trail runs over it and may have collapsed part of the burrow at an earlier date (photo)
	653438	3952170	Burrow	2	240	
	654275	3952594	Burrow	1	300	Under a group of 8 <i>Yucca schidigera</i>
	654495	3952824	Burrow	2 & 1	160	2 burrows- 1 short, the other 0.5 m deep under LAARTR 2 m apart, short burrow is Class 1
	654385	3952794	Burrow	2	240	
	654196	3952684	Burrow	1	240	With tortoise
	653944	3952547	Burrow	3	150	

Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
	653934	3952541	Burrow	1	160	Deep for a small tortoise, 1.5m with dirtbike tracks criss-crossing it(photo)
	653402	3952264	Burrow	5	265	
	653367	3952254	Burrow	1	300	With scat (2) 17mm
	652891	3952031	Burrow	5	300	
	652877	3952022	Burrow	3	265	
	652462	3951204	Burrow	2	330	2 burrows and a pallet within 2m of each other. In a 0.5 m high berm under wires of 220 kV line
	652451	3951173	Burrow	5	330?	Collapsed
	652288	3950847	Burrow	1	290	
	665964	3958723	Burrow	2	470	Caliche burrow, scat outside TY-3, 15 and 17 mm
	654679	3952874	Burrow	2	332	
	654524	3952798	Burrow	3	335	In bank
	654527	3952791	Burrow	4	190	
	653794	3952444	Burrow	3	275	
	652227	3951009	Burrow	3	360	NTY scat (16 mm) on burrow apron
	652097	3950746	Burrow	3	380	
	672672	3959643	Burrow	3	281	NTY-3 scat
	667699	3957854	Burrow		392	
	667927	3958020	Burrow	2	290	
	667193	3957954	Burrow	1	290	Under boulder with tracks
	667147	3957962	Burrow	4	192	
	666912	3958079	Burrow	5	318	
	672424	3959382	Burrow	3	268	Seen en route to transect
	673588	3960029	Burrow	5	272	
	672105	3958345	Burrow	2	282	
	674014	3959737	Burrow	2	262	
	675334	3960796	Burrow	5	220	Seen en route to transect
	674587	3960341	Burrow	6	230	
	673307	3959388	Burrow	3	400	Probably same tortoise as Sign Nos. KB15, 16, 17

Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
	673309	3959389	Burrow	3	360	Cluster of 3 burrows, probably same tortoise as Sign Nos. KB14, 16, and 17
	673306	3959385	Burrow	2	350	Probably same tortoise as Sign Nos. KB14, 15, 17
	673284	3959380	Burrow	2	330	Probably same tortoise as Sign Nos. KB14, 15, 16
	678251	3961898	Burrow	3	325	In a kit fox den
	677994	3962191	Burrow	6	230	
	675696	3961222	Burrow	3	309	
	672643	3959547	Burrow	5	270	Probably same tortoise as Sign No. KB22.
	672653	3959557	Burrow	3	310	Same wash as KB21
	672927	3959779	Burrow	3	260	
	672704	3959655	Burrow	1	301	With tortoise
	669899	3958152	Burrow	3/4	279	Caliche
	654640	3952886	Burrow	2	263	
	654604	3952870	Burrow	1	309	Fresh tracks inside burrow
	652602	3951798	Burrow	4	280	
	651683	3949826	Burrow	3	260	
	650323	3946722	Burrow	5	210	
	650677	3946485	Burrow	2	340	Modified canid
	651925	3949271	Burrow	5	260	
	651920	3949942	Burrow	5	295	Old scat inside
	652302	3950924	Burrow	1	285	With tracks
	652386	3951117	Burrow	3	280	
	652442	3951264	Burrow	5	290	
	652307	3951282	Burrow	2	235	
	662665	3958120	Burrow	4	270	Dug by canid , but tortoise shape inside, wouldn't need much work to make nest
	659652	3956040	Burrow	4	160	<i>Neotoma lepida</i> debris outside
	654432	3952296	Burrow	5	205	
	654691	3952429	Burrow	2	270	
	654768	3952476	Burrow	1	320	

Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
	654999	3952573	Burrow	2	280	
	655026	3952585	Burrow	2	150	
	655186	3952671	Burrow	3	140	
	655399	3952787	Burrow	1	275	
	655630	3952899	Burrow	3	305	
	656276	3953216	Burrow	2	145	
	656737	3953438	Burrow	3	290	
	654228	3952508	Burrow	2	135	
	654581	3952689	Burrow	2	325	
	654809	3952797	Burrow	3	350	
	651559	3950431	Burrow	5	180	
	654709	3953743	Burrow	1	290	
	652306	3952129	Burrow	1	240	
	656202	3953911	Burrow	2	170	
	653607	3952465	Burrow	5	210	Mouth broken down inside looks like tortoise
	666661	3957865	Burrow	4	310	Under boulders, looks like used by tortoise
	666349	3958312	Burrow	1	350	
	671615	3959035	Burrow	2	24	
	671290	3959041	Burrow	4	400	Caliche cave, tort shape, no other sign
	672125	3959956	Burrow	4	290	Caliche cave, no tracks or scat, very tort shaped
	672401	3959747	Burrow	4	340	Excellent cave, recently had a lot of <i>Neotoma</i> debris cleaned out
	672267	3959513	Burrow	2	380	4 caves, also 320, 340, 400 mm, scat and recently used
	672964	3960115	Burrow	3	310	Modified canid dig
	675470	3962517	Burrow	3	230	
	675629	3963133	Burrow	2	320	Caliche cave; scat inside
	675640	3963122	Burrow	3	360	
	649457	3943900	Burrow	3	320	Modified fox den
	650012	3944608	Burrow	3	210	

Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
	650255	3944959	Burrow	2	340	Modified fox den
	649528	3944343	Burrow	3	350	
	648857	3943648	Burrow	5	280	Mostly filled in and old
	649907	3945931	Burrow	2	250	
	649783	3945662	Burrow	5	290	Mostly filled in
	649242	3944681	Burrow	2	270	Modified fox den, old tracks
	649238	3944678	Burrow	1	370	Modified fox den, fresh tracks
	649024	3944482	Burrow	6	260	Probably old tortoise, mostly filled in
	648971	3944419	Burrow	3	250	
	648990	3944266	Burrow	3	210	
	649991	3945475	Burrow	4	320	Kit fox den that appears to have been modified by a tortoise
	649819	3945893	Burrow	2	290	
	649882	3945976	Burrow	1	Not Measured	Tortoise resting inside
	667421	3958265	Burrow	3	176	
	641281	3936412	Burrow	3	304	Originally made by canid
	649081	3944182	Burrow	3	291	
	649203	3944401	Burrow	3	280	
	649122	3944317	Burrow	3	310	
	667598	3958209	Burrow	2	355	
	666881	3958346	Burrow	3	280	
	667301	3958594	Burrow	3	280	
	672672	3959643	Burrow	3	281	With NTY3 adult scat inside
	669950	3958420	Burrow	4	170	0.4 m long
	668565	3959105	Carcass/Shell Part	4 years	180	Half of carcass, unknown gender
	671195	3958559	Carcass/Shell Part	4 years	Adult	Disarticulated
	670779	3958541	Carcass/Shell Part	>4 years	>230	40% intact
	670610	3958514	Carcass/Shell Part	>4 years	>240	60% intact
	636190	3931629	Carcass/Shell Part		130	Freshly dead (3 photos); 2 burrows (360 and 340)

Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
	652348	3950246	Carcass/Shell Part	4 years	~240	Female, 70% intact
	652846	3951532	Carcass/Shell Part	>4 years	Unknown	8 pieces of bone frags
	668768	3958852	Carcass/Shell Part	>4 years	190	Plastron only
	665264	3959126	Carcass/Shell Part	>4	Unknown	Scattered under tower 1380
	668086	3958094	Carcass/Shell Part	>4 years	Large adult	Half carcass, probably male, very broken, possibly lion
	667852	3958233	Carcass/Shell Part	>1 year	Small adult/subadult	One pectoral scute
	669965	3958152	Carcass/Shell Part	>4 years	Adult	Female
	669620	3958820	Carcass/Shell Part	>4 years	220	Probably female
	652429	3951377	Carcass/Shell Part	1-2 years	92	Plastron fractured; May have been dropped from tower or run over
	652134	3950742	Carcass/Shell Part	>2 years	220	Female
	675638	3962673	Carcass/Shell Part	2-3 years	210	Female, badly broken, mountain lion?
	676621	3963180	Carcass/Shell Part	>4 years	Adult	Single piece of shell bone
	673110	3959825	Carcass/Shell Part	2-3 years	230	Little sign of trauma, very blond
	673927	3960728	Carcass/Shell Part	1 year	182	Female shell
	667301	3958594	Carcass/Shell Part	2-3 years	190	
	669458	3959755	Tortoise		200	Female, standing in open
	654247	3952675	Tortoise		188	Probable male (longish tail and gular)
	653632	3952364	Tortoise		275	Male
	667598	3957797	Tortoise		280	Male, face looks good except slightly bloody below R nares

Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
	666094	3958701	Tortoise		199	Eating between large boulders in rocky wash; female
	649145	3944558	Tortoise		215	Female
	654331	3952569	Tortoise		>250	Male; associated burrow is 290 mm
	648828	3944997	Tortoise		230	Healthy looking male
	653633	3952479	Tortoise		200	
	666107	3958403	Tortoise			In burrow, mouth of burrow 270mm
	650064	3946173	Scat	NTY-3	18	
	669801	3958979	Scat	TY-2	15	
	655386	3953250	Scat	TY-2	21	
	652715	3951876	Scat	TY-2	17	
	650293	3946725	Scat	NTY-3	16	
	650233	3946590	Scat	NTY-3	18	
	650192	3946495	Scat	NTY-4	13	
	649076	3944493	Scat	NTY-4	18	
	651785	3947726	Scat	NTY	20	In runnel
	651984	3949363	Scat	TY-2	25	gravelly slope
	666576	3959090	Scat	NTY-3	23	Very pale
	665972	3959135	Scat	TY-2	15	
	666163	3959014	Scat	TY-1	12	
	666599	3958955	Scat	TY-2	17	
	651987	3950331	Scat	TY-2	13	Another scat, NTY-4, 14mm at same location
	651992	3950386	Scat	TY-2	11	
	652728	3951842	Scat	TY-2/3	16	En route to transect, near Tower No. 1316
	650405	3946821	Scat	NTY-3	17	
	650009	3946268	Scat	NTY-3	12	
	650148	3946611	Scat	TY-2	15	
	651569	3949885	Scat	NTY-3	17	Pale, but tight and dark inside
	651603	3949970	Scat	TY-2	13	
	651927	3950573	Scat	TY-2	16 & 10	2 scat, stuck together, same event
	651947	3950625	Scat	TY-2	21	

Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
	653846	3952167	Scat	TY-2	13	En route to transect
	652972	3951622	Scat	TY-1	12	Incidentally seen off the transect
	669139	3958959	Scat	TY-1	15	
	650290	3946625	Scat	NTY-3	20	
	650062	3946116	Scat	TY-2	15	
	640929	3936345	Scat	TY-1	19	
	667870	3958027	Scat	TY-2	Juvenile	Possible chuckwalla, but location, length, width suggest tortoise
	668306	3958304	Scat	TY-2	17	Off Transect
	667855	3958234	Scat	TY-2	18	
	667722	3958159	Scat	TY-2	19	
	667544	3958040	Scat	TY-3/NTY-3	13	
	667014	3957996	Scat	NTY-4	13	
	667023	3958203	Scat	TY-2	18	
	672944	3959985	Scat	NTY-4	16	
	669781	3958166	Scat	TY-2	13	
	668479	3958203	Scat	TY-2	16	
	667623	3958412	Scat	TY-3	19	
	666577	3958608	Scat	TY-2	14	Slope of cobble hill
	666134	3958688	Scat	TY-3	16	Between rocky hills
	653749	3952410	Scat	TY-2	15	
	651781	3949619	Scat	NTY-3	21	A lot of soil in it
	651733	3949509	Scat	TY-2	17	
	650398	3946538	Scat	TY-3	19	Contains thick stems
	651654	3949483	Scat	NTY-4	16	
	651991	3950583	Scat	TY-2	15	
	654854	3952049	Scat	TY-2	18	
	651483	3952368	Scat	TY-2	18	
	651528	3951227	Scat	TY-2	13	2 pieces
	651589	3951374	Scat	TY-2	20	
	653015	3952154	Scat	TY-2	18	



Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
	666477	3957868	Scat	TY-2	16	En route to transect
	676590	3963236	Scat	NTY-4	22	Almost white
	676714	3963727	Scat	NTY-4	19	White scat, in wash and could have been washed here
	649882	3945877	Scat	TY-2	12	
	649088	3944654	Scat	NTY-4	16	
	649519	3945205	Scat	TY-2	15	
	649855	3945925	Scat	TY-2	21	
	664557	3958352	Scat	TY-2	15	Gravel and cobble ridge
	667647	3958451	Scat	NTY-3	15	
	653467	3952270	Scat	TY-2	19	
	667020	3959346	Scat	TY-2	12	
	667728	3959022	Scat	TY-2	17	
	667494	3958991	Scat	TY-1	9	
	667478	3958989	Scat	NTY-4	20	
	667301	3958594	Scat	NTY-3	15	
	640995	3936295	Scat (2)	TY-2	9	
	652706	3951883	Scat (2)	TY-2	13	
	653467	3952270	Scat (2)	TY-2	19	
	653512	3952297	Scat (3)	TY-2	16	
	640984	3936280	Scat (5)	TY-2	9, 16	
	670251	3958185	Tracks	1	190	In gravel wash with caliche caves
	639902	3934237	Tracks		150	
	648630	3944033	Tracks		150	Fresh
	640941	3936388	Tracks		190	
	640393	3935625	Tracks		280	19mm scat, TY-2, 2m away
	648300	3943373	Tracks		202	Fresh
	651890	3950017	Tracks		240	Fresh
	654513	3952340	Tracks		235	
	649659	3944092	Tracks		26	Fresh
	649648	3944543	Tracks		198	
	648397	3943547	Tracks	1	176	
	648251	3943465	Tracks	1	163	En route to transect

Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
<b>2009 Surveys</b>						
<b>Proposed Route</b>	0666576	3958681	Burrow	2	380	In side of caliche wash
	0666574	3958688	Burrow	2	300	In side of caliche wash; scat and eggshell fragments
	0666293	3958604	Burrow	2	290	Rock burrow, scat
<b>Alternative A</b>	677649	3961540	Burrow	1	195	Burrow with tracks
	673599	3959892	Burrow	1	320	
	676826	3961924	Burrow	1	315	Burrow with tracks
	672509	3959004	Burrow	1	320	
	676798	3961912	Burrow	1	220	Female tortoise inside, two other burrows in area, tracks east of wash
	674641	3960453	Burrow	1	275	
	672992	3959306	Burrow	1	340	
	676851	3961801	Burrow	1	260	Tracks all over area 180 mm, 200 m west still many tracks
	672408	3959005	Burrow	2	310	
	673000	3959411	Burrow	2	235	
	676529	3961727	Burrow	2	320+	
	676799	3961648	Burrow	2	240	
	676861	3961700	Burrow	2	300	Tracks 2 m east of burrow
	675430	3960325	Burrow	3	330	May be used by fox now
	674011	3959955	Burrow	3	305	
	678014	3962992	Burrow	3	230	
	677021	3962082	Burrow	3	240	340 mm deep
	674172	3960111	Burrow	3	320	
	673453	3959629	Burrow	3	285	
	673615	3959784	Burrow	3	265	
676091	3961168	Burrow	3	190		
676838	3961851	Burrow	3	270		
676841	3961976	Burrow	5	180	Old, eroded	

Project Element	Eastings <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
	675614	3961364	Burrow	5	280	
	676442	3961650	Burrow	5	305	Collapsed tortoise burrow, used by other animal
	678257	3962744	Burrow	5	270	On side of bermed wash
	678084	3962859	Burrow	5	180	
	673494	3959697	Carcass/Shell Part	> 4 years	NR	Old fragment
	674322	3960253	Carcass/Shell Part	> 4 years	NR	Scattered old carcass
	674372	3960531	Carcass/Shell Part	1-2 years	145	Female, 12 marginals on left side, 11 on right
	676285	3961584	Carcass/Shell Part	1-2 years	205	Female, possibly shot, took photos
	674840	3960732	Carcass/Shell Part	2-4 years	215	Male
	676064	3961558	Carcass/Shell Part	2-4 years	240	Male
	676041	3960587	Carcass/Shell Part	3 years	255	Male intact shell
	675441	3960337	Carcass/Shell Part	4 years	~210	Shell broken
	673647	3959765	Scat	TY-2	17	
	677564	3961489	Tracks		151	Fresh
	677972	3961768	Tracks		150	Old track
	676790	3961942	Tracks		170	Fresh, in wash
	674557	3960544	Tracks		160	
	677236	3962349	Tracks		180	
	676691	3961981	Tracks		170	
	675873	3961266	Tracks		190	
	676152	3961211	Tracks		195	More tracks 100 m east, same size
	676421	3961389	Tracks		195	
	676451	3961416	Tracks		180	Tracks all over 100 m, tracks at 200 m
	676913	3961842	Tracks		190	
	676583	3961615	Tracks		110	
	677035	3962149	Tracks		170	

Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
<b>Alternative B</b>	680459	3966115	Burrow	1	290	Live tortoise inside, 40 m east of line
	680480	3965606	Burrow	1	230	With tracks
	680112	3966078	Burrow	1	340	Active, tracks and scat; tortoise Sign QBTT8 came from this burrow
	678439	3966155	Burrow	2	340	Has 5 scat inside, in wash bank
	680796	3967033	Burrow	3	240	
	680562	3966973	Burrow	3	300	
	680498	3967061	Burrow	3	~320	
	680560	3966587	Burrow	3	320	
	680474	3965408	Burrow	3	260	
	680481	3965467	Burrow	3	270	
	680516	3966075	Burrow	3	280	
	680087	3965893	Burrow	3	280	Inactive, not used this year, definitely tortoise
	680725	3967208	Burrow	5	320	
	680466	3964626	Burrow	5	170	
	680784	3967070	Burrow	5	320	
	680606	3967156	Burrow	NR	240	Fox complex, 2 burrows modified by tortoise in the past
	677845	3965397	Carcass/Shell Part	> 4 years	Unknown	May be small adult, scattered disarticulated bone fragments
	677704	3964625	Carcass/Shell Part	> 4 years	Unknown	Single bone fragment in wash
	680981	3966405	Carcass/Shell Part	> 4 years	Adult	Plastron bone fragment
	679124	3965118	Carcass/Shell Part	> 4 years	Adult	5 bone fragments, very old
	680644	3966512	Scat	NTY-3	15	
	680511	3965813	Scat	NTY-3	12	
	680494	3965417	Scat	NTY-3	10	
	380493	3965767	Scat	NTY-3	12	
	680500	3965779	Scat	TY-2	16	
	680538	3966100	Tortoise		285	Female
	680101	3966074	Tortoise		~220	Eating <i>Schismus</i> ; from burrow Sign No. QBTB9

Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
	680661	3967160	Tracks		155	
	680580	3967109	Tracks		150	
	680562	3967127	Tracks		150	
	680365	3966947	Tracks		160	Fresh, in soft soil
<b>Alternative C</b>						
	645918	3943103	Burrow	1	270	
	645464	3942477	Burrow	2	450	Second entrance 310 mm, 3 scat inside 16-19 mm
	647584	3943162	Burrow	3	230	
	642806	3939479	Burrow	4	190	No scat or tracks
	647516	3943221	Burrow	5	NR	
	645294	3942505	Scat	TY-2	12	
	645948	3943170	Scat	TY-2	16	
	645933	3943080	Scat	TY-2	16	
	645142	3942391	Scat	NR	NR	
	643275	3940579	Tracks		190	
<b>Alternative D</b>						
	647314	3940581	Burrow	1	310	With tracks
	646944	3940440	Burrow	5	270	
	646491	3940702	Burrow	5	230	
	647174	3941410	Carcass/Shell Part	> 4 years	Est. Sub-Adult	3 pieces only
	647199	3941020	Scat	TY-2	20	
	646700	3940725	Scat	TY-2	15	
	647125	3940508	Tracks		195	
	647341	3940623	Tracks		200	
	647364	3940706	Tracks		190	
<b>Ivanpah Substation</b>						
	638769	3934281	Burrow	2	300	Nice shape, no scat
	639030	3934544	Burrow	4	165	Entrance dug out, inside of tunnel looks good, can't see back
	638803	3934414	Carcass/Shell Part	> 4 years	> 220	In open, disarticulated

Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
<b>Telecom Path 2: Section 1 (Eldorado-Lugo 500 kV Transmission Line)</b>						
	674461	3949440	Burrow	2	320	Recent use, but currently empty, photo D
	675245	3951481	Burrow	3	200	Some debris inside, good condition
	677279	3956429	Burrow	4	210	Starts out with good form but gets mousey in the back, no other sign
	675085	3951102	Burrow	5	Caliche cave	Moderately clean caliche cave. No obvious present occupation by tortoise, but has shape and depth, probable historic use, at least 1.8 m deep. More nice caliche habitat to north, tortoise-looking area
	677484	3956855	Carcass/Shell Part	NR	NR	
	678205	3958553	Tracks		200	
	678195	3958560	Tracks		140	
<b>Telecom Path 2: Section 2, and Section 3: Alternatives 1 and 2 (Nipton Road)</b>						
	660369	3926960	Burrow	1	245	With tracks
	646204	3925849	Burrow	1	120	Tracks, can't see the back, empty
	643600	3926061	Burrow	1	310	Fresh tracks, can't see back, 2nd burrow 2 m west, same size
	655207	3925922	Burrow	1	310	Tortoise inside, tracks, scat inside and out (NTY, 15 mm) 2 other burrows 250 mm adjacent
	657364	3927223	Burrow	1	190	
	643159	3924983	Burrow	2	310	Burrow with scat, TY-2 20 mm
	645643	3925977	Burrow	2	230	
	655883	3926329	Burrow	2	260	Two Class 5 burrows of similar size within 6 m
	641263	3926428	Burrow	2	150	
	643100	3926132	Burrow	2	280	Cobwebs, but clean, in wash bank
	653932	3925512	Burrow	2	250	Cobwebs and minor debris at mouth, otherwise quite clean, classic form
	657391	3926811	Burrow	2	280	Entire tunnel collapsed
	660705	3927983	Burrow	2	390	
	659524	3927145	Burrow	2	310	
	661977	3927119	Burrow	2	340	Under <i>Yucca</i> ; classic
	655608	3925445	Burrow	3	260	
	659198	3926670	Burrow	3	210	

Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
	645822	3925933	Burrow	3	320	
	646242	3925840	Burrow	3	250	
	653905	3925396	Burrow	3	180	Mouth slightly deteriorated, but overall good
	654102	3925571	Burrow	3	140	Good condition, but may be used by other sp.; minor deterioration on apron
	654582	3925711	Burrow	3	230	Mouth deteriorated, cobwebs, but good interior with old scat inside
	664651	3927475	Burrow	3	520	Cave
	659306	3927288	Burrow	3	130	Small, nice shape and mound, unused
	660899	3927661	Burrow	3	410	Perfect burrow, wash bank, rats using now, 1 TY-3 scat 25 mm
	656343	3926844	Burrow	3	300	Long unused in berm/dike
	659814	3927200	Burrow	3	340	
	645750	3925557	Burrow	5	310	Definitely tortoise, somewhat deteriorated
	655770	3926673	Burrow	5	280	
	654952	3926424	Burrow	5	290	
	654877	3926386	Burrow	5	230	
	655164	3926088	Burrow	5	180	May be Class 3, but substrate is so soft and sandy that deteriorates rapidly
	655250	3926128	Burrow	5	290	May be Class 3, but substrate is so soft and sandy that deteriorates rapidly
	658198	3926262	Burrow	5	290	
	658229	3925871	Burrow	5	340	Old and unused
	658392	3925893	Burrow	5	310	0.4 m from tunnel, caved in
	658603	3925959	Burrow	5	~300	Tunnel collapsed
	661954	3926790	Burrow	5	260	Old; hole in roof
	658668	3926834	Burrow	6	170	Tunnel collapsed, old
	642457	3925930	Carcass/Shell Part	> 1 year	Adult	Small adult, fragment on road edge, road kill, scute and bone
	657907	3925770	Carcass/Shell Part	> 4 years	Adult	Broken, likely male
	658792	3926677	Carcass/Shell Part	> 4 years	~200	Broken shell, female
	661936	3927311	Carcass/Shell Part	> 4 years	~220	Half of shell, female, broken up

Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
	645658	3925587	Carcass/Shell Part	> 4 years	250	Male, gular chewed off
	641426	3927009	Carcass/Shell Part	> 4 years	Adult	Old male, scutes quite sunken, disarticulated
	655780	3926303	Carcass/Shell Part	> 4 years	Sub-Adult	
	642140	3926207	Carcass/Shell Part	> 4 years	Adult	Disarticulated and scattered
	641801	3926188	Carcass/Shell Part	> 4 years	Sub-Adult	1 piece in wash
	654269	3925618	Carcass/Shell Part	> 4 years	Sub-Adult	Disarticulated and scattered near edge of wash
	655650	3926048	Carcass/Shell Part	> 4 years	Adult	
	654147	3925339	Carcass/Shell Part	> 4 years	Unknown	Bone, size of quarter
	642366	3925951	Carcass/Shell Part	> 4 years	Adult	Bone fragment on road berm
	657943	3925909	Carcass/Shell Part	> 4 years	Adult	65% of shell bones, 5% of scutes present, scattered
	657629	3926894	Carcass/Shell Part	> 4 years	Adult	4 scattered bone fragments
	658088	3927008	Carcass/Shell Part	> 4 years	Adult	Single bone fragment
	659068	3926936	Carcass/Shell Part	1-2 years	130	Canid depredation
	645783	3925368	Carcass/Shell Part	2-3 years	Juvenile	Broken 3 pieces at base of fence post, 2 partial plastrons of different individuals
	657924	3926191	Carcass/Shell Part	2-4 years	275	Old male (Shell Wear Class 7), possible coyote depredation, likely history of chewing by domestic dogs
	647198	3924666	Carcass/Shell Part	4 years		Broken up shell, medium sized tortoise, shell pieces spread out, washed around
	657424	3926231	Carcass/Shell Part	4 years	Adult	Scutes still remain, but shell disfigured
	655026	3925249	Scat	NTY-3	18	
	660496	3927352	Scat	NTY-3	14	



Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
	660549	3927361	Scat	NTY-3	15	
	646408	3925788	Scat	NTY-3	12	Bleached, tight, slight odor inside
	664633	3927469	Scat	NTY-3	19	
	659173	3926757	Scat	NTY-4	16	
	657408	3926225	Scat	NTY-4	50	Old, white
	658522	3925930	Scat	NTY-4	15	Almost white
	643820	3925945	Scat	TY-1	21	Very fresh, yesterday, 2 pieces
	657466	3926424	Scat	TY-2	9	
	650751	3924692	Scat	TY-2	18	
	655777	3925073	Scat	TY-2	9	
	643517	3926169	Scat	TY-2	19	2 pieces
	642486	3926266	Scat	TY-2	15	
	641024	3927169	Scat	TY-2	20	< 100 m from I-15
	642993	3926585	Scat	TY-2	20	
	643009	3926580	Scat	TY-2	15	
	643286	3926508	Scat	TY-2	19	3 scats same event
	645244	3926055	Scat	TY-2	25	
	645271	3926048	Scat	TY-2	20	
	645407	3926030	Scat	TY-2	21	
	645846	3925925	Scat	TY-2	20	
	653482	3925526	Scat	TY-2	11	
	655002	3925850	Scat	TY-2	17	2nd piece 18 mm, 1 piece geophagic
	657796	3926929	Scat	TY-2	16	
	657485	3927244	Scat	TY-2	16	
	655183	3924890	Scat	TY-3	15	
	655795	3925516	Scat	TY-3	24	Scat was mostly soil and sand with some veg, Solid, slight odor
	660409	3927532	Scat	NR	NR	
	642068	3926417	Tracks		220	
	646557	3925411	Tracks		160	Probable female, long toenail marks
	646504	3925409	Tracks		220	Many tracks in this area
	653449	3925903	Tracks		230	
	645850	3925244	Tracks		140	

Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
<b>Microwave Tower for Telecom Path 2: Section 3A</b>						
	656853	3927653	Burrow	1	290	With tracks
	656973	3927515	Burrow	1	300	With tracks
	657747	3927667	Burrow	2	300	
	656976	3927711	Burrow	3	230	With class 4 scat, 20 mm
	657341	3927572	Burrow	3	300	
	657377	3927502	Burrow	3	250	
	656909	3927486	Burrow	3	300	
	657126	3927328	Burrow	3	290	
	657753	3927353	Burrow	5	270	
	656708	3927418	Burrow	5	250	
	656871	3927438	Burrow	5	260	
	657682	3927840	Carcass/Shell Part	> 4 years	Adult	Female
	656728	3927287	Carcass/Shell Part	> 4 years	~250	Female, chewed and healed gular
	656750	3927100	Carcass/Shell Part	2 years	Immature	Found en route to 1200 ZOI 400 m from tower site
	656772	3927156	Carcass/Shell Part	3-4 years	~230	Female
	657416	3927251	Carcass/Shell Part	3-4 years	Adult	
	657164	3927336	Scat	TY-2	13	Found 100 m from tower site enroute to ZOI start
	657244	3927633	Scat	TY-2	15	
	657078	3927315	Scat	TY-2	18	
	656736	3927088	Scat	TY-4	20	Found en route to start of 1200 ZOI to 2400 ZOI, 410 m from tower site
	657395	3927345	Tracks		210	
	656714	3927467	Tracks		170	
<b>Telecom Path 2: Section 3: Alternative 2 (I15 at the Nipton Exit to Primm Golf Course and West)</b>						
	641157	3927116	Burrow	1	230	Tortoise in burrow
	641374	3927749	Burrow	2	220	
	643078	3932518	Burrow	2	90	
	641356	3928048	Burrow	3	270	Fresh, though with annuals. Has the tracks path

Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
	642465	3930759	Burrow	3	240	
	642917	3931552	Burrow	4	220	Not deep, but very good shape and recent
	642613	3932088	Carcass/Shell Part	> 4 years	Adult	Small
	641977	3928986	Carcass/Shell Part	> 4 years		Crumbling, disarticulating
	643281	3933094	Carcass/Shell Part	> 4 years	Adult	One disarticulated piece of shell
	641047	3935034	Carcass/Shell Part	> 4 years	Sub-Adult	Disarticulated
	641820	3934816	Carcass/Shell Part	> 4 years	185	Disarticulated
	643211	3932892	Courtship Ring			Fresh
	643495	3933660	Scat	TY-1	20	2 pieces
	642130	3929808	Scat	TY-2	15	
	643302	3933693	Tracks		190	
<b>Telecom Path 2: Section 3: Alternative 1 (I-15 at the Nipton exit to the Mountain Pass Substation, and northeast)</b>						
	637780	3925744	Burrow	4	220	Clean inside, may have been tortoise at one time, but now other species, nice shape and apron
	638433	3933529	Burrow	3	~220	Part of old kit fox complex
	638478	3933617	Burrow	4	~360	In caliche, lots of <i>Neotoma</i> activity, no scat, but shape and apron right
	635821	3930979	Burrow	4	~220	In wash under <i>Acacia greggii</i>
	637517	3933478	Burrow	4	230	In wash bank, looks created by tortoise, but now used by a coyote?
	635451	3931329	Burrow	4	250	Classic tortoise design, but not clean and no other sign
	633856	3930377	Burrow	6	200	Outside caved in but deeper inside looks like tortoise
	638423	3925208	Carcass/Shell Part	1-2 years	148	
	635274	3931135	Carcass/Shell Part	> 4 years	Adult	1 piece peripheral
	637419	3933855	Carcass/Shell Part	2-3 years	122	

Project Element	Easting <sup>1</sup>	Northing	Sign Type <sup>2</sup>	Class <sup>3</sup>	Width/Size <sup>4</sup>	Surveyor's Additional Notes
	637530	3932380	Carcass/Shell Part	2-4 years	Adult	
	636850	3931954	Scat	TY-2	11	
	634652	3930222	Scat	TY-2	11	With class 2 burrow, ~220 mm, rock shelter

1. All coordinates are Universal Transverse Mercator North American Datum 83, Zone 11S.
2. Number in parentheses is number of sign.
3. See Appendix 2 for key to sign type.  
NR = Not Recorded
4. All units are millimeters unless otherwise noted.

## **APPENDIX 2**

### **Sample Desert Tortoise and Special-Status Species Data Form and Key for the Eldorado-Ivanpah 2008 and 2009 Desert Tortoise Surveys**

Appendix 2. Sample Desert Tortoise and Special-Status Species Form, Front Side

NIPTON LEG 6  
600' N ZOI

PROJECT ELDORADO-IVANPAH TRANSMISSION PROJECT Page 1/2  
2009 SPECIAL-STATUS SPECIES SURVEYS

DATE 21 MAY 2009  
TIME: Start 1450  
End 1625

WEATHER:

	Ta	Tg	Cloud Cover	Wind
Start	34.0°C	46.9°C	90% Strato Cumulus	0-3 mph West
End	32.6°C	42.4°C	60% Strato Cumulus	0-2 mph West

SURVEYOR: JENNY WEIDENSEE  
PROJECT ELEMENT NIPTON ROAD  
MILE OR OTHER DESCRIPTOR LEG 6  
ROW  
ZOI - 600' NORTH  
STARTING UTM 6 53 280 E 39 25 305 N  
ENDING UTM 6 55 442 E 39 25 991 N  
(NAD 83)  
TRANSECT WIDTH 30 FT  
TRANSECT LENGTH 2.27 Km

GENERAL SITE DESCRIPTION:  
VEGETATION SHRUB LAYER AND BUNCH GRASSES)  
Aspect Dominants  
LARTR1

Common Species  
AMB DUM

Occasional Species

% Cover 15-20%  
Avg. Height of Dominant Shrub Species  
1.4 LARTR1

UNDERSTORY  
Abundant Species

Exotics (Map concentrations and describe here relative to population size and geographic breadth.)

TOPOGRAPHY  
Landform  
low bajada  
Drainage Type  
small wash + short wash  
Elevation (state meters or feet) 849-888 meters

SUBSTRATE  
Color Tan w/ multicolor gravel and black/brown cryptobiotic soil  
Coarse Particles (Type, % Cover)  
Sand f-c 100%, gravel fine-med 30-40%  
Soil Texture and Consistence  
Soft - loose silty sand

PRESENCE OF PREDATORS: Ravens - # Detected NO # Nests NO  
Coyotes - # Detected YES Scat? YES Scat Piles NO  
Fox natal den

HUMAN-RELATED DISTURBANCES (Onsite and Adjacent)  
Rare vehicle tracks in wash; road trash.

SITE PICTURE: Photographer J. Weidensee  
A - Form   
(Describe site pictures)  
A - Site photo taken east from start @ N11  
B - Site photo taken west from end @ N12  
C - photo of scat

COMMENTS

Reverse Side of Data Form

NIPTON LEG 6  
300'N ZOI

P2/2

↑ N (SHOW DIRECTION)

SIGN (BY NUMBER)  
START N11 ——— 568m (1.7K) ——— 1.14K ——— 1.7K (568m) ——— N12 END 2.27K (1.0 MILE) 73°

HABITAT  
START → ——— small wash SHEET WASH ——— END

(TOPOGRAPHY, ROADS, OTHER DISTURBANCES)

SIGN #	WAYPOINT	UTM (NAD 83)	DESERT TORTOISE			OTHER SPECIES		FURTHER DESCRIPTION
			SIGN TYPE	CLASS	width (sc, bur, tr) MCL (shell, tort)	SPECIES	SIGN TYPE	
1	YNTB14	E6 53 931 N39 25 512	Burrow	2	250 mm			Cobwebs & minor debris @ mouth otherwise quite clean - classic form
2	YNTB15	E6 54 101 N39 25 571	Burrow	3	170 mm			Good condition but may be used by other sp. minor deterioration on apron.
3	YNTC16	E6 54 269 N39 25 618	Carcass	>4 yrs	UNK est. subadult			disarticulated and scattered rear edge of wash
4	YNTB17	E6 54 581 N39 25 711	Burrow	3	230 mm			Mouth deteriorated cobwebs but good interior w/old scat inside
5	YNTS18	E6 55 002 N39 25 850	Scat	TY2	18 mm 17 mm			2 pieces - 1 piece geophagic
6	YNTB19	E6 55 206 N39 25 922	Burrow	1	310 mm	Tortoise	Inside	Tracks; scat inside and out; CAN HEAR TORTOISE moving inside. (Scat NTY 15 mm)

Lar. Tr. 1.2m      Sand off - 1/2      Fine 9mm 30% rd. frag.      Nial for dim      Photo Scat      Coy

## **KEY TO SIGN CLASSES** **(Alice Karl, 2001)**

### **BURROWS**

- 1 - DEFINITELY TORTOISE - FRESH (TRACKS, TORTOISE INSIDE, FRESHLY DISTURBED SOIL ON MOUND/RUNWAY)
- 2 - DEFINITELY TORTOISE - USED THIS SEASON (CLEARED OF ANNUALS, BUT NO FRESHLY DISTURBED SOIL)
- 3 - DEFINITELY TORTOISE – NOT USED THIS SEASON (PROBABLY HAS ANNUALS GROWING IN RUNWAY)
- 4 - POSSIBLY TORTOISE – IN GOOD CONDITION BY UNSURE OF SPECIES USING BURROW
- 5 - DEFINITELY TORTOISE – DETERIORATED SUCH THAT IT WOULD REQUIRE SUBSTANTIAL REMODELING TO BE USABLE
- 6 - POSSIBLY TORTOISE – DETERIORATED

### **SCAT**

- TY1 - WET OR FRESH, DARK, ODORIFEROUS
- TY2 - DRIED, POSSIBLE GLAZE ON PART; UNEXPOSED SURFACES DARK BROWN; SLIGHT ODOR
- TY3 - DRIED, NO GLAZE; AT LEAST PARTIALLY FADED ON EXTERIOR; VERY SLIGHT ODOR
- NTY3- DRIED, NO GLAZE; AT LEAST PARTIALLY FADED ON EXTERIOR; NO ODOR (DISTINGUISHES FROM TY3)
- NTY4- DRIED, LOOSENING, PALE OR BLEACHED

### **CARCASSES – GENERAL INDICATORS FOR TIME SINCE DEATH**

- <1 YR - UNEXPOSED SCUTES NORMAL COLOR AND SHEEN, ADHERE TIGHTLY. EXPOSED SCUTES PALING AND MAY BE LIFTING OR OFF. UNEXPOSED BONE WAXY AND SOLID.
- 1-2 YRS - UNEXPOSED SCUTES NORMAL COLOR WITH SLIGHT SHEEN, MOSTLY TIGHTLY ATTACHED. EXPOSED SCUTES SLIGHTLY PALE WITH NO SHEEN AND NO TO SLIGHT GROWTH RING PEELING. NO ODOR. UNEXPOSED BONE SILKY.
- 2-3 YRS - UNEXPOSED SCUTES PALE AND WITHOUT SHEEN BUT NO GROWTH RING PEELING. EXPOSED SCUTES PALE WITH SLIGHT PEELING. SCUTES LOOSE, OFF AND/OR TIGHT. BONE SUTURES GENERALLY TIGHT.
- 4 YRS - UNEXPOSED SCUTES NORMAL COLOR TO SLIGHTLY PALE, NO SHEEN, NO PEELING. EXPOSED SCUTES LOOSE, PALE, DULL, WITH MODERATE PEELING. SUTURES SEPARATING AND BONE SURFACE IS FISSURED, EDGES ARE ROUGHENED (FISSURED UNDER HAND LENS) AND CHIP FAIRLY EASILY
- >>4 YRS- DISARTICULATED AND DISARTICULATING. BONE EDGES CHIP AND MAY CRUMBLE EASILY. SCUTES ARE PEELING AND CURLED



## **APPENDIX 3**

### **Access and Stub Roads Surveyed in November 2009**

**Appendix 3. Access and Stub Roads Surveyed in November 2009**

Road	Point along Access Road		Endpoint Nearest Tower		Notes	
	Spur Road	Easting	Northing	Easting		Northing
1		668951	3959147	669119	3958978	Endpoint stops inside ROW, not at Tower
2		668697	3958994	668711	3958959	Endpoint stops inside ROW, not at Tower
3		667901	3958648	667906	3958630	Endpoint stops inside ROW, not at Tower
4		667805	3958609	667855	3958488	
5		667554	3958451	667739	3958292	
5A		667599	3958327	667739	3958292	Endpoint stops inside ROW, not at Tower
6		667357	3958369	667396	3958230	Endpoint stops inside ROW, not at Tower
7		667302	3958369	667236	3958304	Endpoint stops inside ROW, not at Tower
7A		667184	3958381	667184	3958331	Endpoint stops inside ROW, not at Tower
8		667016	3958453	666995	3958420	Endpoint stops inside ROW, not at Tower
9		666559	3958735	666572	3958615	Endpoint stops inside ROW, not at Tower
10		666385	3958677	666299	3958613	Endpoint stops inside ROW, not at Tower
10A		666349	3958689	666312	3958662	
11		665965	3958666	666061	3958803	
11A		666058	3958797	666035	3958789	
12		664839	3959014	664829	3959114	
12A		664830	3959089	664829	3959114	Endpoint stops inside ROW, not at Tower
13		664442	3958921	664352	3958963	Endpoint stops inside ROW, not at Tower
<b>Access Road</b>						
	<b>West End</b>		<b>East End</b>			
1	678199	3962666	680311	3962838		
	<b>South End</b>		<b>North End</b>			
2	678199	3962666	678350	3963177	Endpoint stops inside ROW, not at Tower	
3	672259	3958833	672053	3959084	Endpoint stops inside ROW, not at Tower	
4	672259	3958833	670953	3959036	Endpoint stops inside ROW, not at Tower	

## **APPENDIX 4**

### **Towers Surveyed on the Telecom Path 2: Section 1 (Eldorado-Lugo 500 kV Transmission Line)**

**Appendix 4. Towers Surveyed on the Telecom Path 2: Section 1 (Eldorado-Lugo 500 kV Transmission Line)**

Tower #	Type	Body Retrofit	Peak Retrofit
152-1	EHT-S-3		X
154-2	EMT-1		X
154-3	EMT-3	X	
155-5	EMT-3	X	
156-1	EMT-2		X
156-3	EMT-3	X	
156-4	EMT-3	X	
157-1	EMT-3	X	
157-2	EMT-3	X	
158-1	EMT-3	X	
158-4	EMT-3	X	
159-3	EMT-3	X	
159-4	EMT-3	X	
161-4	EMT-3	X	
163-1	EMT-3	X	X
163-2	EMT-3	X	
163-4	EMT-3	X	
164-4	EMT-3	X	
166-1	EMT-3	X	
166-3	EMT-3	X	
167-3	EMT-3	X	
168-1	EMT-3	X	
168-2	EMT-3	X	
168-3	EMT-3	X	
168-4	EMT-3	X	X
169-1	EMT-3	X	X
170-1	EMT-3	X	
170-2	EMT-3	X	
170-3	EMT-3	X	
171-1	EMT-3	X	
171-2	EMT-3	X	
171-3	EMT-3	X	
172-1	EMT-3	X	
172-2	EMT-3	X	
172-3	EMT-3	X	
173-1	EMT-3	X	
173-2	EMT-3	X	
173-3	EMT-3	X	
173-4	EMT-3	X	
174-1	EMT-3	X	
174-2	EMT-3	X	X
175-1	EMT-3	X	X
175-2	EMT-3	X	
175-3	EMT-3	X	
175-4	EMT-3	X	
176-2	EHA-1	X	X

## **APPENDIX 5**

### **Field Personnel for Desert Tortoise Surveys**

## **Appendix 5. Field Personnel**

### **2008**

Gavin Bieber  
Dave Focardi  
Paul Frank  
Cathy Halley  
Rick Hunter  
Alice Karl  
Michael Omana  
Art Schaub  
Lindsay Spenceley

### **2009**

Dave Focardi  
Paul Frank  
Bill Hasskamp  
Mary Ann Hasskamp  
Alice Karl  
Shawn Lindey  
Michael Omana  
Art Schaub  
Kevin Walsh  
Jenny Weidensee

**SOUTHERN CALIFORNIA EDISON  
ELDORADO-IVANPAH TRANSMISSION PROJECT**

**2010 DESERT TORTOISE SURVEY REPORT**

**DRAFT**

**EPG, Inc**  
Tucson, Arizona

**DRAFT**  
**May 25, 2010**

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## **INTRODUCTION**

Southern California Edison (SCE) is proposing to develop the Eldorado-Ivanpah Transmission Project (EITP) in order to provide transmission of power generated by several solar power projects proposed for the Ivanpah Valley. The project will include replacement of the existing Eldorado-Baker-Coolwater-Dunn Siding-Mountain Pass 115kV transmission line with a new double-circuit 220kV line between the existing Eldorado Substation in Nevada and the new Ivanpah Substation in California.

The proposed route was surveyed for Desert Tortoise (*Gopherus agassizi*) in 2008 to provide initial data for the analysis of the potential effects of the EITP on the desert tortoise, a federally listed Threatened species in California and Nevada. The Desert Tortoise is a California state-listed Threatened species, a Nevada state-protected reptile, and a Bureau of Land Management (BLM) sensitive species. In 2009, following additional engineering, alternatives to the proposed route, the proposed Ivanpah Substation, additional access roads, telecommunications (telecom) alternatives, including a microwave tower location were surveyed. Results of both years' surveys were presented in a report prepared by Karl (2010).

Since the 2009 surveys, additional areas needing surveys were identified. This included a portion of the Eldorado-Lugo line that will be utilized to carry the secondary EITP telecom line consisting of an optical fiber ground wire (OPGW), Primm access roads, Jean access roads, access from Highway 95 to the Eldorado Substation, two helicopter landing zones, laydown areas (Nipton, Yates Well Road, Primm, and Jean), access roads identified as K, L, M, and Q, and eight OPGW splicing locations (Figure 1). These project elements were all surveyed in the spring of 2010 and this report is a summary of findings from those surveys.

## **PROJECT SETTING AND DESCRIPTION**

### **Environmental Setting**

The reader is referred to EPG (2008) for a detailed habitat description of the project area.

## **SURVEY METHODS**

In 2008, surveys were completed between May 13 and 23, inclusive. In 2009, they were conducted between May 14 and 29, inclusive; additional surveys on some spur and access roads were conducted on November 2. In 2010, surveys were conducted between April 4 and 10, inclusive. Pedestrian transects were completed consistent with the U.S. Fish and Wildlife Service (USFWS) protocol of 1992. The 1992 protocols were used in 2008 and 2009, so were also used in 2010 for consistency, even though the USFWS had established a new set of protocols in 2009 (USFWS 2009). The basic method was to survey 100 percent of the right-of-ways or the potential disturbance area in the case of non-linear facilities (helicopter landing zones, lay down areas, and splicing towers/sites), using parallel 30-foot-wide belt transects. In addition,

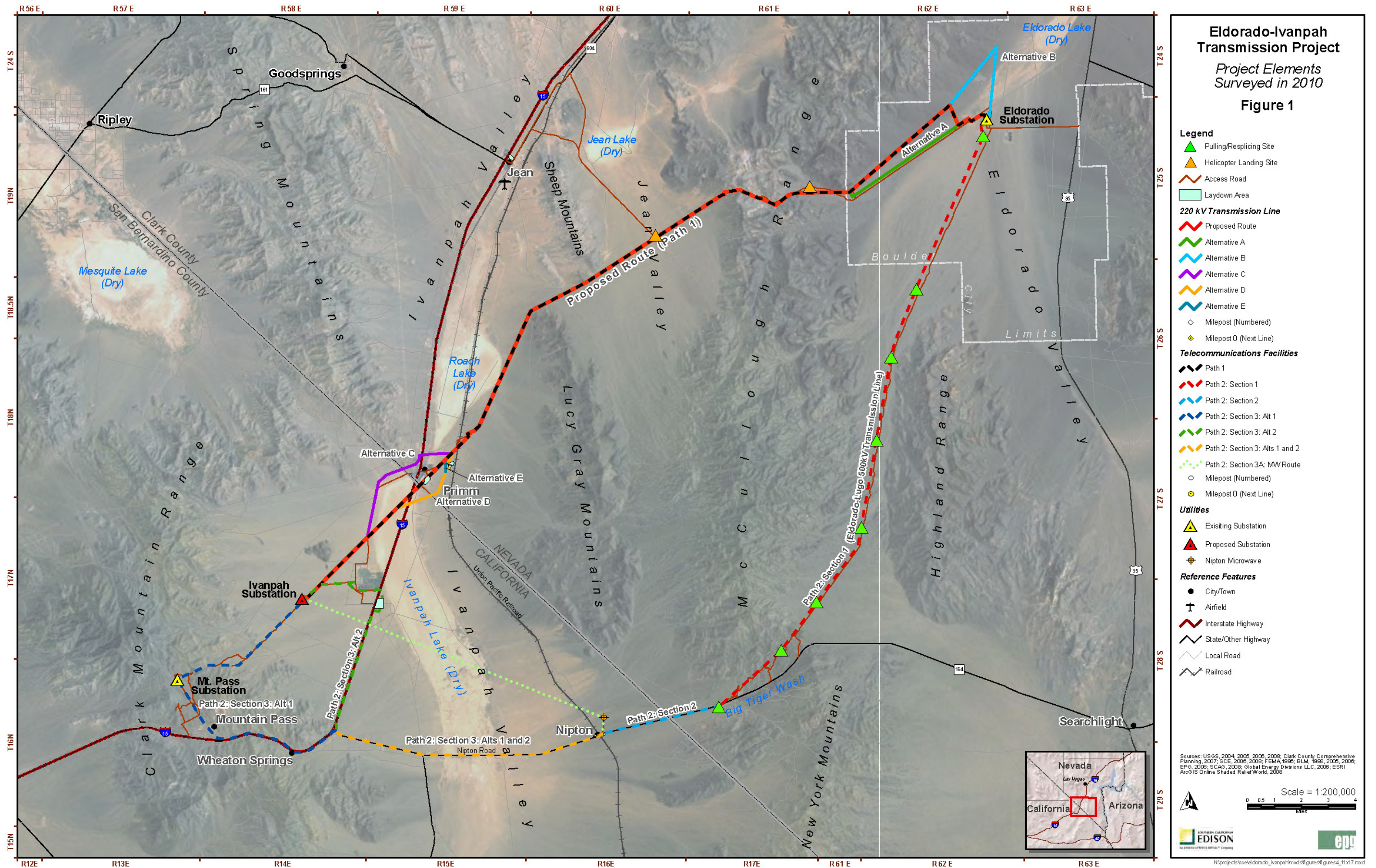


Figure 1 Project Elements Surveyed in 2010

30-foot-wide Zone of Influence (ZOI) transects were walked on both sides of the right-of-way (access roads in 2010) at 100, 300, 600, 1,200, and 2,400 feet from the outer edges of the right-of-way. The rare exceptions to this, were those areas where no tortoise habitat existed (e.g., on the Primm golf course and on paved roads).

On all transects, all tortoise sign (e.g., individual animals, dens, burrows, scats, tracks, pellets, and skeletal remains) observed was measured, mapped, and described relative to condition, size, and (where applicable) gender. Current and recent weather conditions were recorded to identify the potential for tortoise activity. Topography, drainage patterns, soils, substrates, plant cover, anthropogenic disturbances, and aspect-dominant, common, and occasional plant species were described and mapped. Mapping sign and habitat features was achieved using Global Positioning System (GPS) units. All transect Data were recorded on specially-designed forms (Appendix 2). Every mile of right of way was photographed as were ZOI transects, lay down areas, helicopter landing zones, minor access roads, and splicing tower sites.

In 2008, six very experienced surveyors conducted the surveys. Each had between 6 and 30 years experience searching for and studying tortoises on many types of surveys including tortoise mark-recapture plots, telemetry studies, behavioral studies and linear surveys. EPG also supplied three biologists who were familiar with conducting field surveys and knew many of the species. The less experienced surveyors were familiarized with Desert Tortoise sign and only walked the right-of-way initially to learn about tortoises and where to look for sign. In the right-of-way, they were always adjacent to experienced surveyors. Inexperienced personnel conducted some ZOI transects after the initial learning period, but their transects were always adjacent to those of more experienced surveyors.

In 2009, ten people walked the surveys, eight of whom were very experienced as identified above. Of the remaining two surveyors, one had a year's experience, on this project in 2008 as well as several other tortoise projects and the other was an experienced field geologist who had been conducting tortoise surveys with the experienced crew throughout the spring.

In 2010, five highly experienced people (Appendix 3), all of whom also worked in 2008 or 2009 or both, conducted surveys on the various elements of the project.

In 2008, the weather was clear, warm, and calm during the surveys with maximum daily air temperatures of approximately 100 degrees Fahrenheit. In May 2009 similar conditions occurred with daily air temperature maxima between 87 degrees Fahrenheit and 104 degrees Fahrenheit. In the fall of 2009, daily maximum air temperatures were 64 to 85 degrees Fahrenheit, with overnight lows of 44 to 54 degrees Fahrenheit. In early April 2010, temperatures ranged between 39 degrees Fahrenheit in the early morning and 84 degrees Fahrenheit in the afternoon. Most mornings were warmer than 39 degrees Fahrenheit and most afternoons were cooler than 84 degrees Fahrenheit. In 2010, winds were generally light and variable, below 10 mph but gusted between 15 and 35 mph on April 5 and between 10 and 30 mph on April 4.

Because of the variety of elements surveyed, variations in the above methods were applied to ensure a comprehensive survey. Each is described below; also, see Figure 1.

## **Eldorado-Lugo Transmission Line**

**Survey Element A** – Two 30-foot-wide transects were walked on both sides along the entire length of the line from Nipton Road to the Eldorado Substation. Subcomponents surveyed along the Eldorado-Lugo transmission line included:

**Survey Elements K, L, M, and Q** – Possible access road alternatives near Nipton Road. Element Q is a “Y” at the north end of the Eldorado-Lugo transmission line that was added to the survey inventory in the field. Access road surveys consisted of two 30-foot-wide transects on each side of each road.

**Survey Elements R through Y** – Eight paired pulling/splicing sites located at specific towers along the Eldorado-Lugo transmission line.

## **Access Roads**

**Survey Element B – Primm Access Road Alternative** – The Primm access road alternative runs along the west side and north of the golf course at Primm. The road was surveyed using Zone of Influence (ZOI) transects except where ZOIs were previously done in 2009 or on the golf course side of the road. One hundred percent surveys were conducted at 60 feet on either side of the road, except on the golf course.

**Survey Element C – Jean Access Roads Alternatives** – One hundred percent surveys were conducted on both sides of the Jean access road alternatives and ZOI surveys were conducted beyond that.

**Survey Element D – Highway 95 to Eldorado Substation** – One hundred percent surveys were conducted within 60 feet of either side of the road with ZOI transects beyond that.

## **Helicopter Landing Zones**

**Survey Elements E and F** – helicopter landing zone E is in the Ivanpah Valley and landing zone F is in the McCullough Range (Figure 1). One hundred percent coverage was done on each helicopter landing pad with no ZOI transects. Landing Zone E is 150 m x 150 m and landing zone F is 213 m x 71 m

## **Laydown Areas**

**Survey Element G – Nipton Laydown Area** – The Nipton laydown area is approximately 224 m by 80 m. The site is highly disturbed with minimal Desert Tortoise habitat elements. One hundred percent survey coverage was not done on this site.

**Survey Element H – Yates Well Road Laydown Area** – The Yates Well Road laydown area is south of Primm and the Primm golf course in California. The site is 548 m by 621 m and currently sports a number of disturbances including roads, a bridge, construction fencing, and

other fencing. There are some elements of tortoise habitat on the site and a one hundred percent clearance was done on the site.

**Survey Element I – Primm Laydown Areas** – There are four potential laydown areas near Primm; Primm 3-north, Primm 3-south and Primm 4 and Primm 5 (Figure 1). All four sites are highly disturbed with very few Desert Tortoise habitat elements. The sites were perused, but one hundred percent surveys were not done on any of them owing to the level of existing disturbance.

**Survey Element J – Jean Laydown Area** – The Jean laydown area (Figure 1) is essentially denuded with no Desert Tortoise habitat. This site was perused, but no tortoise surveys were undertaken.

## **SURVEY RESULTS**

### **Eldorado-Lugo Transmission Line**

Only four sign, two burrows and two carcasses, were found along the Eldorado-Lugo transmission line (Figure 2 – Panels A and B; Appendix 1). The two burrows were located in the vicinity of Milepost 6 in the Eldorado Valley. One carcass was found between Mileposts 8 and 9, also in the Eldorado Valley. The second carcass was found near Milepost 24 at the south end of the McCullough Range.

### **Primm Access Road Alternative**

A single tortoise burrow was found on the Primm access road alternative. The burrow was north and west of the Primm Golf Course (Figure 3; Appendix 1).

### **Jean Access Roads Alternatives**

One hundred percent surveys of 60 feet on both sides of the Jean access roads coupled with ZOI transects resulted in the discovery of 96 total sign including tortoises, 74 burrows, 10 carcasses, and 2 scat (Figure 4; Appendix A). Tortoise sign density appears to be greatest on the northern access alternative in the vicinity of a small butte (Figure 4) although there is also considerable sign associated with the southern alternative.

### **Highway 95 to Eldorado Substation Access Road**

One hundred percent coverage of 60 feet on either side of the road coupled with ZOI transects resulted in the discovery of 9 burrows and 3 carcasses (Figure 5; Appendix 1).



**Figure 2a Eldorado-Lugo Transmission Line**



## Eldorado-Ivanpah Transmission Project

*Desert Tortoise Sign  
2010 Survey Data*

**Figure 2b**

**Legend**

**Desert Tortoise**

- Tortoise
- Carcass/Shell Part
- Burrow
- Scat
- Courtship Ring
- Track
- Other

**Survey Elements**

- Pulling/Respicing Site
- Helicopter Landing Zone
- Laydown Area
- Access Road

**220kV Transmission Line**

- Proposed Route
- Alternative A
- Alternative B
- Alternative C
- Alternative D
- Alternative E
- ◇ Milepost (Numbered)
- ◇ Milepost 0 (New Line)

**Telecommunications Facilities**

- Path 1
- Path 2: Section 1
- Path 2: Section 2
- Path 2: Section 3: Alt 1
- Path 2: Section 3: Alt 2
- Path 2: Section 3: Alts 1 and 2
- Path 2: Section 3A: Proposed MW Route
- Milepost (Numbered)
- Milepost 0 (New Line)

**Utilities**

- ▲ Existing Substation
- ▲ Proposed Substation
- ⊕ Nipton Microwave

Scale = 1:50,000

Sources: USGS, 2004, 2005, 2006, 2008; Clark County Comprehensive Planning, 2007; SCE, 2006, 2008; FEMA, 1998; BLM, 1998, 2005, 2006; EPG, 2008; SCAQ, 2008; Global Energy Divisions LLC, 2006; ESRI ArcGIS Online Shaded Relief World, 2008

**Figure 3b Eldorado-Lugo Transmission Line**

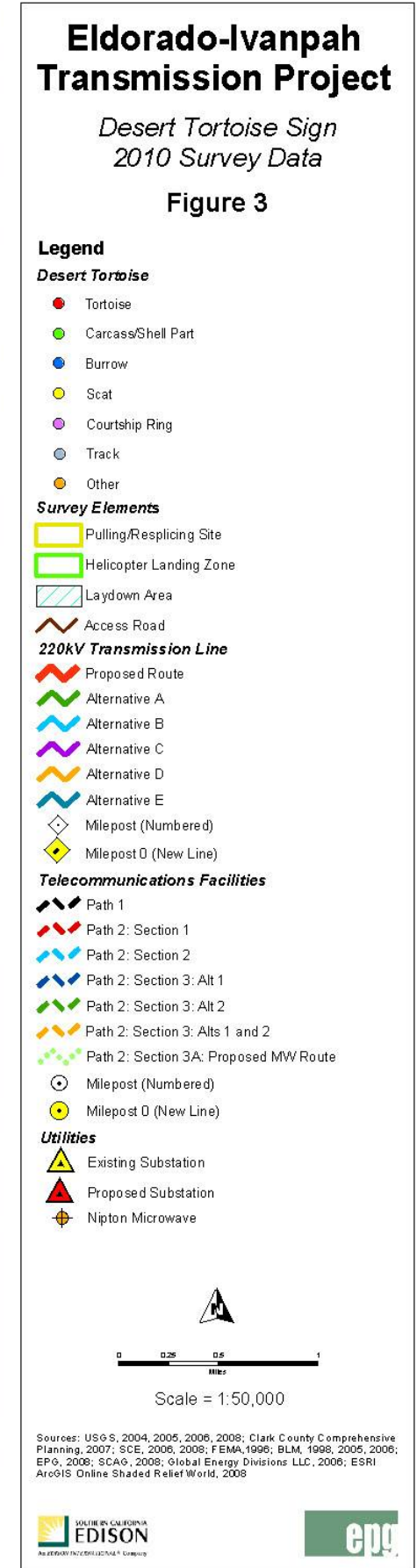


Figure 4 Primm Access Road Alternative



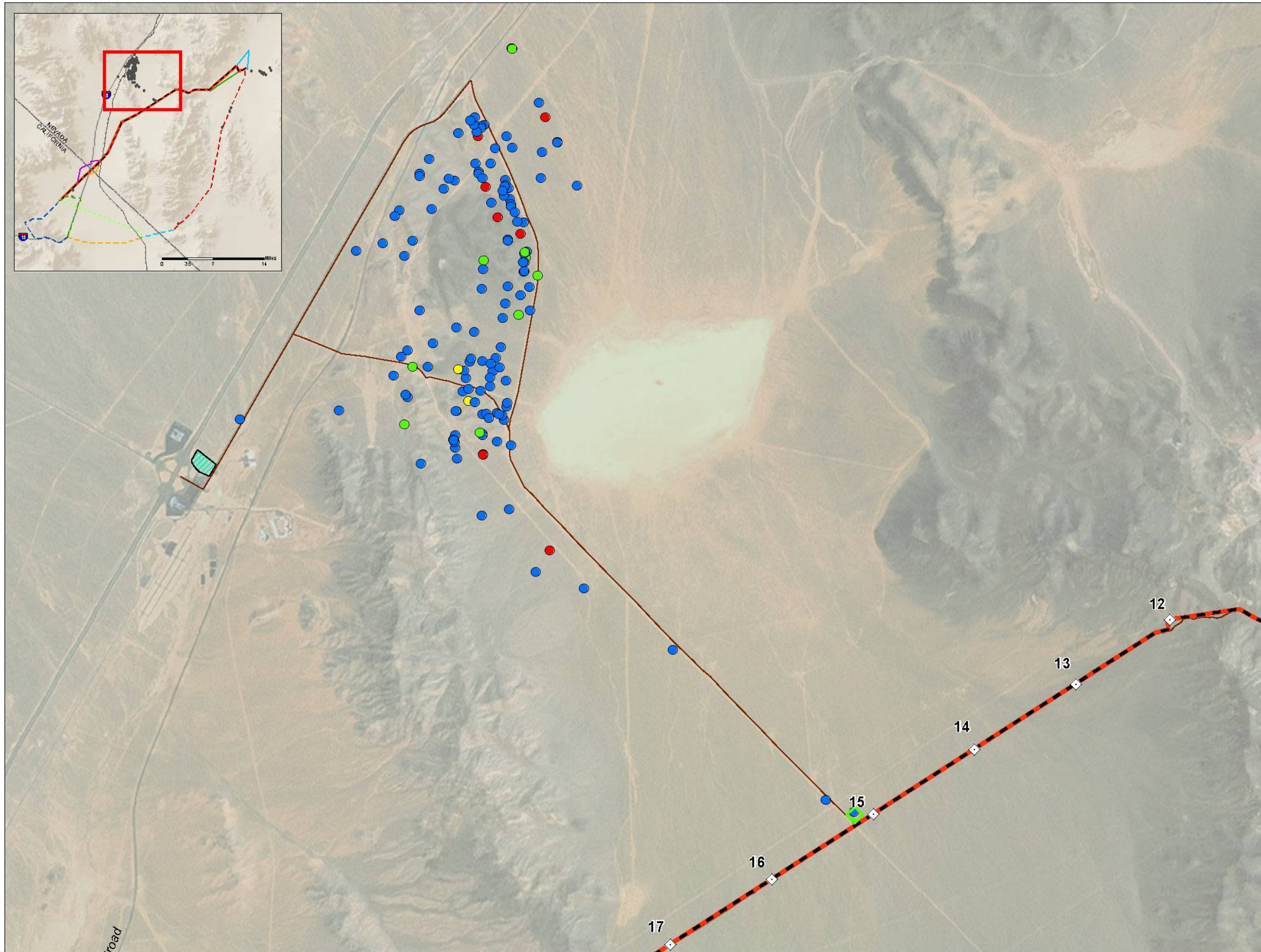


Figure 5 Jean Access Roads

# Eldorado-Ivanpah Transmission Project

Desert Tortoise Sign  
2010 Survey Data

Figure 4



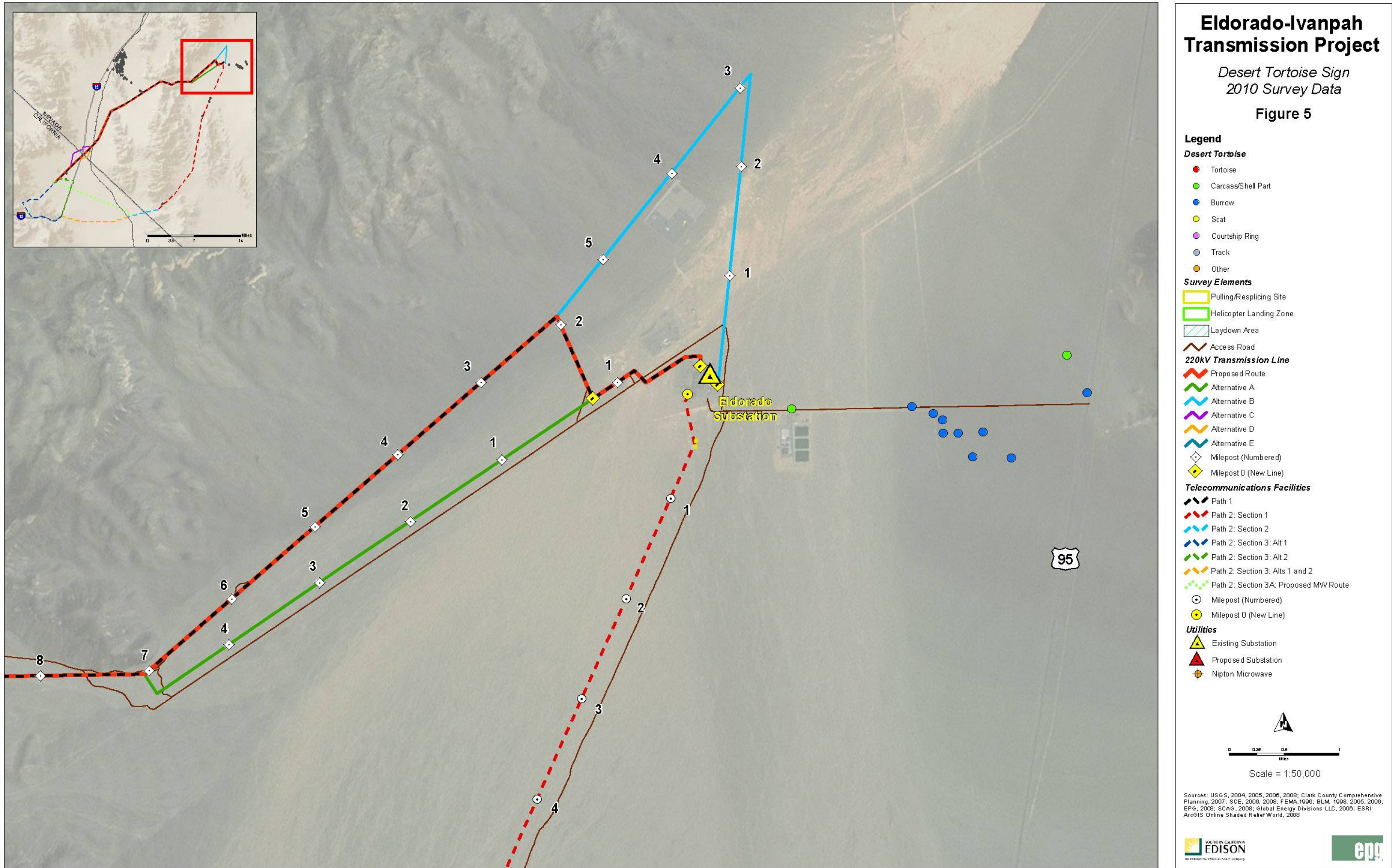


Figure 6 Highway 95 to Eldorado Substation Access Road

## **Helicopter Landing Zones**

One hundred percent surveys of two helicopter landing zones resulted in a single burrow being found on Landing Zone 5.

## **Other Study Elements**

No tortoises or sign thereof were found on any of the other study elements (see Table 1)

## **DISCUSSION AND RECOMMENDATIONS**

### **General Project Impacts**

Based on survey results demonstrating the presence of Desert Tortoises on several project elements it is clear that construction on or utilization of any of the project elements may result in permanent and temporary, as well as direct and minor indirect impacts to the Desert Tortoise. A detailed analysis of impacts and potential mitigation measures is premature at this time because Project design is not finalized. Final project design can be followed by a detailed assessment of the Project's impacts and development of suitable mitigation. However, a preliminary summary of impacts and mitigation is provided here based on what is known about current Project alternatives and reasonable expectations for construction and operation of the project.

The Project will include the following:

- Removal and/or disturbance to an unknown acreage of vegetation for upgrading of access roads; vegetation will also be removed or disturbed at wire splicing sites
- There may be some minor impact to native vegetation, most likely to individual plants, at equipment laydown areas
- Individual plants may also be damaged at helicopter landing sites

In general, direct impacts to Desert Tortoises from construction and operation activities at any of the elements identified in this report would include loss of habitat and could include loss of individual tortoises. Loss of habitat, even in temporarily disturbed areas (i.e., splicing sites) would be considered to be permanent due to the very slow recovery rates of vegetation in Mojave Desert systems. Special habitat resources, such as specific burrowing or nesting sites could be lost, especially in the mountains and associated washes. This largely applies to fossorial species such as the Desert Tortoise, because of site fidelity and unidentified factors that foster continued use of specific sites. While the loss of specialized resources could be biologically important, the loss of generalized foraging and coversite habitat that may be removed is unlikely to create a biologically significant impact. This is because (1) project elements discussed in this report are generally in habitats that have already been disturbed; (2) the loss and/or degradation of habitat is anticipated to be relatively small, and disturbed sites will likely still be usable by Desert Tortoises; (3) there is ample, similar habitat surrounding all project elements; (4) losses associated with utilization of project elements would not block connectivity because of their small size and the amount of suitable habitat surrounding them; and, (5) a habitat restoration plan will be developed for the project.

**Table 1 Eldorado-Ivanpah Transmission Line Project  
Summary of Desert Tortoise Observations  
Spring 2010**

**Eldorado-Lugo Transmission Line**

T – 0  
B – 3  
C – 2  
S – 0  
O – 0

**Helicopter Landing Zone 5**

T – 0  
B – 1  
C – 0  
S – 0  
O – 0

**Primm Access Roads**

T – 0  
B – 1  
C – 0  
S – 0  
O – 0

**Helicopter Landing Zone 3**

No sign

**Nipton Laydown Area**

No Sign

**Yates Well Road Laydown Area**

No Sign

**Jean Access Roads**

T – 10  
B – 142  
C – 10  
S – 2  
O – 0

**Primm Laydown Areas (four sites)**

No Sign

**Jean Laydown Area**

No Sign

**Access Road – Hwy 95 to Eldorado Sub**

T – 0  
B – 8  
C – 3  
S – 0  
O – 0

**Access Roads (K, L, M, Q)**

No Sign

**Towers R through Y**

No Sign

**Key:**

T = Tortoise; B = Burrow; C = Carcass; S = Scat; O = Other (pallets, courtship rings, etc.)

Indirect impacts that could result from activities at project elements could include the introduction and/or spread of exotic plant species. With appropriate mitigation, however, indirect impacts are likely to be negligible. Since there is an existing 115kV transmission line, upgrading the transmission line would not create a new feature in the environment that would attract tortoise predators, specifically Common Ravens (*Corvus corax*). Also, there are existing recreational routes throughout the project area, so new recreational access would not be provided by project elements.

During project operation, direct impacts could include the loss of individuals as a result of vehicle collisions during routine maintenance activities.

### **Desert Tortoise Population Impacts**

Some Project elements intersect areas targeted by the USFWS for Desert Tortoise recovery (Eldorado-Lugo transmission line) intersect the Ivanpah and Piute-Eldorado Desert Tortoise Wildlife Management Area (DWMA), see Figure 7. DWMA, established by the land management agencies to receive reserve-level management, were recommended by the 1994 Desert Tortoise Recovery Plan (USFWS 1994) to promote Desert Tortoise recovery. BLM's Northern and Eastern Mojave (NEMO) Plan (BLM 2002), the planning area of which encompasses the California portion of the project, and the Las Vegas BLM District provide a Desert Tortoise conservation strategy that focuses on tortoises inside DWMA. For the NEMO planning area, there are no specific management prescriptions for lands outside DWMA, where all habitats are considered to be Category III, the least important Desert Tortoise habitat category (BLM 1988).

The Eldorado-Lugo transmission line also intersects designated Desert Tortoise Critical Habitat (Figure 8). Highway 95, associated with the Highway 95 to Eldorado Substation access road element of this report forms the western boundary of designated Critical Habitat east of the Eldorado Substation (i.e., this access road is not in designated Critical Habitat [Figure 8]). Desert Tortoise Critical Habitat encompasses those habitats that are deemed essential for tortoise conservation; the federal designation of Critical Habitat affords legal protection to those habitats.

### **Recommended Mitigation**

A mitigation and monitoring plan, to be approved by all of the relevant resource agencies, must be developed to minimize project effects on Desert Tortoises and other biological resources. The USFWS protocol survey results will provide an important data set for this plan because they identify the distribution of tortoises and areas of tortoise concentration. The level of construction monitoring and mitigation in those areas will be directed by these data. The NEMO plan also lists several standard mitigation measures for work in Desert Tortoise habitat that must be incorporated into the construction monitoring plan.

The following are recommendations that have been accepted by resource agencies for similar projects, have been shown to be successful, and should be incorporated into the Project mitigation and monitoring plan.

### **Onsite Mitigation – General Measures**

**Minimization of Habitat Degradation.** In general, disruption of ecological processes should be minimized to the extent practicable. For construction of linear facilities, including access roads stub roads, habitat degradation should be limited to essential areas only. Where practical, previously disturbed areas should be used for construction staging, laydown and parking areas, and driving.

All construction support facilities should be delineated in the field and shown on a project location plan.

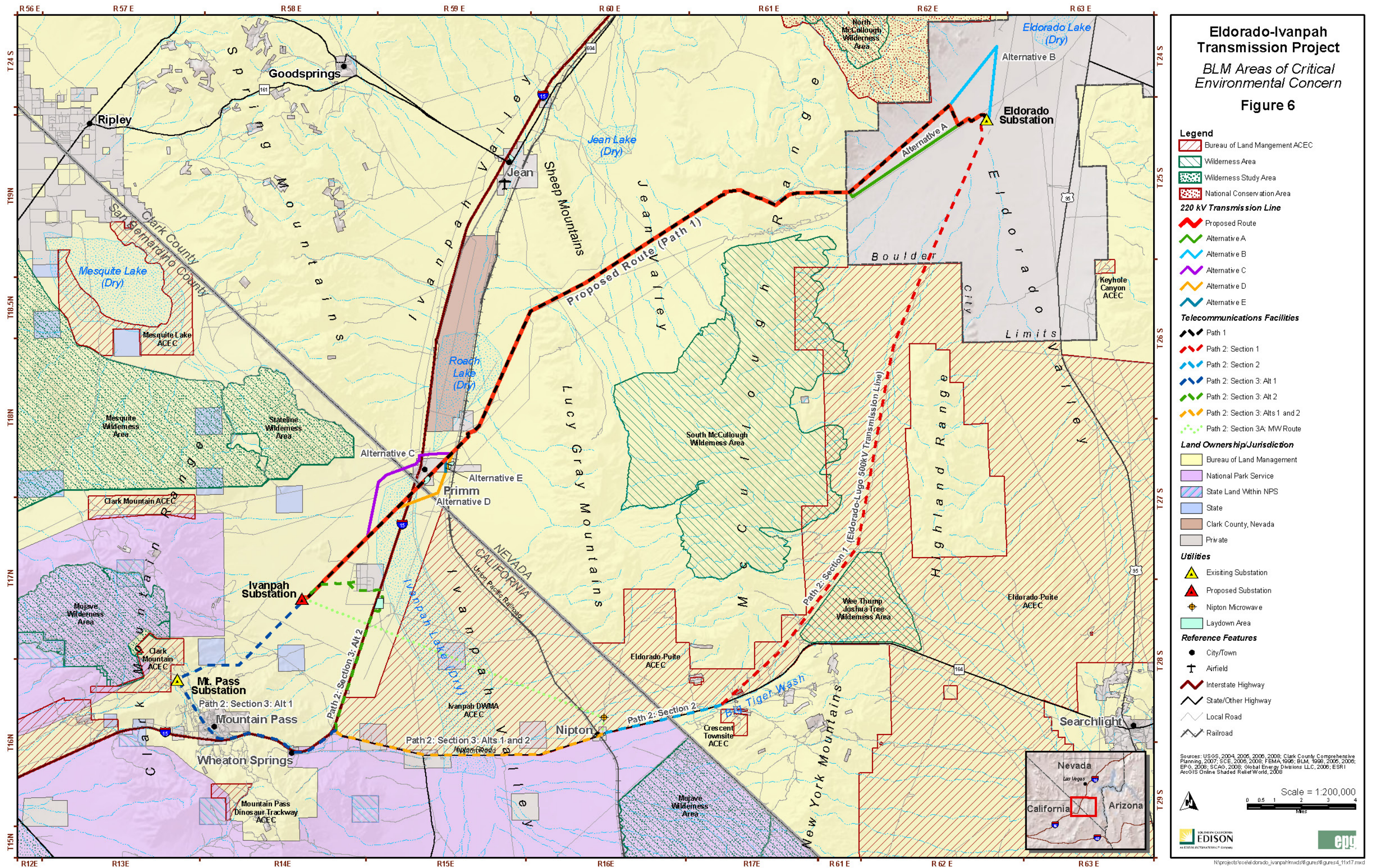
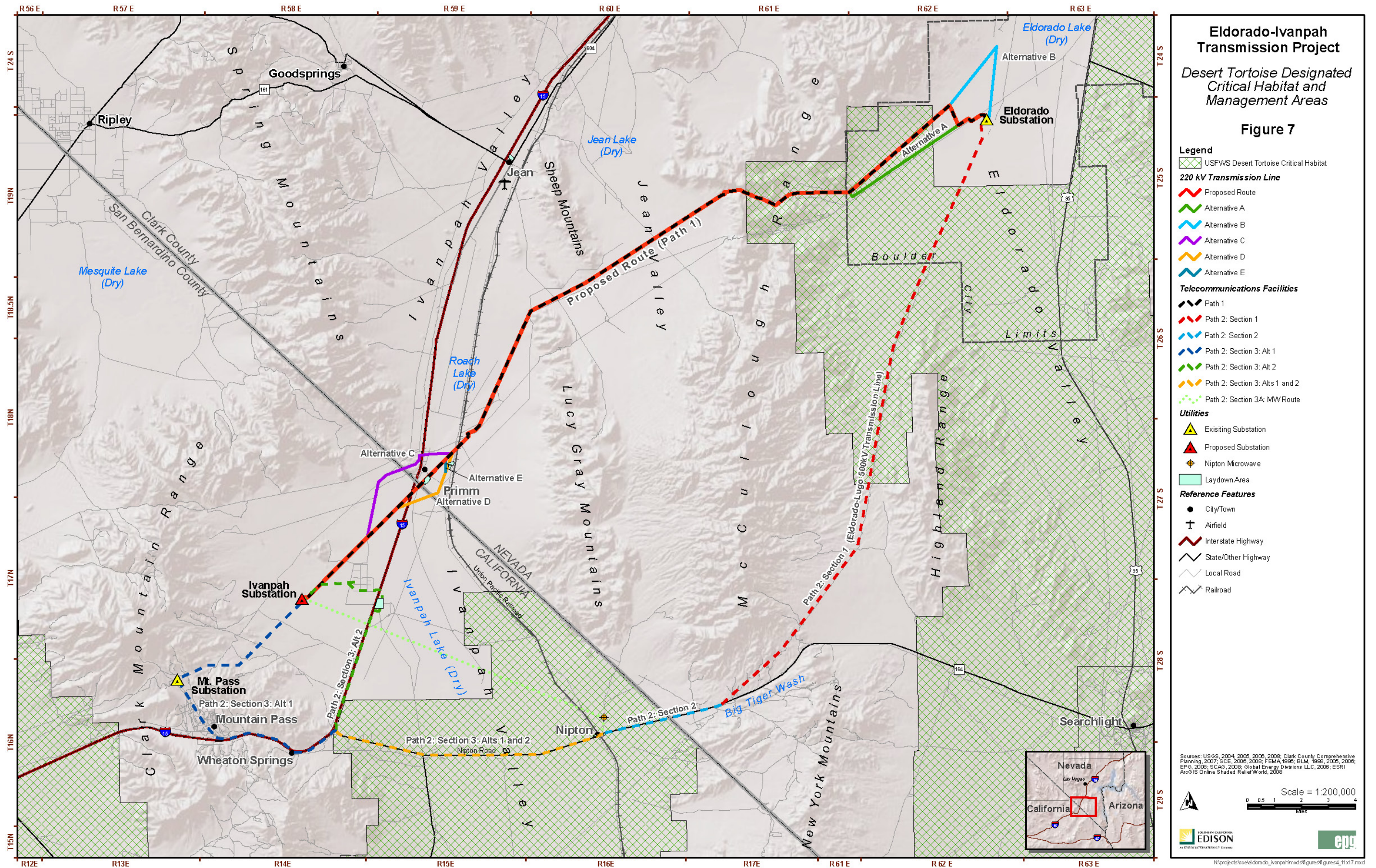


Figure 7 Desert Tortoise Population Impacts



**Figure 8 Designated Desert Tortoise Critical Habitat and Management Areas**



**Avoidance.** Avoidance of biological resources through appropriate seasonal construction restrictions and pre-construction surveys will help minimize impacts. To minimize construction-related mortality of nocturnal species (e.g., snakes), it is recommended that all construction activities be conducted during daylight hours to the extent feasible.

**Construction and Operations-related Environmental Protection.** Prior to the start of construction, all activities, contingencies, and environmental protection measures related to construction and operation must be detailed relative to environmental protection. Issues addressed should include, but not be limited to, pre-construction clearance and species presence surveys, biological monitoring, designated working areas and equipment storage, stream protection, equipment maintenance and cleaning, fueling and accidental fuel spills, and removal of hazardous waste and construction-related materials.

**Designation of a Project Biologist.** A Project biologist should be assigned to ensure successful monitoring of construction activities and successful mitigation implementation, and to implement the worker education program. The Project biologist would be approved by the resource agencies and would be responsible for approving biological monitors. The Project biologist would work with the construction supervisor and the Project environmental compliance coordinator and would have the authority to halt construction to ensure successful mitigation. Finally, the Project biologist would be responsible for progress and other reports to the agencies.

**Raven Monitoring and Control Plan.** In order to monitor the effectiveness of Project Design Features (PDFs) to minimize the attractiveness of Common Ravens to the Project, a monitoring plan should be developed. This plan would also address measures for control, collaboration with the USFWS range-wide raven control program (USFWS 2008), and adaptive management.

**Weed Control.** A weed control program should be developed that delineates methods to monitor and minimize the introduction and/or spread of weeds and methods for weed eradication, should populations increase in response to the project.

**Restoration.** For all temporary surface disturbance areas, including those external to the Project due to erosion or other project factors, a restoration program should be implemented to reclaim temporarily disturbed habitats as close to pre-disturbance conditions as possible. The restoration program would include relevant techniques, principles, and success standards in the context of desert restoration. The NEMO Plan (BLM 2002) also provides guidance for site rehabilitation and rehabilitation credits.

**Worker Environmental Awareness Program (WEAP).** A WEAP will be developed to ensure that project construction and operation occur within a framework of safeguarding environmentally sensitive resources. Although facility construction has the greatest potential to harm environmental resources, the WEAP will also address those environmental issues that pertain to Project operations such as general conduct, repairs, and maintenance.

**Reporting.** During construction, the Project biologist will provide progress reports to relevant agencies to describe the extent of construction, mitigation measures implemented, mitigation success or difficulties, and suggestions. Any harassment or mortality of listed species, with suggestions for mitigation improvement, would be documented.

**Adaptive Management.** When data show that alterations in the PDFs and mitigation measures are required to adequately protect wildlife and habitats, then these should be analyzed with the resource agencies and changes implemented, as feasible.

### **Onsite Mitigation – Desert Tortoise-specific Measures**

To minimize direct and indirect impacts to Desert Tortoise from the Project, a detailed suite of measures in addition to those outlined above must be developed and incorporated into the mitigation and monitoring plans prior to construction. The most important onsite protection measure for Desert Tortoises is a thorough construction-associated clearance and monitoring program that minimizes tortoise injuries and loss. This program will include, at a minimum:

- pre-construction surveys
- clearance surveys
- adequate monitoring of construction and maintenance activities in unfenced habitat
- relocation/translocation plan
- methods to accommodate routine maintenance and repair activities

### **Offsite Habitat Compensation**

Onsite mitigation will strongly assist in species protection. Offsite mitigation (habitat compensation) will fully mitigate for Project-associated direct and indirect impacts to Desert Tortoise and other special status species. All compensation should be scientifically supportable and based upon species impacts, Project locations, and direct as well as indirect impacts. Habitat for compensation should be acquired based on wildlife and plant values that are specifically impacted and the quality and conservation value afforded by the compensation lands. Habitat enhancement for compensations lands should be considered when analyzing compensation acreage.

Compensation ratios will be agreed upon in consultation with the resource agencies. The NEMO plan (2002) requires habitat compensation inside DWMA's and designated Critical Habitat at a 5:1 ration; habitat compensation for Category III habitat is 1:1 (BLM 2002).

## LITERATURE CITED

- EPG, Inc. 2008. Eldorado-Ivanpah Transmission Project: Biological Technical Report. Prepared for Southern California Edison. 57 pp., plus appendices.\
- Karl, A.E. 2010. Southern California Edison Eldorado-Ivanpah transmission line project Desert Tortoise surveys. Report submitted to EPG. 24 pp., plus attachments
- United States Department of the Interior, Bureau of Land Management. 1988. Desert Tortoise Management on the Public Lands: A Rangelwide Plan. Unpublished. 24 pp.
- \_\_\_\_\_ 2002. Final Environmental Impact Statement. Final California Desert Conservation Area Plan Amendments for the Northern and Eastern Mojave Planning Area. California Desert District, Riverside, CA.
- United States Fish and Wildlife Service (USFWS). 1992. Field Survey Protocol for any Federal Action that May Occur within the Range of the Desert Tortoise.
- \_\_\_\_\_ 1994. Desert Tortoise (Mojave population) Recovery Plan. Portland, Oregon. 73 pp., plus appendices.
- \_\_\_\_\_ 2008. Environmental assessment to implement a Desert Tortoise Recovery Plan Task: reduce common raven predation on the desert tortoise. 156 pp.
- \_\_\_\_\_ 2009. Preparing for any action that may occur within the range of the Mojave Desert Tortoise (*Gopherus agassizi*). April 2009. 16 pp.

**Appendix 1: Eldorado-Ivanpah Transmission Project  
Results of 2010 Desert Tortoise Surveys**

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**ELDORADO-IVANPAH TRANSMISSION LINE PROJECT  
RESULTS OF 2010 DESERT TORTOISE SURVEYS**

<b>Project Element</b>	<b>Easting<sup>1</sup></b>	<b>Northing</b>	<b>Sign Type</b>	<b>Class<sup>2</sup></b>	<b>Width/Size<sup>3</sup></b>	<b>Surveyor's Additional Notes</b>
<b>Eldorado-Lugo</b>	676527	3953966	Burrow	6	340	Possibly a caved in ground squirrel burrow <sup>4</sup>
	676511	3953986	Burrow	3	340	Possibly a caved in ground squirrel burrow <sup>4</sup>
	676462	3953878	Burrow	3	340	Possibly a caved in ground squirrel burrow <sup>4</sup>
	676537	3953966	Burrow	2	120	Has tortoise roof for 15 cm before it curves out of sight
	676817	3954751	Burrow	2	320	Cannot see back
	674980	3950497	Carcass Parts	3	Adult	Near berm
	665193	3929171	Carcass Parts	>4	Adult	2 m from road
<b>Primm Access Road</b>	642046	3963589	Burrow	4	205	Possible tortoise O.K. shape but old, unsure of current use
<b>Jean Access Roads</b>	654899	3962031	Burrow	3	260	Under white bursage at base of limestone mountain
	654941	3962208	Burrow	3	210	Under creosote bush
	654991	3962423	Burrow	3	305	Under creosote bush
	655055	3962826	Burrow	2/3	315	In open on sand, silt, gravel flat
	655158	3963402	Burrow	2/3	290	Under creosote bush
	655175	3963665	Burrow	2	465	Under white bursage
	655181	3963782	Carcass	>4	Adult	On side of cobble hill
	654795	3964850	Burrows	3	360, 290	In silt/gravel on slope of hill
	655454	3961648	Burrow/Pallet	2/3	210	In the side of a runnel under creosote bush
	655423	3962357	Burrow	2	210	Under white bursage – scat in back
	655139	3962037	Burrow	3	285	Under creosote bush on hillside
	654237	2962357	Carcass	4	Adult	Large piece of bone with scute attached
	655565	3965285	Burrow	2	210	Burrow has loose, flat, clean floor
	655484	3965439	Burrow	3	290	2 beer cans removed
	655943	3964883	Burrows	3	340	Second burrow is also class 3, not measured
	655557	3966614	Burrow	3	330	Old carcass 5 m away (see next entry)
	655560	3966610	Carcass	2/3	140	Very little peeling of scutes
	655917	3965889	Burrow	3/4	300	Formerly tortoise – something else has moved in
	655999	3965691	Tortoise	Adult	240♂	Foraging, dirt on back of shell
	656165	3965361	Tortoise	Adult	230♂	Dirt on back

**ELDORADO-IVANPAH TRANSMISSION LINE PROJECT  
RESULTS OF 2010 DESERT TORTOISE SURVEYS**

<b>Project Element</b>	<b>Easting<sup>1</sup></b>	<b>Northing</b>	<b>Sign Type</b>	<b>Class<sup>2</sup></b>	<b>Width/Size<sup>3</sup></b>	<b>Surveyor's Additional Notes</b>
	656162	3965356	Burrow	1	280	6 m from tortoise listed above
	656213	3963210	Burrows	2	300	Second burrow not measured
	656429	3964778	Burrow	2	230	Clean flat floor
	655544	2961312	Burrow	5	280	Shallow, not active, in road berm
	655350	3961361	Burrow	6	200	Nice shape, but deteriorated
	655166	3961457	Burrow	2	300	
	655154	3961444	Burrow	3	210	
	655172	3961187	Burrow	1	310	Freshly disturbed, shallow, tracks present
	655174	3961185	Tortoise	Adult	225♀	Out walking, evidence of old healed(crushing) trauma
	655516	3960457	Burrow	2	310	Rocky gravel surface, fresh digging inside burrow
	656063	3959911	Tortoise	Adult	295♀	Sunning, resting on mound of burrow
	656519	3959398	Burrow	3	200	
	655874	3959817	Burrow	3	290	Old scat near burrow mound
	655154	3960376	Burrow	2	270	Excellent condition <i>Schismus</i> on mound, burrow is fresh
	654346	3961063	Burrow	3	260	Good condition, but not recently used
	654825	3961130	Burrow	2	290	Fresh inside, dirt bike track within 1 m
	654803	3961278	Burrow	5	250	Collapsed in front
	654795	3961353	Burrow	2	300	Some disturbed soil
	654799	3961441	Burrow	3	200	No recently disturbed
	659764	3956570	Burrow	3	270	Old, may be being used by another species, classic form
	657705	3958582	Burrow	4	210	Classic shape, presently being used by some other species
	655381	3951726	Burrow	2/3	280	Under creosote bush
	654977	3962065	Burrows	3	290, 200	Under creosote bush on slope of limestone hill
	654432	3962357	Burrow	3	275	Under white bursage on slope of gravel/cobble hill
	654080	3962497	Burrow	3	260	In open in silty, sand, gravel soil
	655263	3962214	Burrow	2/3	260	Under creosote bush on silt/sand, gravel flats
	654921	3962304	Burrow	2	290	Under creosote bush on silt/sand, gravel flats
	654839	3962325	Scat	TYI	35 x 10	On flats near wash

**ELDORADO-IVANPAH TRANSMISSION LINE PROJECT  
RESULTS OF 2010 DESERT TORTOISE SURVEYS**

<b>Project Element</b>	<b>Easting<sup>1</sup></b>	<b>Northing</b>	<b>Sign Type</b>	<b>Class<sup>2</sup></b>	<b>Width/Size<sup>3</sup></b>	<b>Surveyor's Additional Notes</b>
	654169	3962576	Burrow	3	260	Under creosote bush silt/sand, gravel – scats in back
	653978	3962241	Burrow	3	155	Under creosote bush, nice shape, not used this season
	654978	3961901	Scat	TYII		Also rock burrow with scat just up the hill
	655066	3961885	Burrow	1	450	Cave with scat, cannot see very far back
	655212	3961729	Burrow	2	320	Rock top, in soil of wash bank
	655250	3961671	Burrow	1		Rock top, soil bottom, ♀ tortoise basking nearby
	654502	3962669	Burrow	3	290	In open on top of silty-limestone cobble hill
	655012	3962468	Burrow	2/3	170	Under white bursage on silt/sand, gravel flat
	655167	3962433	Burrow	2/3	175	In open on silt/sand, gravel flat
	655276	3962404	Burrow	2/3	280	Under creosote bush on silt/sand, gravel flat
	655395	3962349	Burrow	2	165	In runnel bank – silt/sand/gravel – tracks also present
	655134	3961481	Carcass	<1	117	
	654813	3961766	Carcass	>4	Adult	Disarticulated
	654809	3961763	Burrow	2	245	3 scat in tunnel
	654161	3961955	Burrow	2	290	>10 scat inside tunnel TYI and TYII
	654143	3961988	Burrow	2	275	TYI and TYII inside – nice
	654819	3962884	Burrow	2/3	340	Limestone/conglomerate/caliche burrow with scats in bank
	654326	3963113	Burrow	2	305	Under creosote bush near top of hill
	653253	3961775	Burrow	2	320	Nice, clean, tracks
	654125	3961590	Carcass	>4	Adult	Disarticulated
	654777	3961385	Burrow	2	260	Nice – creosote bush
	654781	3961380	Burrow	2	250	<i>Ephedra nevadensis</i>
	651931	3961658	Burrow	2	215	5 scat outside and at least 6 inside burrow
	655066	3965697	Burrow	3	245	
	655004	3965653	Burrow	3	240	Entrance dug out by canid
	654845	3965485	Burrow	3	260	Hill top
	654450	3965137	Burrow	2	290	Nice – floor recently flattened out – pallet
	654329	3964944	Burrow	2	290	Under white bursage, freshly cleaned out

**ELDORADO-IVANPAH TRANSMISSION LINE PROJECT  
RESULTS OF 2010 DESERT TORTOISE SURVEYS**

<b>Project Element</b>	<b>Easting<sup>1</sup></b>	<b>Northing</b>	<b>Sign Type</b>	<b>Class<sup>2</sup></b>	<b>Width/Size<sup>3</sup></b>	<b>Surveyor's Additional Notes</b>
	654324	3964907	Burrow	1	290	Tracks, freshly cleaned, can't see back
	654056	3964449	Burrow	3	310	Nice tunnel, entrance collapsed
	653993	3964371	Burrow	3	300	<i>Schismus</i> and California brome growing in entrance
	653831	3964007	Burrow	2	280	Under creosote bush, nice – no recent activity
	653748	3963907	Burrow	3	290	Nice shape, winter-spring annuals growing in entrance
	654121	3963838	Burrow	3	290	Not used this spring, nice tunnel, annuals in entrance
	654230	3964042	Burrow	3	115	Nice tunnel – can't see back, entrance a little collapsed
	654485	3964466	Burrow	3	250	Nice tunnel
	654645	3964734	Burrow	3	350	NTY scat in burrow, <i>Schismus</i> growing
	654715	3964870	Burrow	3	310	NTY scat in tunnel, apron need cleaning
	655897	3963575	Carcass Parts	1	Adult♀	Next to berm
	655188	3965589	Burrow	2	275	2 other class 3 burrows within 5 m – in open
	655331	3965283	Burrow	3	220	Under creosote bush
	655803	3963109	Burrow	3	260	Under creosote bush
	655146	3965574	Burrow	2	290	In open sand/silt/gravel flat
	655469	3965855	Burrow	3	280	Under creosote bush, scats also present
	655478	3964789	Burrow	3	260	In open on sand/silt/gravel flat
	655515	3964743	Burrow	3	305	Under creosote bush – 9 scat inside burrow opening
	655713	3964290	Burrow	2	290	On bottom of hill slope 8(?) scats in back
	655788	3963425	Burrow	3	240	Under creosote bush next to OHV road
	655483	3961825	Burrow	3	215	In open on silty, sandy, gravel flat
	655144	3965553	Burrow	3	210	Under creosote bush
	655458	3964775	Burrow	2	280	Under creosote bush on flats, nice!
	655525	3964599	Burrow	1	380	Includes tortoise under creosote bush on flats
	655547	3964530	Burrow	3	310	Under creosote bush at toe of hill
	655574	3964500	Burrow	2	350	Under creosote bush at toe of hill
	655596	3964423	Burrows	2	320, 270	Class 3 burrow 2 m away, 8 scats inside, at toe of hill
	655626	3964296	Burrows	3	220	Two burrows 0.5 m apart in open on hill/slope



**ELDORADO-IVANPAH TRANSMISSION LINE PROJECT  
RESULTS OF 2010 DESERT TORTOISE SURVEYS**

<b>Project Element</b>	<b>Easting<sup>1</sup></b>	<b>Northing</b>	<b>Sign Type</b>	<b>Class<sup>2</sup></b>	<b>Width/Size<sup>3</sup></b>	<b>Surveyor's Additional Notes</b>
	6659961	3964266	Burrow	2	310	In open on hill slope, scat in back
	655753	3963895	Burrows	2/3	285, 220	Under creosote bush on flats
	655739	3963812	Carcass Parts	2	Adult	In the open on flats between hills
	655718	3963628	Burrow	2/3	321	Under creosote bush at toe of hill
	655494	3961875	Burrow	2	285	Under creosote bush on silty, gravel flats
	655414	3961624	Burrow	2	210	Under creosote bush on silty, gravel flats
	655360	3961736	Burrow	3	250	Under white bursage on silty, gravel flats
	655480	3962168	Burrow	3	270	Eggshell fragments under creosote bush, sandy, gravel flats
	655648	3963053	Carcass Parts	>4	Adult	In open on gravel, sandy flats
	655675	3963315	Burrow	2/3	190	Under creosote bush on sandy, gravel flats
	655721	3963633	Burrow	2/3	320	Under creosote bush
	655719	3963758	Burrow	3	220	In open, sandy, gravel flats
	655708	3963757	Burrow	2	315	In open, sandy, gravel flats
	655725	3963873	Burrows	3	220, 230	Both under creosote bush on sandy, gravel flats
	655730	3963890	Carcass Parts	>4	Adult	On sandy, gravel flats
	655674	3964135	Tortoise		210♀	Basking near top of gravel/cobble hill
	655452	3964643	Burrows	2/3	320, 290	In runnel bank under creosote bush, both within 5 m
	655433	3964712	Burrow	3	300	Under creosote bush in silty gravels
	655274	3965076	Burrows	2/3	280	Under creosote bush on silt, sand, gravel flat
	655104	3965439	Tortoise		220♀	Burrow 0.1 m away, basking under creosote bush
	655092	3965497	Burrow	2/3	200	In open on silty, sandy, gravel flats
	655058	3965574	Burrow	2/3	295	Under white bursage on silty, sandy, gravel flats
	655070	3965076	Burrow	3	210	Under creosote bush on sandy gravel flat
	655116	3964964	Burrow	2	265	In open on sand, silt, gravel flats
	655167	3964884	Burrow	2	290	In open on gravel silt flats – scat in back
	655206	3964767	Tortoise		280♂	Basking near white bursage, burrow 0.1 m away
	655281	3964553	Burrow	3	200	Under creosote bush on sandy, gravel flats
	655367	3964357	Tortoise		230♀	On top of gravel/cobble hill under white bursage and rock

**ELDORADO-IVANPAH TRANSMISSION LINE PROJECT  
RESULTS OF 2010 DESERT TORTOISE SURVEYS**

<b>Project Element</b>	<b>Easting<sup>1</sup></b>	<b>Northing</b>	<b>Sign Type</b>	<b>Class<sup>2</sup></b>	<b>Width/Size<sup>3</sup></b>	<b>Surveyor's Additional Notes</b>
	655500	3964062	Burrows	2	345, 305	Both in open on gravel/cobble flats between hills
	655504	3964039	Burrow	2	260	Under creosote bush on gravel, sandy flats + scats
	655502	3963432	Burrow	2	480	In open on gravel flats at base of hill
	655465	3963209	Burrow	3	230	In open on silt, sand, gravel flats
	655436	3963006	Burrow	3	200	In open on silty, gravelly flat with scat
	655345	3962476	Burrow	2	210	Under white bursage on silty, gravel flats
	6553000	3962297	Burrow	3	240	Silty, gravel flats: three other class 5 burrows within 2 m
	655265	3962096	Burrow	2	290	Under creosote bush
	655167	3961726	Burrow	2	170	Under creosote bush
<b>Access Road from Highway 95 to Eldorado Substation</b>	684546	3962153	Burrow	5	300	Tunnel beyond entrance totally collapsed
	683978	3962165	Burrows	2	280, 270	
	683553	3962516	Burrow	6	280	Old, probably tortoise
	683767	3962511	Carcass	>4	Adult	Disarticulated, mostly bones
	684137	3962529	Burrow	3	280	
	683544	3962706	Burrow	5	310	Tunnel totally collapsed
	683405	3962794	Burrow	5	270	Mostly collapsed, probably used last year
	685655	3963105	Burrow	3	270	In wash bank
	685364	3963651	Carcass	>4	Adult	Large adult – just bone – 12 to 20 years
	683089	3962898	Burrow	4	290	Looks like a canid dig modified by a tortoise – in berm
	681335	3962861	Carcass	4	Small Adult	15 fragments, some scutes 10 m from berm of road
<b>Helicopter Landing Zone 5</b>	660116	3956411	Burrow	3	190	Annual vegetation growing in entrance, no recent activity
<b>Other Project Elements</b>						

**No tortoises or tortoise sign observed on:**

Helicopter Landing Zone 3; Nipton Laydown Area; Yates Well Road Laydown Area; Primm Laydown Areas E-1, E-2, W-1, or W-2; Jean Laydown Area; Access Roads K, L, M, Q; Tower Sites R – Y

1 – All units are Universal Transverse Mercator North American Datum 83, Zone 11S

2 – See Appendix 2 for a key to sign type

3 – All units are millimeters

**ELDORADO-IVANPAH TRANSMISSION LINE PROJECT  
RESULTS OF 2010 DESERT TORTOISE SURVEYS**

<b>Project Element</b>	<b>Easting<sup>1</sup></b>	<b>Northing</b>	<b>Sign Type</b>	<b>Class<sup>2</sup></b>	<b>Width/Size<sup>3</sup></b>	<b>Surveyor's Additional Notes</b>
4 – These burrows were not included in the total burrow count						

**Appendix 2: Sample Desert Tortoise and  
Special Status Species Form and Key for the  
Eldorado-Ivanpah 2010 Desert Tortoise Surveys**

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**KEY TO SIGN CLASSES**  
**(Alice Karl, 2001)**

**BURROWS**

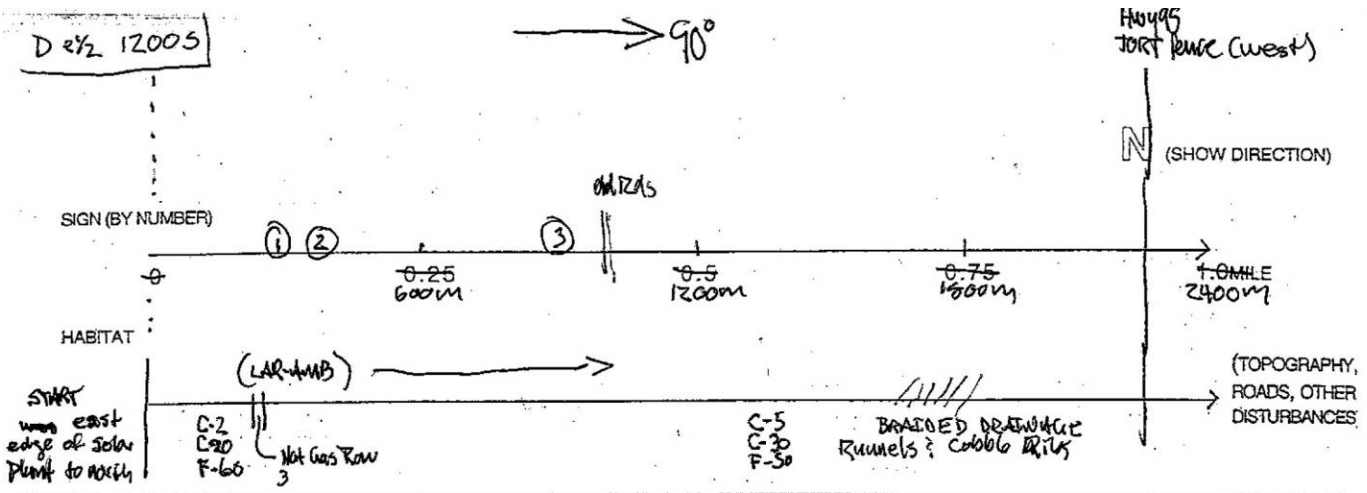
- 1 - DEFINITELY TORTOISE - FRESH (TRACKS, TORTOISE INSIDE, FRESHLY DISTURBED SOIL ON MOUND/RUNWAY)
- 2 - DEFINITELY TORTOISE - USED THIS SEASON (CLEARED OF ANNUALS, BUT NO FRESHLY DISTURBED SOIL)
- 3 - DEFINITELY TORTOISE – NOT USED THIS SEASON (PROBABLY HAS ANNUALS GROWING IN RUNWAY)
- 4 - POSSIBLY TORTOISE – IN GOOD CONDITION BY UNSURE OF SPECIES USING BURROW
- 5 - DEFINITELY TORTOISE – DETERIORATED SUCH THAT IT WOULD REQUIRE SUBSTANTIAL REMODELING TO BE USABLE
- 6 - POSSIBLY TORTOISE – DETERIORATED

**SCAT**

- TY1 - WET OR FRESH, DARK, ODORIFEROUS
- TY2 - DRIED, POSSIBLE GLAZE ON PART; UNEXPOSED SURFACES DARK BROWN; SLIGHT ODOR
- TY3 - DRIED, NO GLAZE; AT LEAST PARTIALLY FADED ON EXTERIOR; VERY SLIGHT ODOR
- NTY3- DRIED, NO GLAZE; AT LEAST PARTIALLY FADED ON EXTERIOR; NO ODOR (DISTINGUISHES FROM TY3)
- NTY4- DRIED, LOOSENING, PALE OR BLEACHED

**CARCASSES – GENERAL INDICATORS FOR TIME SINCE DEATH**

- <1 YR - UNEXPOSED SCUTES NORMAL COLOR AND SHEEN, ADHERE TIGHTLY. EXPOSED SCUTES PALING AND MAY BE LIFTING OR OFF. UNEXPOSED BONE WAXY AND SOLID.
- 1-2 YRS - UNEXPOSED SCUTES NORMAL COLOR WITH SLIGHT SHEEN, MOSTLY TIGHTLY ATTACHED. EXPOSED SCUTES SLIGHTLY PALE WITH NO SHEEN AND NO TO SLIGHT GROWTH RING PEELING. NO ODOR. UNEXPOSED BONE SILKY.
- 2-3 YRS - UNEXPOSED SCUTES PALE AND WITHOUT SHEEN BUT NO GROWTH RING PEELING. EXPOSED SCUTES PALE WITH SLIGHT PEELING. SCUTES LOOSE, OFF AND/OR TIGHT. BONE SUTURES GENERALLY TIGHT.
- 4 YRS - UNEXPOSED SCUTES NORMAL COLOR TO SLIGHTLY PALE, NO SHEEN, NO PEELING. EXPOSED SCUTES LOOSE, PALE, DULL, WITH MODERATE PEELING. SUTURES SEPARATING AND BONE SURFACE IS FISSURED, EDGES ARE ROUGHENED (FISSURED UNDER HAND LENS) AND CHIP FAIRLY EASILY
- >>4 YRS- DISARTICULATED AND DISARTICULATING. BONE EDGES CHIP AND MAY CRUMBLE EASILY. SCUTES ARE PEELING AND CURLED



SIGN #	WAYPOINT	UTM (NAD 83)	DESERT TORTOISE			OTHER SPECIES		
			SIGN TYPE	CLASS	width (sc, bur, tr) MCL (shell, tort)	SPECIES	SIGN TYPE	FURTHER DESCRIPTION
①	SPDTB03	06 83 553 39 62 516	BURROW	6	280			Old probably tortoise
②	SPDTC04	06 83 767 39 62 511	CARCASS	>4	Adult			disarticulated mostly bones
③	SPDTB05	06 84 137 39 62 529	BURROW	3	280			
	L-A		AMM MOMBEI MAL RAE CUM PDC CAM					
	OB OR							

east 1/2

PROJECT ELDORADO-IVANPAH TRANSMISSION PROJECT  
2010 SPECIAL-STATUS SPECIES SURVEYS

Page 1 ✓

DATE 08 April 2010

TIME: Start 14:40  
End 15:45

WEATHER:

	Ta	Tg	Cloud Cover	Wind
Start	26.5	46	Clear	3-5 N
End	26	42	Clear	2-4 W

SURVEYOR: PAUL FRANK  
 PROJECT ELEMENT D  
 MILE OR OTHER DESCRIPTOR east 1/2  
 ROW \_\_\_\_\_  
 ZOI - 1200 SOUTH  
 STARTING UTM 06 83 288 E 39 62 513 N  
 ENDING UTM 06 85 583 E 39 62 567 N  
 (NAD 83)  
 TRANSECT WIDTH 36 FT  
 TRANSECT LENGTH 2290 M

GENERAL SITE DESCRIPTION:

VEGETATION SHRUB LAYER AND BUNCH GRASSES)

Aspect Dominants LARTRI-AMPSDUM

Common Species

Occasional Species OPUBAS, OPACCH, HYSBUL, KRAERE (far east only)

% Cover \_\_\_\_\_ 15%  
Avg. Height of Dominant Shrub Species 1.5, 0.3

UNDERSTORY

Abundant Species MONBEL, ANALS, CHASP, CAMSP, PEC sp, RAFNE D, SCHSP

Exotics (Map concentrations and describe here relative to population size and geographic breadth.)  
SCHSP - starting to come up, BRATOM - not much - some near disturbance

TOPOGRAPHY

Landform BAJADA

Drainage Type one large braided drainage system, funnels

Elevation (state meters or feet) 1810 - 2000 ft.

SUBSTRATE

Color Fines-Brown, CP mostly volcanic gray-purple ish  
Coarse Particles (Type, % Cover) Cobbles 3%, Coarse Gravel 25%, Finegravel 55%  
Soil Texture and Consistence sandy loam with high % of gravel

PRESENCE OF PREDATORS: Ravens - # Detected 2 # Nests \_\_\_\_\_  
Coyotes - # Detected \_\_\_\_\_ Scat? yes - old Scat Piles \_\_\_\_\_

HUMAN-RELATED DISTURBANCES (Onsite and Adjacent)  Hwy 95 at east end - some water borne trash a Natural gas ROW with well maintained rd & 3 pipelines, Old Rd.

SITE PICTURE: Photographer P. Frank

A - Form   
(Describe site pictures)  
A - start (west end) -> 90°  
B - end (east end) -> 270°

### **Appendix 3: Field Personnel for Desert Tortoise Surveys**



## 2010 FIELD PERSONNEL

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- Dave Focardi
- Paul Frank
- Bill Hasskamp
- Mary Ann Hasskamp
- Jenny Weidensee