# Lower Colorado River Multi-Species Conservation Program

*Balancing Resource Use and Conservation*

# Desert Tortoise Surveys in the Chuckwalla Desert Wildlife Management Area on Private Land Parcels Proposed for Acquisition

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

October 2010

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# Lower Colorado River Multi-Species Conservation Program

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**Multi-Species Conservation Program**
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**October 2010**

# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ac | acre(s) |
| DWMA ACEC | Desert Wildlife Management Area/Area of Critical Environmental Concern |
| GIS | Geographic Information System |
| GPS | Global Positioning System |
| Information Index | Information Index for Desert Tortoise Sign |
| LCR MSCP | Lower Colorado River Multi-Species Conservation Program |
| m | meter(s) |
| mm | millimeter(s) |
| UNLV | University of Las Vegas |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |
| UTM | Universal Transverse Mercator |

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# ABSTRACT

The Lower Colorado Multi-Species Conservation Program (LCR MSCP) is required to acquire and protect 230 acres (ac) of existing occupied desert tortoise *(Gopherus agassizii)* habitat to fulfill Desert Tortoise Conservation Measure One in the Habitat Conservation Plan (LCR MSCP 2004). Six parcels totaling 240 ac were surveyed during June 2010, and one 20-ac parcel was surveyed in September 2010. The objectives of the surveys were to determine if the parcels contain desert tortoise sign and/or live desert tortoise. Desert tortoise sign and/or live desert tortoises were detected on all seven parcels. Two live desert tortoises inside their burrows were detected in the Cheung property. Two live desert tortoises outside their burrows were detected on land adjacent to the Cheung property. Two live desert tortoises were detected outside their burrows in the Kim property. Desert tortoise sign was detected at 131 locations in the Cheung property, 7 locations in the Krans & Richey property, and 20 locations in the Kim property. Relative desert tortoise density, based on desert tortoise sign, was very low to moderate on the seven parcels.

# INTRODUCTION

The Lower Colorado Multi-Species Conservation Program (LCR MSCP) is required to acquire and protect 230 acres (ac) of existing occupied desert tortoise *(Gopherus agassizii)* habitat to fulfill Desert Tortoise Conservation Measure One in the LCR MSCP Habitat Conservation Plan (LCR MSCP 2004). The Coachella Valley Mountains Conservancy proposed to LCR MSCP the acquisition of 260 ac of private land within the Chuckwalla Bench Desert Wildlife Management Area/Area of Critical Environmental Concern (DWMA ACEC). Seven parcels, six that are 40 ac in size and one that is 20 ac in size, have been appraised and are ready to be purchased by the LCR MSCP. Susanna Cheung currently owns the following five parcels: 719-160-012, 719-160-015, 719-160-016, 719-160-019, and 719-160-021. Jerry Krans currently owns one parcel, 709-440-055, and the Kim household owns one parcel, 709-440-040. Surveys for the desert tortoise on these lands were conducted during June 2010 and September 2010. The objectives of these surveys were to determine if the above-mentioned parcels contained desert tortoise sign and/or live desert tortoises.

# SITE LOCATION AND DESCRIPTION

The parcels surveyed are located off Interstate 10 near Red Cloud Mine Road and Bradshaw Trail Road in the Chuckwalla Bench area, a broad alluvial region of the Chuckwalla DWMA ACEC (figure 2). The Chuckwalla DWMA ACEC is located in the Eastern Colorado Desert in Riverside County, California, between the Chuckwalla Mountains and the Chocolate Mountains (figure 1). The majority of the land in the Chuckwalla DMWA ACEC is managed by the Bureau of Land Management; however, there are many small private in-holdings (figure 2) (U.S. Fish and Wildlife Service [USFWS] 1994). Habitat within the DWMA ACEC is typical of the Eastern Colorado Desert, which includes well-developed washes, desert pavements, piedmonts, bajadas, and rocky slopes. Vegetation communities include succulent scrub, creosote bush scrub, Sonoran Desert mixed scrub, and desert dry wash woodland.[1] The Chuckwalla Bench area of the DWMA ACEC has supported a high density of desert tortoises (USFWS 1994). Vegetation within the Chuckwalla Bench area is an enriched creosote bush scrub community with a high diversity of flora.[1] Several tree species, including ironwood, palo verde, smoke tree, and desert willow occur in the desert washes.[1] The alluvial fans support an extremely diverse plant community, with nine species of cactus found on rocky slopes, desert pavement areas, or in sandy washes.[1]

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[1] Mark Massar, Bureau of Land Management Palm Springs Office, Mark_Massar@blm.gov, 1201 Bird Center Drive, Palm Springs, CA 92262.

**Figure 1.—Desert tortoise parcels in the Chuckwalla DWMA ACEC.**

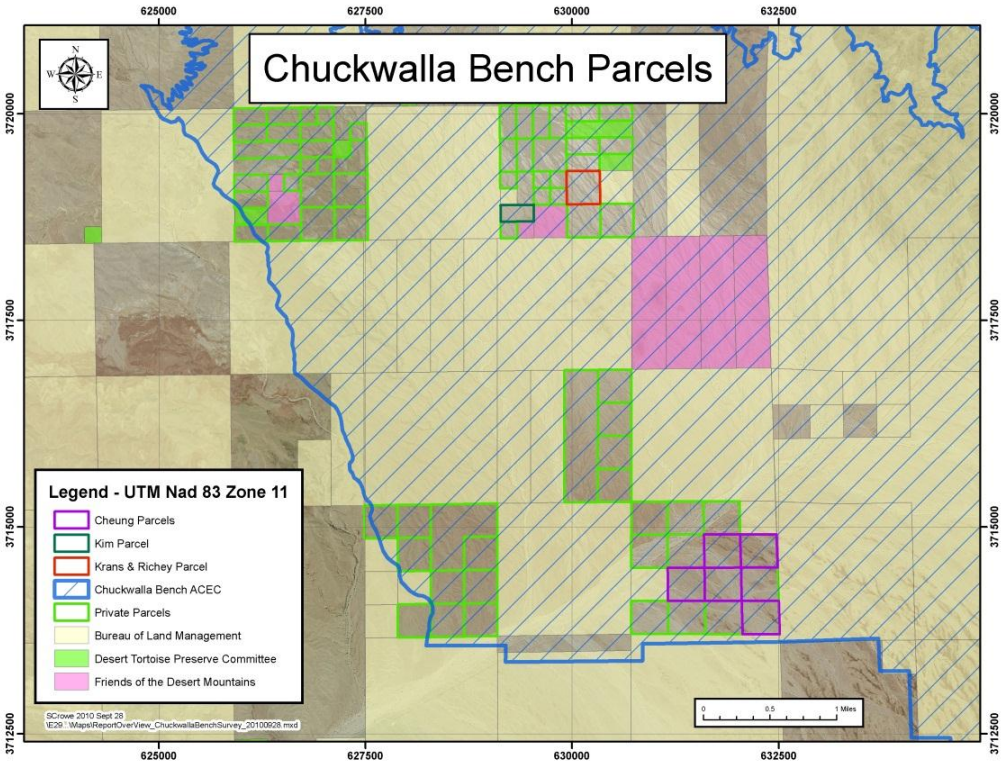


**Figure 2.—Land ownership and surveyed parcels in the Chuckwalla DWMA ACEC.**

# METHODS

The parcels were surveyed the week of June 14, June 28, and September 13, 2010. Cheung parcel 21 was surveyed on June 15, parcel 12 and 16 were surveyed on June 16, and parcels 15 and 19 were surveyed on June 17. Krans & Richey parcel 55 was surveyed on June 29, and the Kim parcel was surveyed on September 16. Surveys began at sunrise and ended between 9:00 a.m. and 12:00 p.m. depending on temperature.

Surveys were conducted according to the 2010 pre-project field survey protocol for potential desert tortoise habitat (USFWS 2010). The protocol recommends that surveys be conducted during the desert tortoise's most active periods, which are April through May or September through October. The majority of the surveys were conducted outside this time period because the LCR MSCP only needed to determine desert tortoise presence/absence for each parcel.

Ten-meter (m) belt transects were walked. For each parcel, transects started at the southeast or southwest corner. Transects were placed approximately every 10 m throughout the parcel. Five surveyors conducted each survey by forming a line. All transects were walked in an easterly or westerly direction. The two surveyors on the end of the line recorded the location of the start point and end point of each transect. After a transect was complete, the line moved 10 m to the north until the northerly border was reached. When walking the transect line, surveyors scanned the area for desert tortoise sign (burrow, scat, pallet, carcass) and all live desert tortoises.

The locations of all desert tortoises both out of the burrow and visibly within the burrow were recorded. The location of all desert tortoise sign was recorded. Locations were recorded with a Global Positioning System (GPS) unit in Universal Transverse Mercator's (UTM) datum NAD 83 during the survey. The number of live tortoises detected, time of day detected, and whether they were in their burrow or out of their burrow was recorded (USFWS 2010). Desert tortoise sign was classified according to the Information Index for Desert Tortoise Sign (Information Index) in the "1992 Field Survey Protocol for any Federal Action that may Occur within the Range of the Desert Tortoise." A description of the sign was recorded (table 1) (USFWS 1992). When a burrow or pallet was found, a mirror was used to look in the burro or pallet to see how deep it was and to detect any visible live desert tortoises within the burrow.

For each survey, the following was recorded: names of surveyors, site description, location of parcel, size of survey area, number of transects walked, transect length, start and end time, and start and end temperature (degrees Celsius ). All data were recorded on a standardized data sheet that was used for all surveys. The data sheet was an edited version of the official 2010 Desert

Table 1.—Information Index for Desert Tortoise Sign (USFWS 1992)

| Sign | Ranking | Description |
|---|---|---|
| Burrows and pallet | 1 | Currently active, with tortoise or recent tortoise sign |
| | 2 | Good condition, definitely tortoise; no evidence of recent use |
| | 3 | Deteriorated condition, definitely tortoise |
| | 4 | Deteriorated condition, possibly tortoise |
| | 5 | Good condition, possibly tortoise |
| Scats | 1 | Wet (not from rain or dew) or freshly dried; obvious odor |
| | 2 | Dried with glaze; some odor; dark brown |
| | 3 | Dried; no glaze or odor; signs of bleaching (light brown); tightly packed |
| | 4 | Dried; light, light brown to pale yellow; loose material; scaly appearance |
| | 5 | Bleached or consisting only of plant fiber |
| Carcass | 1 | Fresh or putrid |
| | 2 | Normal color; scutes adhere to bone |
| | 3 | Scutes peeling off bone |
| | 4 | Shell bone is falling apart; growth rings on scutes are peeling |
| | 5 | Disarticulated and scattered |

Tortoise Pre-Project Survey Data Sheet (USFWS 2010). Since the surveys were conducted outside the desert tortoise active period, a low number of live desert tortoises were expected to be detected. Photographs were taken of all parcels, desert tortoise sign, and select live desert tortoises. All photographs were downloaded and labeled with the following: parcel, UTM location and picture subject (landscape, live desert tortoise, scat, burrow, pallet, etc.).

After the survey, the locations of desert tortoise sign and live desert tortoises were entered into Excel and transferred to the Geographic Information System (GIS). A feature class was created for each parcel with the locations of all desert tortoise sign and live desert tortoise. The number and type of desert tortoise sign per type, per class, and per parcel were calculated.

The estimated number of desert tortoise (i.e., density) present per square mile was quantified using corrected sign per acre based on a linear regression model using triangular-strip survey transects and a density scale developed for Nevada (University of Las Vegas [UNLV] Research Foundation 2009). Table 2 shows the results of this methodology developed to estimate tortoise density. The sign was adjusted to account for multiple sign clearly attributable to one desert

Table 2.—Estimated desert tortoise density based on corrected sign per acre

| Corrected sign per triangular-strip transect[1] | Corrected sign per acre[2] | Tortoises per square mile[1] | Relative density |
|---|---|---|---|
| 0 | 0.0–0.1 | 0–10 | Very low |
| 1–3 | 0.2–0.6 | 10–45 | Low |
| 4–7 | 0.7–1.4 | 45–90 | Moderate |
| 8–11 | 1.5–2.1 | 90–140 | High |
| 12+ | 2.2+ | 140+ | Very high |

[1] Methodology from Berry and Nicholson (1984) and Karl (1981).
[2] Corrected sign per triangular-strip transect divided by 5.5, which is the amount of acres surveyed in one triangular-strip transect.

tortoise, which was the corrected sign estimate (UNLV Research Foundation 2009). For example, a scat, carcass, or pallet located adjacent to a burrow would equal two total sign, but would be counted as one corrected sign. Burrows or pallets that could not be positively identified as associated with desert tortoise (i.e., burrow classes 4 and 5) were not counted as corrected sign. Disarticulated bone, class 5, was not counted as corrected sign. All scat was counted as corrected sign (UNLV Research Foundation 2009). The estimated number of desert tortoises present per square mile was converted to desert tortoises present per parcel.

# RESULTS

## Surveys

Two live desert tortoises inside their burrows were detected in the Cheung property. Two live desert tortoises outside their burrows with a midline carapace length of >160 millimeters (mm) were detected adjacent to the Cheung property less than 200 m away from the parcel border. Two live desert tortoises outside their burrows with a midline carapace length of >160 mm were detected in the Kim Property. Desert tortoise sign was detected at 131 locations in the Cheung property, seven locations in the Krans & Richey property, and 20 locations in the Kim property (table 3; figure 3).

Desert tortoise sign was detected at 27 locations in Cheung parcel 12 (table 3; figure 3).

Table 3.—Desert tortoise sign detected in Cheung parcel 719-160-012
(Number of sign detected per Information Index ranking)

| Type of sign | Index ranking | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | Total |
| Burrow | 4 | 4 | 3 | | | 11 |
| Pallet | | 1 | 2 | | | 3 |
| Scat | | 4 | 4 | | | 8 |
| Carcass | | 1 | 1 | 2 | 1 | 5 |

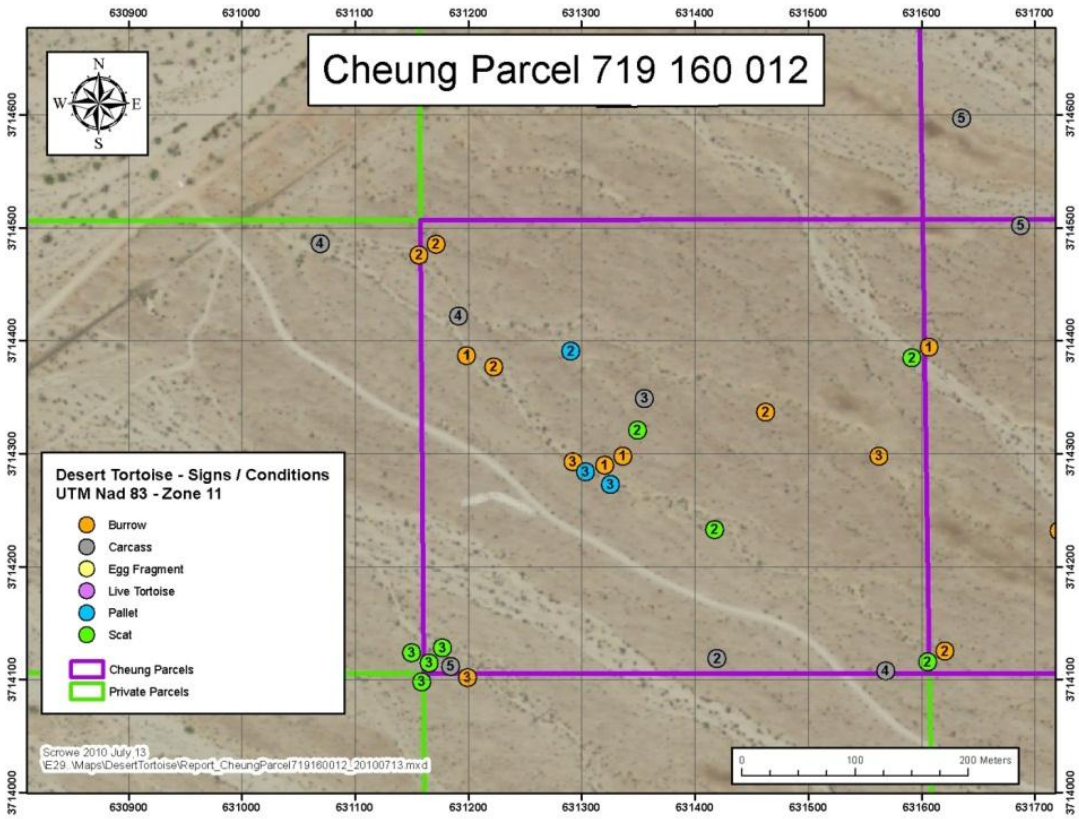


**Figure 3.—Desert tortoise sign detected in Cheung parcel 719-16-12.**
(The color indicates the type of sign, and the number indicates the Information Index ranking.)

One live desert tortoise inside its burrow was detected in Cheung parcel 15. Desert tortoise sign was detected at 32 locations in Cheung parcel 15 (table 4; figure 4).

Table 4.—Desert tortoise sign and live desert tortoises detected in Cheung parcel 719-160-015
(Number of sign detected per Information Index ranking)

| Type of sign | Index ranking | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | Total |
| Burrow | 4 | 5 | | | | 9 |
| Pallet | 2 | 1 | | | | 3 |
| Scat | | 4 | 2 | | | 6 |
| Carcass | | 1 | 2 | 1 | 9 | 13 |
| Eggshell fragment | 1 | | | | | 1 |
| Live tortoise | 1 inside burrow | | | | | 1 |

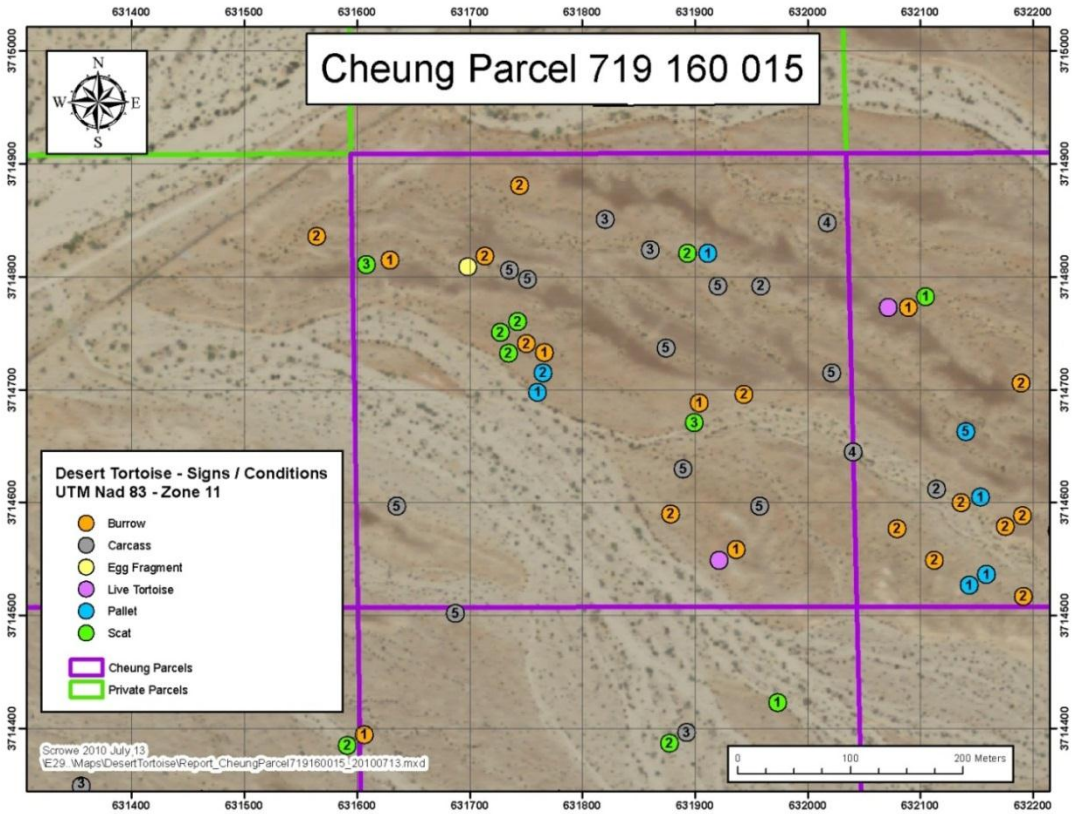


**Figure 4.—Desert tortoise sign and live desert tortoises detected in Cheung parcel 719-160-015.**
(The color indicates the type of sign, and the number indicates the Information Index ranking.)

Desert tortoise sign was detected at 17 locations in Cheung parcel 16 (table 5; figure 5). Two live desert tortoises outside their burrow and a set of six burrows on a cliff side, ranked as being currently used, were detected adjacent to Cheung parcels 16 and 21. One of the live desert tortoises was detected near the set of six burrows. Three pieces of scat were also detected adjacent to the parcel.

Table 5.—Desert tortoise sign detected in Cheung parcel 719-160-016
(Number of sign detected per Information Index ranking)

| Type of sign | Index ranking | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | Total |
| Burrow | 2 | 4 | 1 | | | 7 |
| Pallet | 1 | | | | | 1 |
| Scat | 1 | 3 | 1 | | | 5 |
| Carcass | | 1 | 1 | | 2 | 4 |

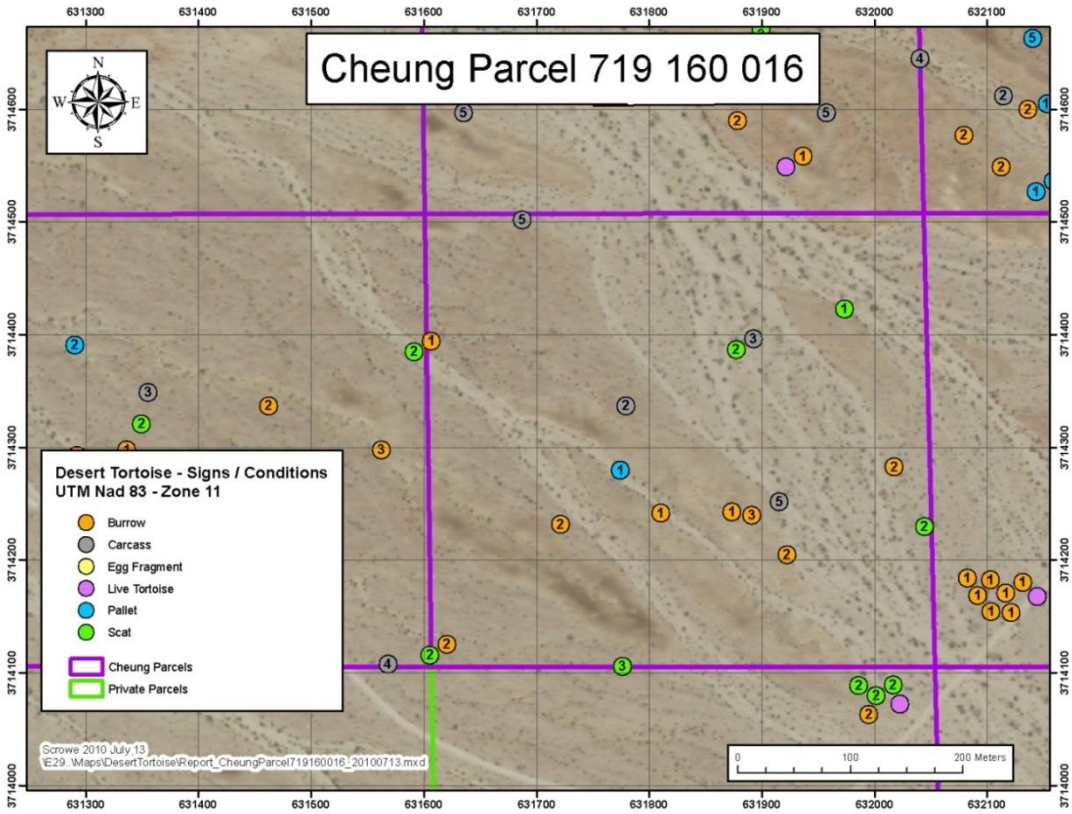


**Figure 5.—Desert tortoise sign detected in Cheung parcel 719-160-016.**
(The color indicates the type of sign, and the number indicates the Information Index ranking.)

One live desert tortoise inside its burrow was detected in Cheung parcel 19. Desert tortoise sign was detected at 39 locations in Cheung parcel 19 (table 6; figure 6).

Table 6.—Desert tortoise sign and live desert tortoises detected in Cheung parcel 719-160-019
(Number of sign detected per Information Index ranking)

| Type of sign | Index ranking | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | Total |
| Burrow | 3 | 12 | 3 | | | 18 |
| Pallet | 4 | 2 | | | 1 | 7 |
| Scat | 3 | 6 | | | | 9 |
| Carcass | | 1 | 3 | 1 | | 5 |
| Live tortoise | 1 inside burrow | | | | | 1 |

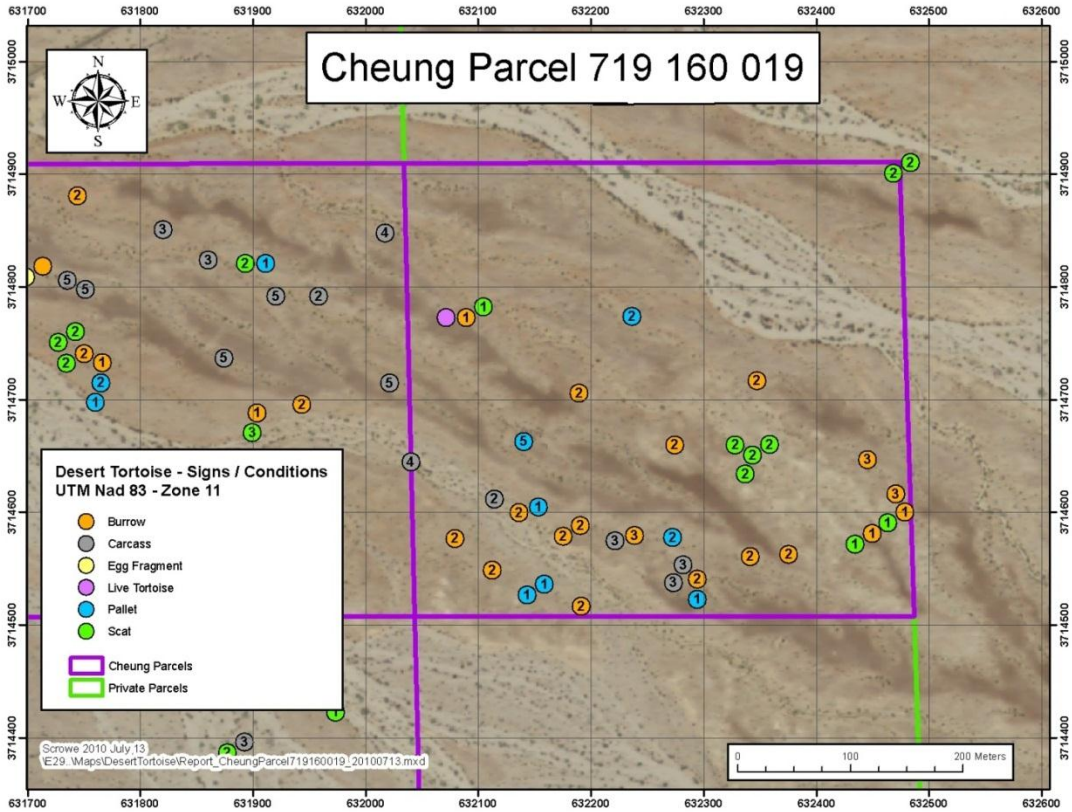


**Figure 6.—Desert tortoise sign and live desert tortoise detected in Cheung parcel 719-160-019.**
(The color indicates the type of sign, and the number indicates the Information Index ranking.)

Desert tortoise sign was detected at 16 locations in Cheung parcel 21 (table 7; figure 7).

Table 7.—Desert tortoise sign detected in Cheung parcel 719-160-021
(Number of sign detected per Information Index ranking)

| Type of sign | Index ranking | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | Total |
| Burrow | 1 | 1 | 2 | | 3 | 7 |
| Pallet | | 1 | | | | 1 |
| Scat | 1 | 3 | | 1 | | 5 |
| Carcass | | 1 | 1 | | 1 | 3 |

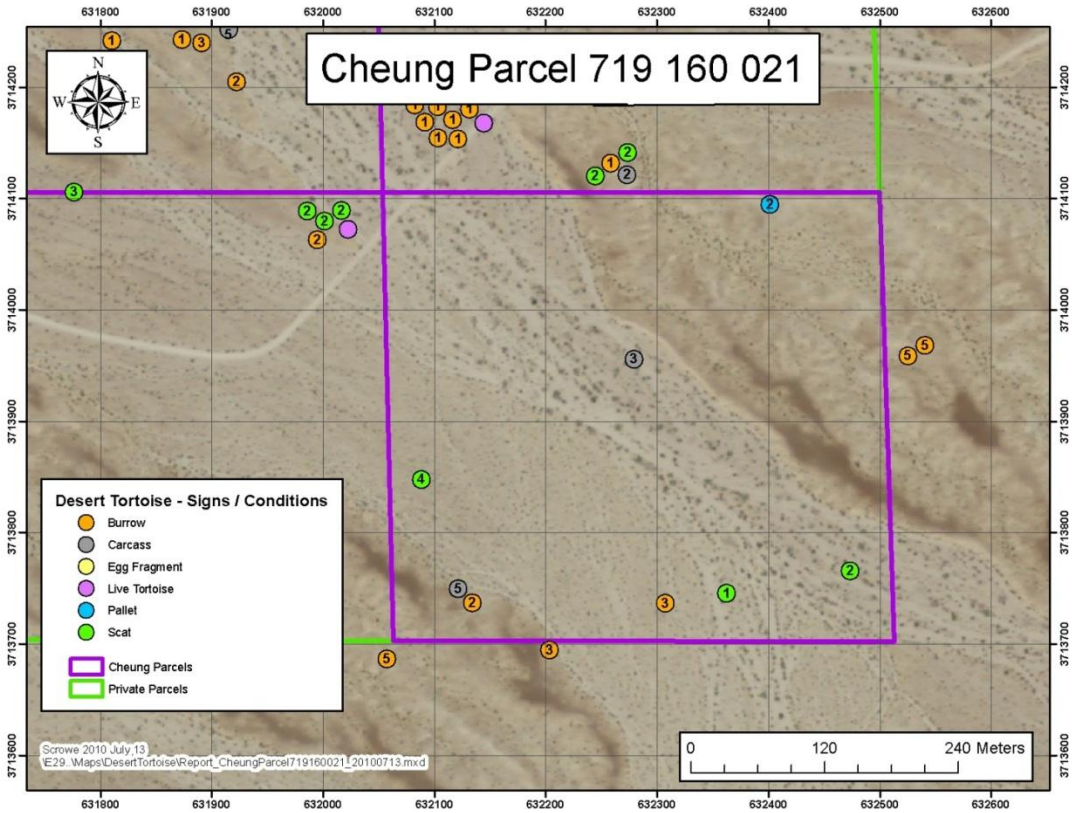


**Figure 7.—Desert tortoise sign detected in Cheung parcel 719-160-021.**
(The color indicates the type of sign, and the number indicates the Information Index ranking.)

Desert tortoise sign was detected at seven locations in Krans & Richey parcel 17 (table 8; figure 8).

Table 8.—Desert tortoise sign detected in Krans & Richey 709-440-055
(Number of sign detected per Information Index ranking)

| Type of sign | Index ranking | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | Total |
| Burrow | | 2 | 1 | 3 | | 5 |
| Scat | | | | 1 | | 1 |
| Carcass | | | | | 1 | 1 |

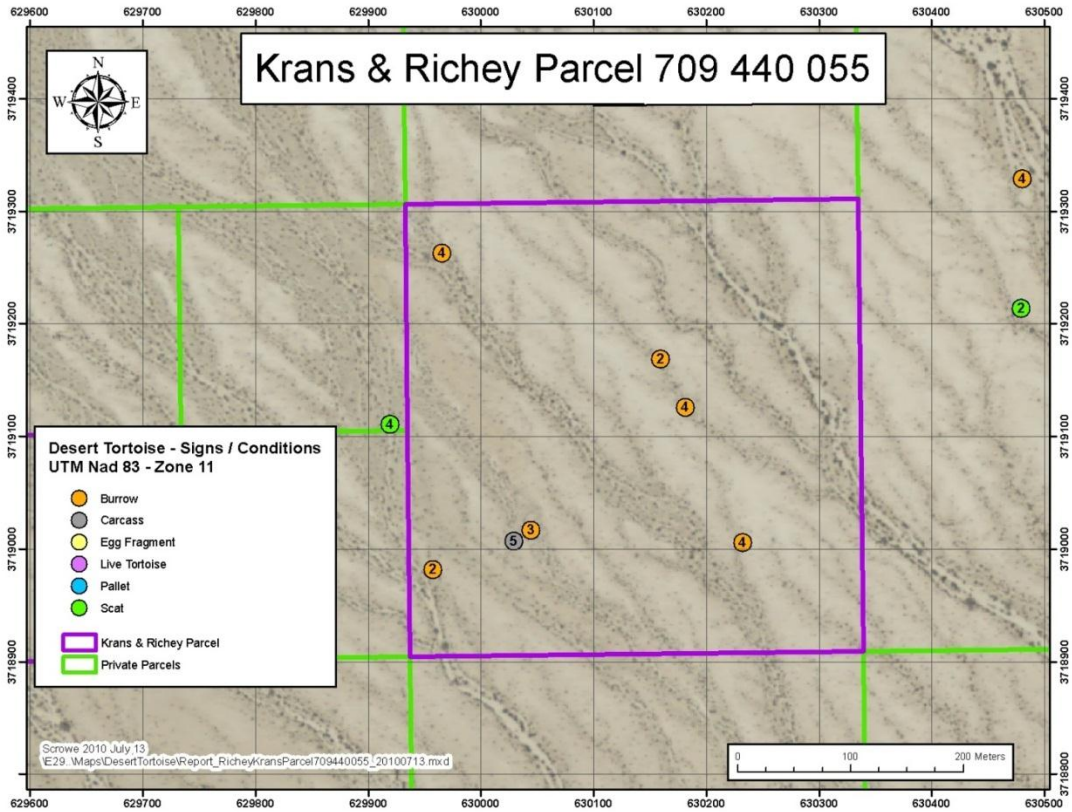


**Figure 8.—Desert tortoise sign detected in Krans & Richey 709-440-055.**
(The color indicates the type of sign, and the number indicates the Information Index ranking.)

Desert tortoise sign was detected at 20 locations in Kim parcel 40. Two live desert tortoises were detected in Kim parcel 40 (table 9; figure 9).

Table 9.—Desert tortoise sign and live desert tortoises detected in Kim parcel 709-440-040
(Number of sign detected per Information Index ranking)

| Type of sign | Index ranking | | | | | Total |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| Burrow | 8 | 1 | | 1 | | 10 |
| Scat | 4 | 2 | 2 | | | 8 |
| Carcass | | | | | 1 | 1 |
| Eggshell fragment | 1 | | | | | 1 |
| Live tortoise | 2 outside of burrow | | | | | 2 |

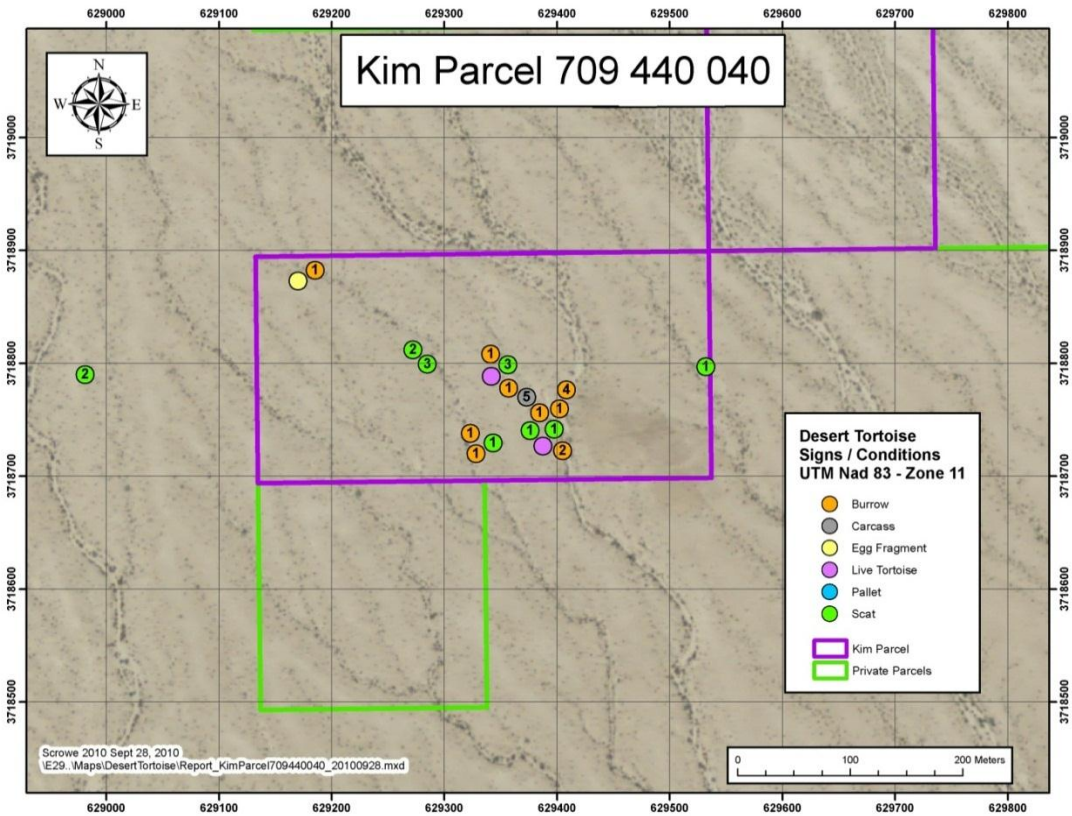


**Figure 9.—Desert tortoise sign detected in Kim parcel 709-440-040.**
(The color indicates the type of sign, and the number indicates the Information Index ranking.)

Desert tortoise density for each parcel was estimated using the corrected sign per acre based on a linear regression model using triangular-strip survey transects and a density scale developed for Nevada (UNLV Research Foundation 2009). Density was very low to moderate for each parcel, ranging from 0 to 5 desert tortoises present on each parcel.

Table 10.—Estimated desert tortoise density per parcel

| Parcel | Acres per parcel | Corrected sign per parcel | Corrected sign/acre | Tortoises/ square mile per parcel | Square miles per parcel | Estimated number of tortoises per parcel | Relative density |
|---|---|---|---|---|---|---|---|
| Cheung parcel 12 | 40 | 16 | 0.40 | 10–45 | 0.06 | 1–3 | Low |
| Cheung parcel 15 | 40 | 14 | 0.35 | 10–45 | 0.06 | 1–3 | Low |
| Cheung parcel 16 | 40 | 14 | 0.35 | 10–45 | 0.06 | 1–3 | Low |
| Cheung parcel 19 | 40 | 26 | 0.65 | 45–90 | 0.06 | 3–5 | Moderate |
| Cheung parcel 21 | 40 | 9 | 0.22 | 10–45 | 0.06 | 1–3 | Low |
| Krans & Richey parcel 55 | 40 | 3 | 0.08 | 0–10 | 0.06 | 0–1 | Very low |
| Kim parcel 40 | 20 | 12 | 0.6 | 10–45 | 0.03 | 0–1 | Low |

## USGS Model

The United States Geological Survey (USGS) developed a habitat suitability model for the desert tortoise in the Mojave and a portion of the northwest Sonoran Desert using field-collected presence data. Potential habitat was modeled using the Maxant algorithm. The model provides the probability of an area being potential desert tortoise habitat (Nussear et al. 2009). The Chuckwalla Bench area, where all seven parcels were located, had a 90 percent probability of being potential desert tortoise habitat (figure 10).

# CONCLUSION

Desert tortoise sign and/or live desert tortoises were detected on all seven parcels on the Cheung, Krans & Richey, and Kim properties (719-160-012, 719-160-015, 719-160-016, 719-160-019, 719-160-021, 709-440-055, and 709-440-040). According to the 2010 pre-project field survey protocol for potential desert tortoise habitats, occurrence of either desert tortoise sign or live desert tortoises indicates desert tortoise presence (USFWS 2010). Therefore, the LCR MSCP concludes that desert tortoises are present on all seven parcels.

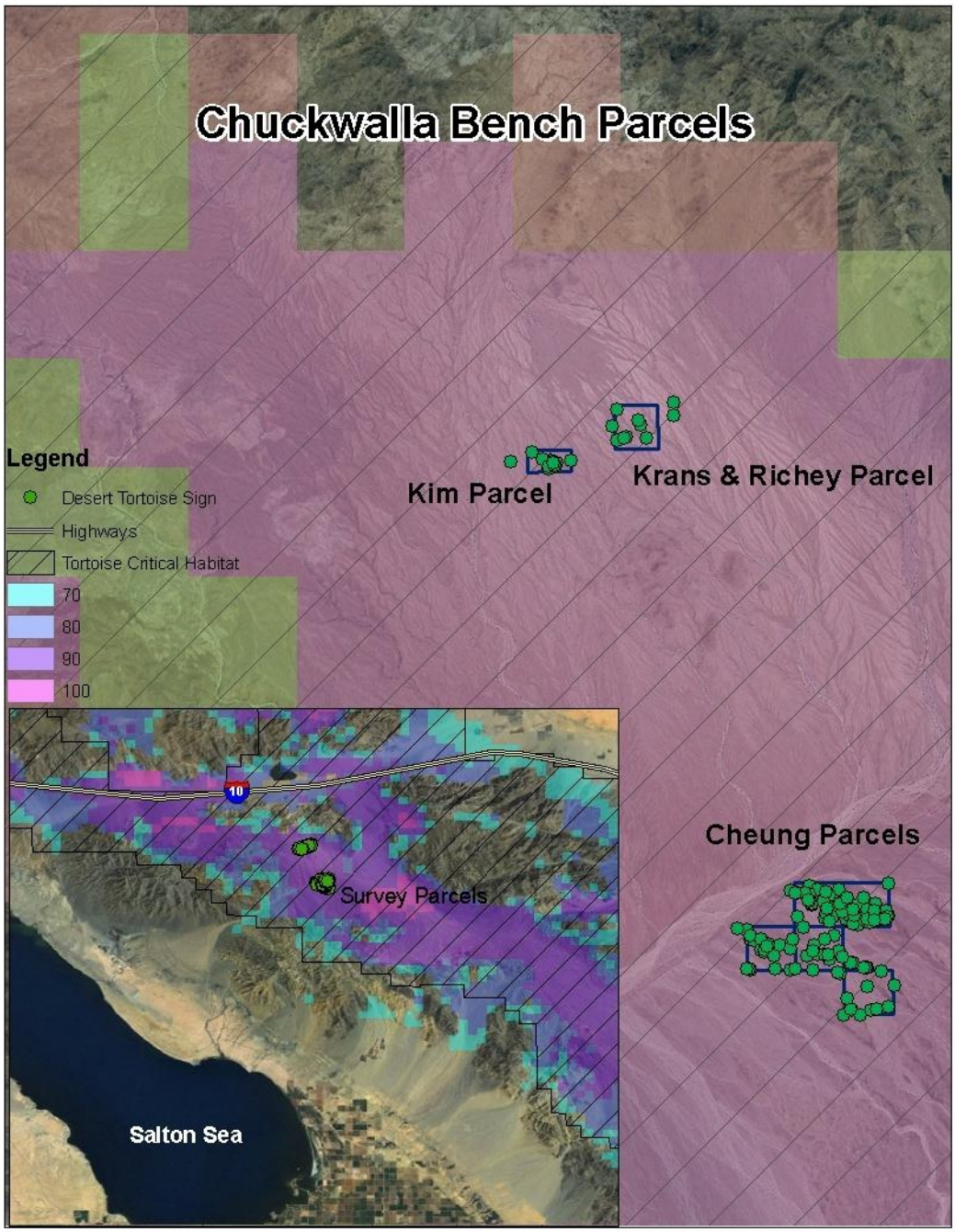


**Figure 10.—Spatial representation of the predicted habitat potential index values for desert tortoise in the private land parcels proposed for acquisition by the LCR MSCP (Nussear et al. 2009).**

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# APPENDIX 1

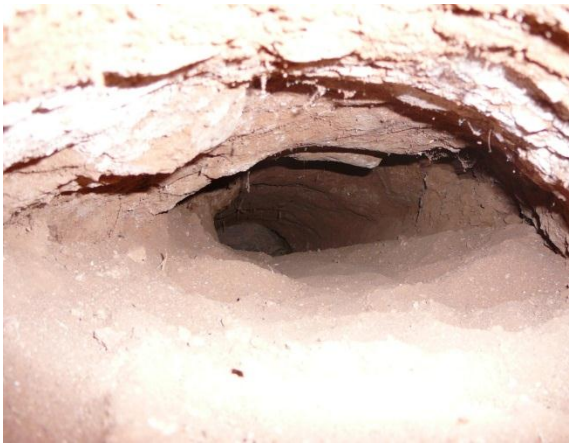
Photographs

**A set of seven currently active burrows on a cliff side.**

**Carcass in Cheung parcel 16.**

**Burrow in good condition in Cheung parcel 21.**

**Currently active pallet in Cheung parcel 16.**



**Live tortoise in burrow in Cheung parcel 15.**

**Scat in Cheung parcel 19.**

**Cheung parcel 12.**

**Cheung parcel 16.**

**Cheung parcel 21.**

**Cheung parcel 15.**

**Cheung parcel 19.**

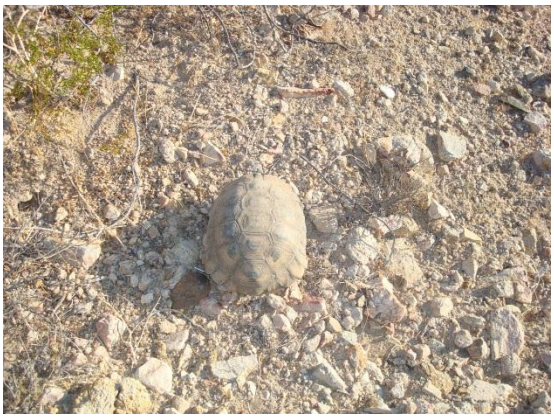
**Krans & Richey parcel 55.**

**Live tortoise in land adjacent to Cheung parcels 16 and 21.**

**Live tortoise in land adjacent to Cheung parcels 16 and 21.**

**Kim parcel 40 landscape view.**

**Kim parcel 40 landscape view.**



**Live desert tortoise in Kim parcel 40.**

**Desert tortoise coming out of its burrow.**

**Pallets on cliff alongside wash that is adjacent to Kim parcel 40.**