

APPENDIX H

**2008 Desert Tortoise Survey Report for  
Additional Ivanpah SEGS Action Area**

---

**PRESENCE/ABSENCE SURVEY FOR THE DESERT  
TORTOISE (*Gopherus agassizii*), on the proposed  
IVANPAH SOLAR ELECTRIC GENERATING  
SYSTEM in Ivanpah Valley, San Bernardino County,  
California**

June 2008

Prepared for:

*CH2MHill, Inc.*

West Region, Environmental Services  
2485 Natomas Park Drive, Suite 600  
Sacramento, California 95833

Prepared by:

*Sundance Biology, Inc.*

179 Niblick Rd. PMB 272  
Paso Robles, CA 93446

## **EXECUTIVE SUMMARY**

As recommended in the US Fish and Wildlife Service (USFWS) *Survey Protocol for any Non-Federal Action that may Occur within the Range of the Desert Tortoise, January 1992*, a desert tortoise (*Gopherus agassizii*) presence or absence survey was conducted on 1.6 miles of access road and 13 non-contiguous areas immediately adjacent to the proposed Ivanpah Solar Electric Generating System project site in Ivanpah Valley, San Bernardino County, California. These areas comprise a total of 726 acres all of which could support desert tortoise activity. The access road and 13 areas are additional acreage to the original 3,870 acres surveyed in 2007.

The delineated area was surveyed for desert tortoises and tortoise sign. No Zone of influence (ZOI) transects were conducted, as requested by the proponent, since they were done in 2007 during the survey of the initial 3,870 acres. Three individual tortoises were found onsite, one each in Areas 1, 2, and 13.

# TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>2</b>
<b>INTRODUCTION .....</b>	<b>4</b>
<b>METHODOLOGY .....</b>	<b>4</b>
SURVEY METHODOLOGY .....	4
ZOI TRANSECTS .....	5
DATA RECORDED .....	5
BIOLOGICAL FIELD TEAM.....	5
<b>RESULTS.....</b>	<b>5</b>
SURVEY AREA.....	5
DESERT TORTOISE.....	6
<b>DISCUSSION.....</b>	<b>6</b>
DESERT TORTOISE.....	6
<b>MITIGATION RECOMMENDATIONS.....</b>	<b>7</b>
DESERT TORTOISE.....	7
<b>TABLE 1. DOMINANT PLANT SPECIES.....</b>	<b>9</b>
<b>TABLE 2. DESERT TORTOISE AND SIGN LOCATIONS.....</b>	<b>10</b>
<b>TABLE 3. MAMMAL SPECIES .....</b>	<b>13</b>
<b>TABLE 4. REPTILE SPECIES .....</b>	<b>13</b>
<b>TABLE 5. BIRD SPECIES.....</b>	<b>13</b>
<b>FIGURE 1. IVANPAH SOLAR ELECTRIC GENERATING SYSTEM PROJECT SITE IN IVANPAH VALLEY, CA. ....</b>	<b>14</b>
<b>FIGURE 2. DESERT TORTOISE SURVEY AREA AND SIGN ENCOUNTERED ON THE IVANPAH SOLAR ELECTRIC GENERATING SYSTEM PROJECT SITE IN IVANPAH VALLEY, CA.....</b>	<b>15</b>
<b>FIGURE 3. AREA PHOTOS AND TORTOISE PHOTOS ON THE IVANPAH SOLAR ELECTRIC GENERATING SYSTEM PROJECT SITE IN IVANPAH VALLEY, CA.....</b>	<b>16</b>

## **INTRODUCTION**

This report addresses the results of a presence/absence survey for the desert tortoise on the additional areas of the proposed Ivanpah Solar Electric Generating System in San Bernardino County, California.

The proposed project is located west of Ivanpah Lake bed and U.S. Interstate 15 in Ivanpah Valley, CA approximately 4.5 miles southwest of Primm, NV on the California-Nevada State line where it intersects U.S. Interstate 15. The site includes portions of Sections 20-22, 27-29, 33-34, T17N, R14E and portions of Sections 2, 3, 4, 10, and 11, T16N, R14E, (Ivanpah Lake, CA quadrangle, 7.5 minute series). The elevation of the proposed project site is between 2,750 ft to 3,450 ft above mean sea level (Figure 1).

A total of 726 acres were surveyed for desert tortoises and tortoise sign between May 15 and May 20, 2008. No Zone of influence (ZOI) transects were conducted, as requested by the proponent, since they were done in 2007 during the survey of the initial 3,870 acres. Additionally, all wildlife species and their sign were noted.

## **METHODOLOGY**

### ***Survey Methodology***

The following methodology was used to increase efficiency in determining presence or absence of desert tortoises through systematic search and location of tortoises, their burrows and other sign. This methodology has proven accurate on other large-scale presence/absence surveys.

Teams consisting of two or three experienced desert tortoise biologists conducted the survey between May 20 and May 25, 2008 by walking a set of transects that covered each of the 13 survey areas plus the access road. Transect spacing was at 30 feet between transect centerlines, the standard width for desert tortoise presence/absence surveys.

A set of UTM coordinates for transect endpoints for virtual north-south or east-west transects were calculated. This resulted in 390 transects ranging from 1,000-6,800 feet in length. Lowrance iFinder handheld global positioning system (GPS) units were used to navigate transects.

One member of the team was responsible for navigating the selected transects. The other members surveyed 30 feet to either side of the navigator. When the end of each transect was reached, the team shifted to the adjacent transects and the navigator programmed the beginning and ending point of the team center transect for the next trip.

Team members focused on a search area that included 15 feet on either side of them. The members of the team remained close to one another without leading or lagging in order to increase the precision of searching. Team members were instructed to search beneath every shrub.

## **ZOI Transects**

ZOI transects are typically conducted in suitable tortoise habitat to the east, west, north, and south of the survey area at 100, 300, 600, 1,200, and 2,400 feet from the survey area perimeter. Since these were done in 2007 around the original 3,870 acres the proponent requested that they not be repeated for this survey (Figure 2).

## **Data Recorded**

Any tortoise or large mammal burrows encountered that could potentially be used by tortoises were visually inspected. Very small burrows that could be potentially used by juvenile tortoises but are much more often rodent burrows were also visually checked when encountered. Only definitive tortoise sign was recorded. All other wildlife species encountered were noted.

## **Biological Field Team**

The biological team for the survey included Christine Halley, Colin Spake, Ashley Spenceley, Debbie Vaughn, and Jenny Weidensee. The survey was managed by Mercy Vaughn.

## **RESULTS**

### **Survey Area**

The survey area ranged in elevation from 2,750 ft to 3,450 ft and is characterized by creosote-bursage desert scrub. Acreages of the areas surveyed are as follows:

Area 1	52.63 acres
Area 2	32.03 acres
Area 3	218.25 acres
Area 4	35.43 acres
Area 5	55.14 acres
Area 6	32.62 acres
Area 7	31.56 acres
Area 8	56.02 acres
Area 9	98.57 acres
Area 10	24.61 acres
Area 11	20.52 acres
Area 12	7.72 acres
Area 13	40.61 acres
Access road	20 acres

The geomorphology of the survey area ranges from lower bajada at the southeast end of the site with predominantly sandy loam soils to upper bajada at the northwest end with predominantly sandy loam to gravel-cobble soil. Human impacts within the survey area include dirt roads, trash dump sites, and OHV trails.

The condition of the desert scrub is generally good. Plants seen on the site are shown in Table 1. Dominant perennials include creosote bush, bursage, and Mojave yucca. Annual vegetation production appeared to be higher than last year, a low production year.

Desert tortoise sign found are listed in Table 2 and shown in Figure 2. All other wildlife sightings are listed in Tables 3 to 5.

### ***Desert Tortoise***

Three live, adult desert tortoises were found onsite, one each in Areas 1, 2, and 13. All three tortoises were adults, two males and one female. The male found in Area 13 was found at the base of a Mojave yucca and appeared healthy. The male found in area 2 was face down in a burrow. Its health could not be determined. The female found in Area 1 was face out in a burrow and appeared healthy. Two sets of tortoise tracks were found one in Area 2 and one in Area 10. The tracks in Area 2 were of an adult tortoise. The tracks in Area 10 were from an immature sized tortoise.

Twenty shell-skeletal remains were found onsite, two of which were juveniles. One juvenile was depredated this year, evidence that reproduction may be occurring on the site. Time since death for 16 of the remains is greater than 4 years, 2 to 4 years for two others and less than 1 year for an adult and the juvenile mentioned above. Remains were found in Areas 1 to 6, 8, 9, and 12.

Thirty tortoise burrows and one pallet were identified onsite. Five of the burrows had tortoise scat in or adjacent to the burrow. Burrows were found in Areas 1, 2, 4, 8, 9, 10, 13, and the access road. The pallet was found in Area 5. Twenty-two of the burrows appeared to be in good condition of which seven have been recently used.

Twenty-four scat events were identified not including those associated with burrows. Twenty-one of these were laid down this year. The scat was found in Areas 1, 2, 3, 5, 6, 8, 9, 10, and 12.

## **DISCUSSION**

### ***Desert Tortoise***

The proposed Ivanpah Solar Electric Generating System project site lies well within the desert tortoise's geographic range. Recent tortoise sign was found in all survey areas except Area 7. All size classes were represented in the recent tortoise sign found including two juvenile shell remains with time since death within the last 2 years. Based on the number of good burrows found, tracks, and recent scat it is likely that more tortoises are using this area than the three found. It is not surprising that more tortoises were not found due to the long narrow shape of the areas surveyed. More tortoises are likely nearby outside the survey area boundaries. Indications are that tortoises are active throughout this valley and have been reproducing suggesting a viable population within the project area.

The proposed Ivanpah Solar Electric Generating System project would have both direct and indirect impacts on desert tortoises on the site and tortoises in the area. Since tortoises use the site indirect impacts would occur through loss of habitat. Direct impacts could occur during construction if a tortoise wanders onto the site and is either injured or killed.

In addition to loss of habitat, the tortoises located onsite would have to be translocated to an appropriate area offsite. The effectiveness of translocation of tortoises is still being researched. Both the translocated tortoises as well as the tortoises located on the recipient site could be affected. This effect could be minimized by translocation within the current home range of tortoises cleared from the site. The long-term use of the site may pose a risk to any tortoises wandering into the area if permanent tortoise proof fencing is not installed and maintained.

## **MITIGATION RECOMMENDATIONS**

### ***Desert Tortoise***

In order to mitigate potential direct impacts, the following recommendations will help minimize the potential for “take” of tortoises during and after construction.

- 1). Develop a translocation plan for the desert tortoises onsite.
- 2). Develop a biological monitoring plan in consultation with the CEC, USFWS and the CDFG. This plan would delineate all measures to be implemented prior to, during and post-construction which would include but are not limited to the following measures:
  - a). Permanent and or temporary tortoise-proof fencing (1”x 2” mesh hardware cloth) may need to be erected and maintained between the interface of the project area and any remaining desert tortoise habitat prior to initiating construction and clearance surveys for desert tortoises onsite. The fence will prevent tortoises from wandering onto the site both during construction as well as during use of the facility. Ongoing maintenance of the fencing would be recommended with oversight by an authorized biologist. Fence installation should be monitored by a qualified tortoise biologist.
  - b). If tortoises are to be cleared from the site it is recommended tortoise clearance surveys be conducted at 15-foot intervals. It is recommended that two coverages without finding any tortoises or new tortoise sign be conducted prior to declaring the site clear of tortoises. All burrows that could provide shelter for a desert tortoise should be excavated during the first clearance survey.
  - c). All construction personnel should undergo desert tortoise awareness training
  - d). After the tortoise proof-fence is erected a qualified biologist(s) should remain onsite until all vegetation is cleared and, at a minimum, conduct site and fence inspections on a bi-weekly basis throughout construction in order to maintain compliance with mitigation measures.

- e). A qualified biologist(s) should be onsite to survey for tortoises immediately in front of vegetation clearance activities in the event a tortoise was inadvertently missed during clearance surveys.
- f). A biologist should remain on-call throughout construction in the event a tortoise wanders onto the site.
- g). A raven management plan should be developed for the project site.

**Table 1. Dominant Plant Species**

<b>Latin Name</b>	<b>Common name</b>
<b>ASTERACEAE</b>	<b>Composite Family</b>
<i>Ambrosia dumosa</i>	Burrobush
<i>Chaenactis fremontii</i>	Desert pincushion
<i>Encelia virginensis</i>	
<i>Ericameria cooperi</i> var. <i>c.</i>	Cooper's goldenbush
<i>Hymenoclea salsola</i>	Cheesebush
<i>Psilostrophe cooperi</i>	Paper-flower
<i>Stephanomeria pauciflora</i>	Wire-lettuce
<b>ASCLEPIADACEAE</b>	<b>Milkweed Family</b>
<i>Asclepias nyctaginifolia</i>	Mojave milkweed
<i>Cynanchum utahense</i>	Utah cynanchum
<b>APOCYNACEAE</b>	<b>Dogbane Family</b>
<i>Amsonia tomentosa</i>	Small-leaved amsonia
<i>Cryptantha</i> sp.	
<b>BORAGINACEAE</b>	<b>Borage Family</b>
<i>Amsinckia tessellata</i>	Devil's lettuce
<b>BRASSICACEAE</b>	<b>Mustard Family</b>
<i>Descurainia pinnata</i> ssp. <i>Glabra</i>	Yellow tansy mustard
<i>Dithyrea californica</i>	Spectacle-pod
<i>Lepidium fremontii</i>	Desert alyssum
<i>Lepidium lasiocarpum</i> var. <i>l.</i>	
<b>CACTACEAE</b>	<b>Cactus Family</b>
<i>Echinocactus polycephalus</i>	Cottontop cactus
<i>Echinocerus engelmannii</i>	Hedgehog cactus
<i>Escobaria vivipara</i>	Beehive cactus
<i>Ferocactus cylindraceus</i>	California barrel cactus
<i>Mammillaria tetrancistra</i>	Corkseed cactus
<i>Opuntia acanthocarpa</i>	Buckhorn cholla
<i>Opuntia basilaris</i>	Beavertail cactus
<i>Opuntia echinocarpa</i>	Golden cholla
<i>Opuntia parishii</i>	Mat cholla
<i>Opuntia ramosissima</i>	Diamond cholla
<b>EPHEDRACEAE</b>	<b>Ephedra Family</b>
<i>Ephedra nevadensis</i>	Nevada joint-fir
<b>EUPHORBIACEAE</b>	<b>Spurge Family</b>
<i>Chamaesyce albomarginata</i>	Spurge
<b>FABACEAE</b>	<b>Legume Family</b>
<i>Acacia greggii</i>	Catclaw
<b>GENTIANACEAE</b>	<b>Gentian Family</b>
<i>Erodium cicutarium</i>	Filaree

<b>Table 1. Dominant Plant Species</b>	
<b>HYDROPHYLLACEAE</b>	<b>Waterleaf Family</b>
<i>Phacelia sp.</i>	
<b>LAMIACEAE</b>	<b>Mint Family</b>
<i>Salazaria mexicana</i>	Bladder sage
<i>Salvia dorrii</i>	
<b>LILIACEAE</b>	<b>Lily Family</b>
<i>Yucca schidigera</i>	Mohave yucca
<b>LOASACEAE</b>	<b>Loasa Family</b>
<i>Mentzelia sp.</i>	
<b>ONAGRACEAE</b>	<b>Primrose Family</b>
<i>Camissonia sp.</i>	Sun cup
<b>POACEAE</b>	<b>Grass Family</b>
<i>Achnatherum hymenoides</i>	Indian rice grass
<i>Achnatherum speciosum</i>	Needle grass
<i>Erioneuron pulchellum</i>	Split grass
<i>Enneapogon desvauxii</i>	Pappus grass
<b>POLEMONIACEAE</b>	<b>Phlox Family</b>
<i>Eriastrum sp.</i>	
<i>Gilia sp.</i>	
<b>POLYGONACEAE</b>	<b>Buckwheat Family</b>
<i>Chorizanthe rigida</i>	Spiny-herb
<i>Chorizanthe brevicornu</i>	Brittle spineflower
<i>Eriogonum fasciculatum ssp. polifolium</i>	California buckwheat
<i>Eriogonum inflatum var. inflatum</i>	Desert trumpet
<b>SOLANACEAE</b>	<b>Nightshade Family</b>
<i>Lycium andersonii</i>	Anderson thornbush
<i>Lycium cooperi</i>	Peach-thorn
<b>ZYGOPHYLLACEAE</b>	<b>Caltrop Family</b>
<i>Larrea tridentata</i>	Creosote

<b>Table 2. Desert Tortoise and Sign Locations (Datum NAD 27 CONUS)</b>				
<b>Sign</b>	<b>Area</b>	<b>Easting</b>	<b>Northing</b>	<b>Notes</b>
burrow	1	641268	3932429	fresh tracks
burrows	1	641149	3932434	
burrow	1	641466	3932454	
burrow	1	640855	3932455	
burrow with scat	1	641148	3932445	
scat	1	641128	3932416	
scat	1	641249	3932431	
scat	1	641381	3932460	
scat	1	641434	3932463	

scat	1	641436	3932463	within 10' of previous scat
scat	1	641452	3932467	
tortoise in burrow	1	641465	3932496	adult female, MCL ~190, in burrow but looks healthy
shell-skeletal remains	2	639438	3932604	fragments
shell-skeletal remains	2	639381	3932970	fragments
shell-skeletal remains	2	639426	3933879	fragments
shell-skeletal remains	2	639111	3937972	juvenile
scat	2	639371	3933602	
tortoise in burrow	2	639421	3933349	adult male, ~240 MCL, facing into burrow health unknown.
tracks	2	639444	3933915	
shell-skeletal remains	3	639177	3933969	female, ~230 MCL
shell-skeletal remains	3	639287	3934312	sub-adult
scat	3	639305	3934105	
burrow	4	640104	3934948	
shell-skeletal remains	4	639990	3934925	female
shell-skeletal remains	4	640048	3934942	female
shell-skeletal remains	5	637757	3934829	
shell-skeletal remains	5	637841	3936387	
pallet	5	637766	3936089	adult
Shell-skeletal remains	6	637206	3456579	
Scat	6	638193	3936544	
Burrow	8	636846	3939045	Adult, w/ scat
Burrow	8	636852	3939049	Adult
Burrow	8	636411	3939011	under yucca, much scat inside
Burrow	8	636858	3939047	caliche cave
Burrow	8	636818	3939069	Adult, series of caves w/scat
Burrow	8	636584	3938990	
Burrow	8	636845	3939046	Adult, caliche cave
Burrow	8	636837	3939052	
Burrow	8	636494	3938954	Adult
Burrow	8	636128	3938969	Adult
Burrow	8	636797	3939073	1 pc bone on apron
Burrow	8	636273	3939120	Adult
Burrow	8	636290	3939116	Adult
Burrow	8	636929	3939222	Adult
Shell-skeletal remains	8	636797	3939073	1 piece only
Shell-skeletal remains	8	636393	3939082	1 piece only, assoc. w/ packrat midden
Shell-skeletal remains	8	636954	3939040	Male est MCL 240
Shell-skeletal remains	8	636229	3939147	Adult, est MCL 255 mm, Some tissue remains (tail, legs), ants

**Table 2. Desert Tortoise and Sign Locations  
(Datum NAD 27 CONUS)**

				scavenging
Shell-skeletal remains	8	636396	3939218	Adult
Scat	8	636606	3939005	Adult
Scat	8	636649	3939023	Adult
Scat	8	636761	3939034	Adult
Scat	8	636341	3939111	in wash bottom
Scat	8	636634	3939008	3 pieces adult, 2 pieces sub-adult
Scat	8	636086	3938595	0.18mi S of area 8
Scat	8	636411	3939018	
Scat	8	636904	3939250	3 pieces
burrow	9	638618	3939471	
shell-skeletal remains	9	638638	3939277	
shell-skeletal remains	9	638501	3939501	scutes attached
scat	9	638101	3939327	
scat	9	637865	3939378	
scat	9	637706	3939385	2 pieces
scat	9	637818	3939400	
burrow	10	639040	3936967	
scat	10	638866	3937963	
scat	10	638891	3938976	
tracks	10	638861	3937962	immature size
burrow	11	639135	3937503	
burrow	11	639115	3937649	
burrow	11	639123	3937592	
burrow with scat	11	639054	3937472	
shell-skeletal remains	11	639153	3937318	whole juvenile carcass
shell-skeletal remains	12	639056	3936914	with scutes
scat	12	639102	3936998	6 pieces
Burrow	13	636781	3940531	
Burrows and scat	13	636847	3940654	burrows in wash w/ scat
Tortoise	13	636707	3940608	Male, est MCL 250 mm, sinking scutes vertebral & costal, @ base of yucca
burrow	Access road	640575	3935115	old, unoccupied, in need of repair
burrow	Access road	640541	3935110	sub-adult size

**Table 3. Mammal Species**

<b>Scientific Name</b>	<b>Common name</b>
<i>Dipodomys merriami</i>	Merriam's kangaroo rat
<i>Desert woodrat</i>	Wood rat
<i>Amnospermophilus leucurus</i>	White-tailed antelope ground squirrel
<i>Lepus californicus</i>	Black-tailed jackrabbit
<i>Sylvilagus audubonii</i>	Desert cottontail
<i>Canis latrans</i>	Coyote
<i>Vulpes macrotis</i>	Kit fox
<i>Homo sapiens</i>	Human
<i>Equus asinus</i>	Wild Burro

**Table 4. Reptile Species**

<b>Scientific Name</b>	<b>Common Name</b>
<i>Gopherus agassizii</i>	Desert tortoise
<i>Phrynosoma platyrhinos</i>	Desert horned lizard
<i>Gambelia wislizenii</i>	Longnose leopard lizard
<i>Sceloporus graciosus</i>	Sagebrush lizard
<i>Callisaurus draconoides</i>	Zebratail lizard
<i>Cnemidophorus tigris</i>	Western whiptail lizard

**Table 5. Bird Species**

<b>Scientific Name</b>	<b>Common Name</b>
<i>Buteo jamaicensis</i>	Red-tailed hawk
<i>Zenaida macroura</i>	Mourning dove
<i>Myiarchus crinitus</i>	Ash-throated flycatcher
<i>Lanius ludovicianus</i>	Loggerhead shrike
<i>Corvus corax</i>	Common raven
<i>Eremophila alpestris</i>	Horned lark
<i>Campylorhynchus brunneicapilus</i>	Cactus wren
<i>Polioptila melanura</i>	Black tailed gnatcatcher
<i>Amphispiza bilineata</i>	Black-throated sparrow
<i>Amphispiza belli</i>	Sage sparrow
<i>Icterus parisorum</i>	Scott's oriole

**Figure 1. Ivanpah Solar Electric Generating System project site in Ivanpah Valley, CA.**

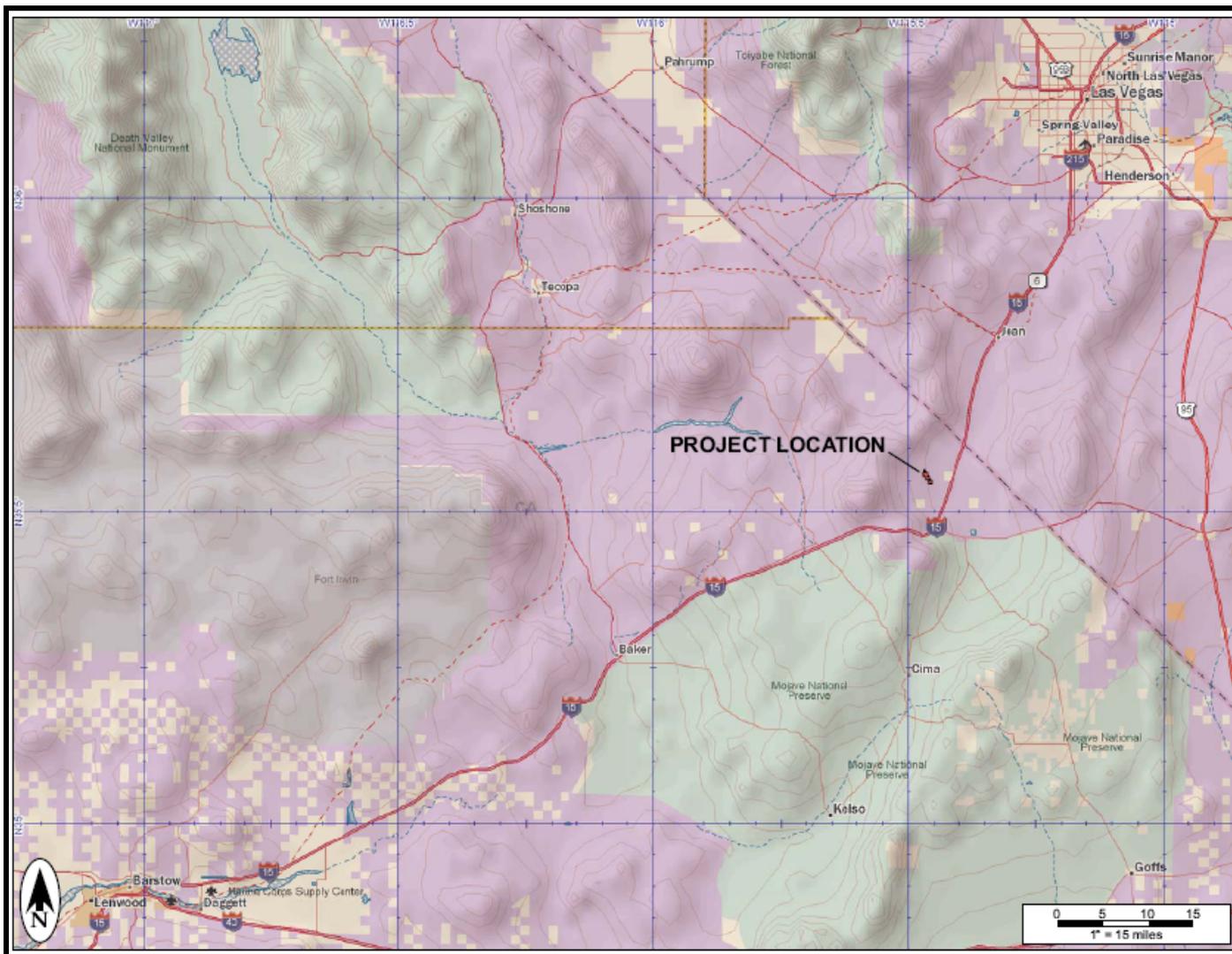
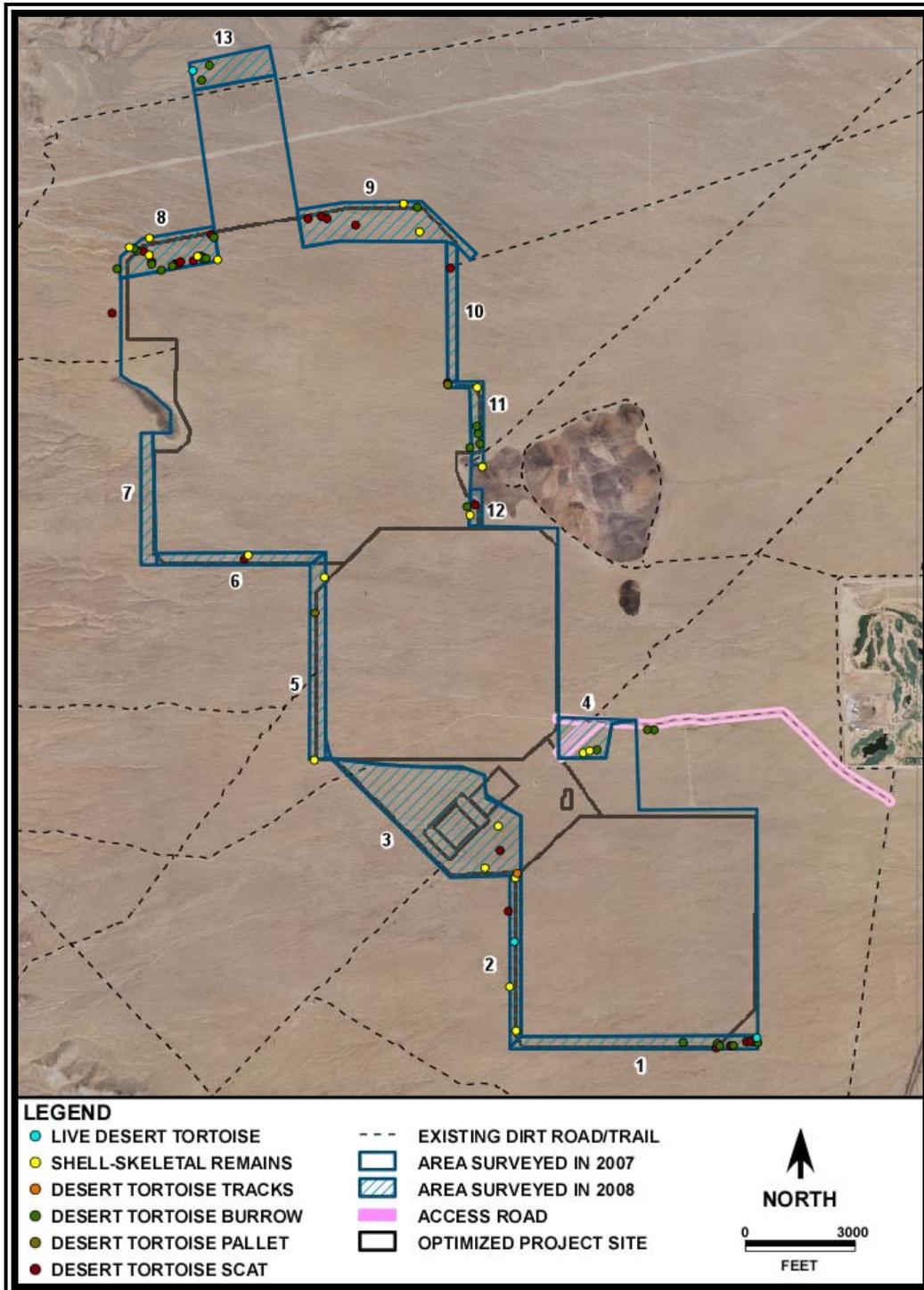


Figure 2. Desert tortoise survey area and sign encountered on the Ivanpah Solar Electric Generating System project site in Ivanpah Valley, CA.



**Figure 3. Area photos and tortoise photos on the Ivanpah Solar Electric Generating System project site in Ivanpah Valley, CA.**



**Area 1 and 2 -View to the north**



**Area 3- View to the north**



**Area 4 and access road -View to the east**



**Area 5- View to the north**



**Area 6 -View to the north**



**Area 7- View to the north**



**Area 8 -View to the north**



**Area 9- View to the north**



**Area 10 -View to the east**



**Area 11- View to the north**



**Area 12 -View to the north**



**Area 13- View to the north**

---

*Sundance Biology, Inc.*

*179 Niblick Road PMB 272, Paso Robles, CA 93446*



**Area 13 –Active adult male tortoise**



**Area 1- Adult male tortoise in burrow**



**Area 2 – Adult female tortoise in burrow**



**Area 11- Juvenile tortoise died within the last year**

*Sundance Biology, Inc.*

*179 Niblick Road PMB 272, Paso Robles, CA 93446*