Topock Project Executive Abstract

Document Title:

Desert Tortoise Presence/ Absence Survey Report for 2009, PG&E Topock Compressor Station, Needles, California

Submitting Agency/Authored by: US Fish and Wildlife Services and Bureau of Land Management

Final Document? ☒ Yes ☐ No

Date of Document: September 24, 2009

Who Created this Document?: (i.e. PG&E, DTSC, DOI, Other)

PG&E

Priority Status: ☐ HIGH ☐ MED ☒ LOW
Is this time critical? ☐ Yes ☒ No

Type of Document:
☐ Draft ☒ Report ☐ Letter ☐ Memo
☐ Other / Explain:

Action Required:
☒ Information Only ☐ Review & Comment
Return to:_____
By Date: _____

☐ Other / Explain:

What does this information pertain to?
☐ Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA)/Preliminary Assessment (PA)
☐ RCRA Facility Investigation (RFI)/Remedial Investigation (RI) (including Risk Assessment)
☐ Corrective Measures Study (CMS)/Feasibility Study (FS)
☐ Corrective Measures Implementation (CMI)/Remedial Action
☐ California Environmental Quality Act (CEQA)/Environmental Impact Report (EIR)
☐ Interim Measures
☒ Other / Explain: Programmatic Biological Assessment (PBA)

Is this a Regulatory Requirement?
☒ Yes
☐ No
If no, why is the document needed?

What is the consequence of NOT doing this item? What is the consequence of DOING this item?

This annual report is required by the approved PBA. Not performing the survey and preparing this report constitute non-compliance with the PBA.

Other Justification/s:
☐ Permit ☐ Other / Explain:

Brief Summary of attached document:

The Desert Tortoise Presence/Absence Surveys 2009 Report presents the findings of the annual field survey for the desert tortoise on lands surrounding the PG&E Topock Compressor Station. The PBA General Project Management Measure No. 21 states the requirement to perform annual tortoise surveys. The results of the field survey are the same as in the past - no live tortoises or new sign of tortoise observed.

Written by: PG&E

Recommendations:

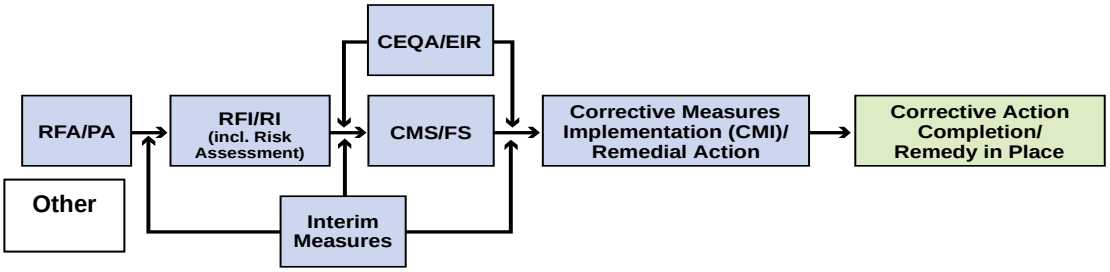
This report is for information only.

How is this information related to the Final Remedy or Regulatory Requirements:
The Desert Tortoise Presence/Absence Surveys 2008 Report is required under the Topock PBA, in accordance with Section 7 of the Endangered Species Act (ESA).

Other requirements of this information?
None

Related Reports and Documents:

Click any boxes in the Regulatory Road Map (below) to be linked to the Documents Library on the DTSC Topock Web Site (www.dtsc-topock.com). **The link to the Documents Library is currently UNDER CONSTRUCTION.**



Legend
RFA/PA – RCRA Facility Assessment/Preliminary Assessment
RFI/RI – RCRA Facility Investigation/CERCLA Remedial Investigation (including Risk Assessment)
CMS/FS – RCRA Corrective Measure Study/CERCLA Feasibility Study
CEQA/EIR – California Environmental Quality Act/Environmental Impact Report

Version 9

Pacific Gas and Electric Company

Yvonne J. Meeks
Manager

Environmental Remediation
Gas Transmission & Distribution

Mailing Address
4325 South Higuera Street
San Luis Obispo, CA 93401

Location
6588 Ontario Road
San Luis Obispo, CA 93405

805.234.2257
Fax: 805.546.5232
E-mail: YJM1@pge.com

September 24, 2009

Ms. Cathy Wolff-White
U.S. Department of the Interior
Bureau of Land Management
2610 Sweetwater Avenue
Lake Havasu City, AZ 86406

Subject: 2009 Desert Tortoise Presence/ Absence Survey Report for the PG&E Topock Compressor Station, Needles, California

Dear Ms. Wolff-White:

This letter transmits the 2009 *Desert Tortoise Presence/ Absence Surveys for the PG&E Topock Compressor Station*. This report was prepared in conformance with the Programmatic Biological Assessment, general project management measure 25, and includes information on the annual (Spring 2009) field survey for the desert tortoise on lands surrounding the PG&E Topock Compressor Station. The survey was conducted by Garcia and Associates (GANDA), and followed the *United States Fish and Wildlife Service Field Survey Protocol for Any Federal Action that May Occur in the Range of the Desert Tortoise* (USFWS 1992). The survey results were similar to past results with no recent evidence of desert tortoise presence.

If you have any questions, please do not hesitate to contact me at (805) 546-5243.

Sincerely,

Yvonne Meeks
Topock Remediation Project Manager

Cc: Carrie Marr / USFWS
Aaron Yue / DTSC
David Elms / CDFG
Rob Knutson / PlaidLogic

Enclosure

DESERT TORTOISE PRESENCE/ABSENCE SURVEYS FOR THE PG&E TOPOCK COMPRESSOR STATION

GARCIA and ASSOCIATES

NATURAL & CULTURAL RESOURCE CONSULTANTS

GANDA

September 2009

Prepared By:

Garcia and Associates
1 Saunders Avenue
San Anselmo, CA 94960

Table of Contents

Figures

Table

Appendices

Introduction

Garcia and Associates (GANDA) conducted the 2009 spring field survey for desert tortoise (*Gopherus agassizii*) on the lands surrounding Pacific Gas and Electric Company's (PG&E's) Topock Compressor Station near Needles, California (Figure 1). This annual survey is required under the *Programmatic Biological Assessment for Pacific Gas and Electric Topock Compressor Station Remedial and Investigative Actions* (CM2M HILL 2007). The purpose was to determine the presence or absence of the federally and State-threatened desert tortoise by following the guidelines published in the United States Fish and Wildlife Service (USFWS) *Field Survey Protocol for any Federal Action that May Occur Within the Range of the Desert Tortoise* (Protocol; USFWS 1992).

Previous desert tortoise surveys were conducted in April/May of 2005, 2006, 2007, and 2008. Although no live tortoises were observed within the survey area, those surveys resulted in the discovery of one tortoise carcass and four sets of tortoise shell bone fragments (Figure 2). Detailed descriptions of those finds are included in the *Desert Tortoise Presence/Absence Survey* reports for 2005, 2006, 2007, and 2008 (GANDA 2005; GANDA 2006; GANDA 2007; GANDA 2008). This report describes the survey methods, findings, and conclusions of the 2009 desert tortoise survey.

Survey Area Description

The survey area comprises approximately 388 hectares surrounding the Topock Compressor Station, which is in the Mojave Desert approximately 24 kilometers (km) southeast of Needles, California in San Bernardino County (Figure 1). The predetermined boundaries of the survey area that were established five years ago include the National Trails Highway to the north and northeast and the Chemehuevi Mountains to the south and southeast (Figure 2). Mojave creosote bush (*Larrea tridentata*)-dominated areas and dry washes, similar to those in the survey area, are present west of the survey area. The Colorado River flows adjacent to the survey area, to the north and east. The terrain includes sparsely vegetated desert, unvegetated desert pavement, numerous shallow to deep washes, gently rolling hills, and the base of the Chemehuevi Mountains in the southeastern portion of the survey area.

Anthropogenic features within the survey area include the compressor station, IM3 Treatment Plant, paved and unpaved access roads, four existing evaporation ponds, an inactive rock quarry, two water tanks for Park Moabi, historic Route 66, numerous groundwater wells, and six natural gas pipelines that run partially above and partially below ground. The site of four former (closed) evaporation ponds is located southeast of the existing evaporation ponds. Interstate 40 and the Burlington Northern Santa Fe (BNSF) Railroad pass through the survey area in an east-west direction. The elevation within the survey area ranges from approximately 61 to 305 meters above sea level. Representative photos of the survey area are provided in Appendix A, photos 1-4.

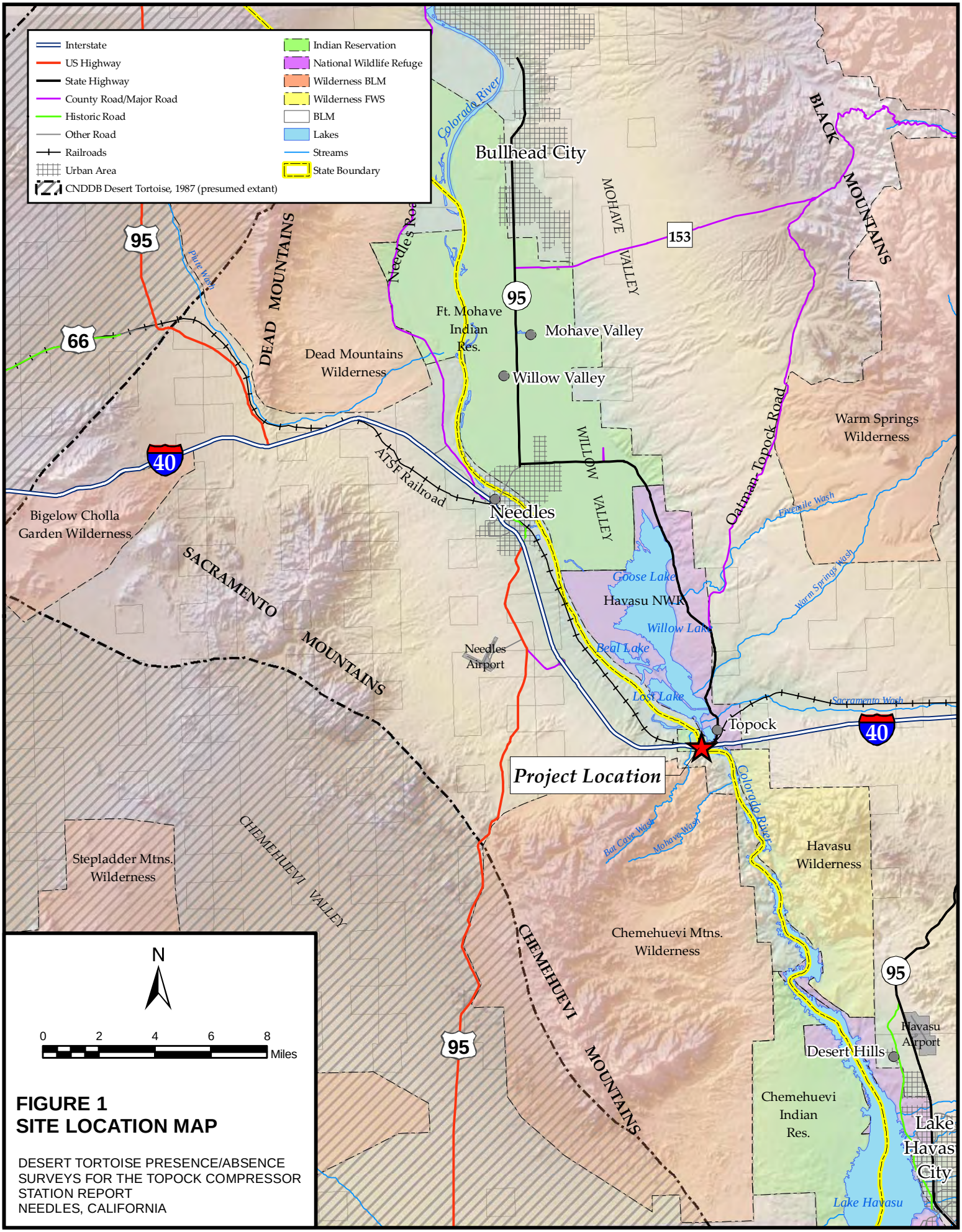


FIGURE 1
SITE LOCATION MAP

DESERT TORTOISE PRESENCE/ABSENCE SURVEYS FOR THE TOPOCK COMPRESSOR STATION REPORT
NEEDLES, CALIFORNIA

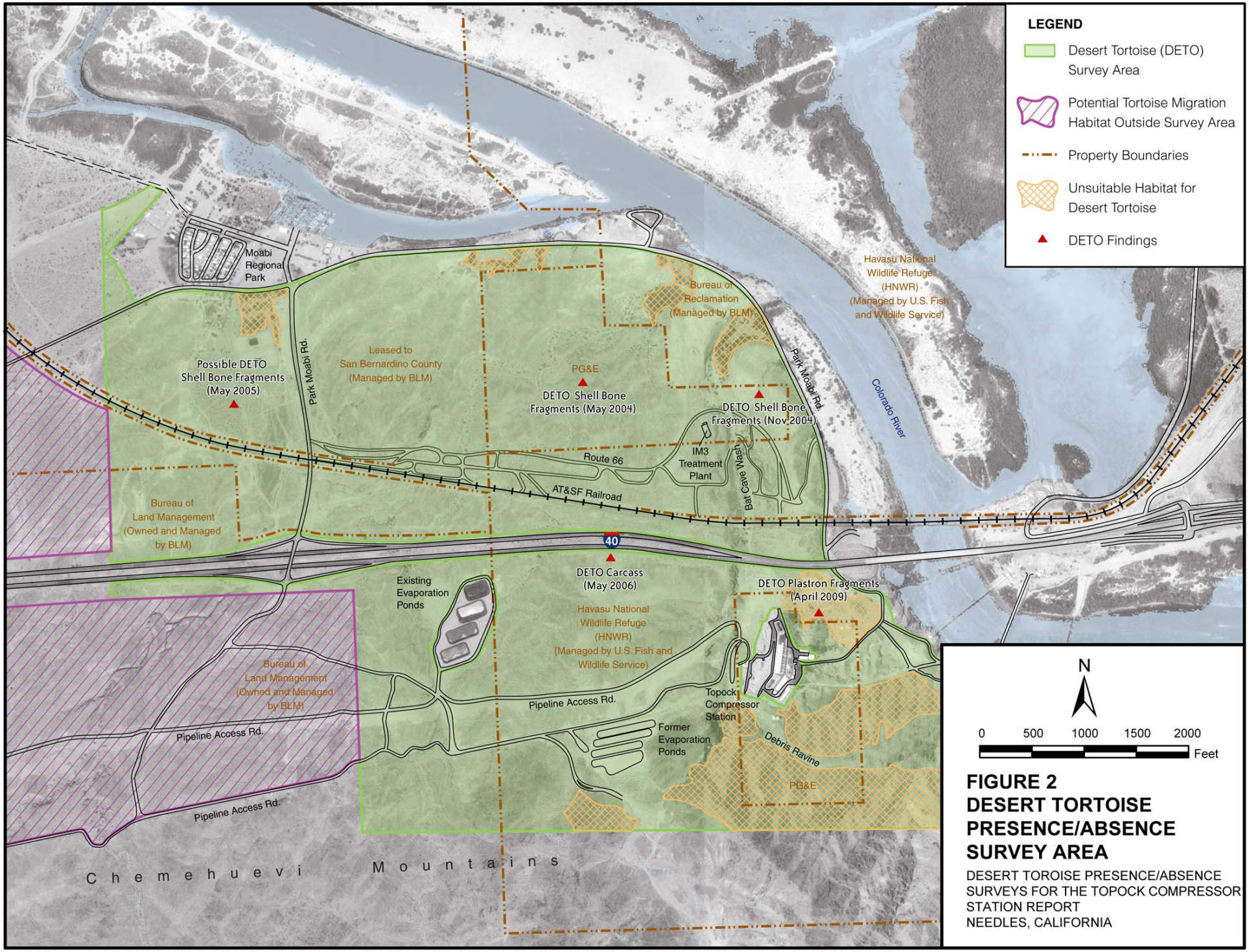


FIGURE 2
DESERT TORTOISE PRESENCE/ABSENCE SURVEY AREA

DESERT TOROISE PRESENCE/ABSENCE SURVEYS FOR THE TOPOCK COMPRESSOR STATION REPORT
NEEDLES, CALIFORNIA

Most of the survey area is on land managed by the Bureau of Land Management (BLM); however, other portions are owned by PG&E or are part of the Havasu National Wildlife Refuge, managed by the USFWS.

Vegetation and Wildlife Habitat

There are two distinct habitat types within the survey area: Mojave creosote bush-dominated areas and dry washes. Both are extremely arid and characterized by only a few dominant perennials.

Mojave creosote scrub dominates the upland areas and is characterized by creosote bush and bursage (*Ambrosia dumosa*). Additional shrubs scattered throughout these areas include white ratany (*Krameria grayi*), brittlebush (*Encelia farinosa*), and cheesebush (*Hymenoclea salsola*). Annual plants observed this year included desert indianwheat (*Plantago ovata*), notch-leaved phacelia (*Phacelia crenulata* ssp. *crenulata*), desert buckwheat (*Eriogonum trichopes*), Arabian schismus (*Schismus arabicus*), and many types of cryptantha (*Cryptantha* spp.).

The majority of the survey area is dissected by myriad dry washes that exist between the mountains to the south of the survey area and the Colorado River to the north and east (Figure 1; Appendix A, Photo 1). Vegetation in the washes is characterized by Mojave desert wash scrub, which consists predominantly of desert-lavender (*Hyptis emoryi*), sweetbush (*Bebbia juncea*), cat-claw acacia (*Acacia greggii*), palo-verde (*Cercidium microphyllum*), smoketree (*Psorothamnus spinosus*), and tamarisk (*Tamarix ramosissima*). The densities of the vegetation in the washes vary dramatically, from portions that are impassable, to areas with relatively sparse vegetation, such as the northern portion of Bat Cave Wash.

Each annual survey conducted between 2005 and 2007 occurred in May after the majority of plant species within the survey area had gone dormant. However, in 2008 and 2009, the survey was conducted in April, following a season of higher-than-normal rainfall. As a result, the surveyors recorded many more plant species than during the earlier surveys when species were either not present or dry and not identifiable. The lists of plant species incidentally observed in the past are provided in the 2005, 2006, 2007, and 2008 survey reports (GANDA 2005; GANDA 2006; GANDA 2007; GANDA 2008). Plants observed during the 2009 survey are provided in Appendix B of this report.

Survey Methods

GANDA wildlife biologists Rob Gilman, Ross Wilming, Miriam Lara, Chloe Scott, Jason Brooks, and Jacqueline Finck conducted a desert tortoise presence/absence survey from March 31 to April 3, and April 6 to April 8, 2009, which is during the active season for this species, in accordance with the Protocol (USFWS 1992). The weather during the survey was warm and sunny with calm winds in the afternoons, ranging from 8 to 16 km per hour.

Air temperatures ranged from approximately 23 to 34° C; the average temperature was 28° C. The surveys were performed between 08:00 and 16:00 hours.

Linear transects were walked systematically to search for desert tortoises and their sign (burrows, scat, tracks, shells, bones, etc.). Particular emphasis was given to searching around the bases of creosote bushes and along the banks of the numerous washes. The survey area was surveyed at 100-percent coverage by spacing transects every 10 meters.

The zone of influence around the survey area was not surveyed due to the natural and artificial barriers that surround the north, east, and south boundaries of the survey area. These barriers constitute unsuitable habitat for desert tortoise and would likely prevent individuals from entering the survey area. However, because similar potential desert tortoise habitat continues west of the survey area, it is possible that a tortoise could enter the survey area along the western boundary (Figure 2). In 2009, the surveyors surveyed outside of the western boundary, as requested by the BLM (C. Wolff-White, pers. comm. 2008) and USFWS (C. Marr, pers. comm. 2008). The purpose was to survey the potential migration pathways that a tortoise could use to enter the survey area.

The areas presented as 'Potential Tortoise Migration Habitat Outside of the Survey Area' on Figure 2 are bordered by a pipeline access road to the south, the AT&SF Railroad to the north, and are separated by Interstate 40. Within these areas (see the purple-crosshatched areas on Figure 2), the surveyors surveyed the pipeline rights-of-way, access roads, and the numerous washes that could function as corridors into the survey area. The areas within 0.8 km of Interstate 40 were not considered a potential migrational pathway because tortoise densities near well-used highways tend to be lower (Boarman and Sazaki 1996). Collisions with vehicles are a main cause of morality for desert tortoises.

Aerial photographs, topographic maps, and global positioning system (GPS) units were used to navigate and assist in determining the boundaries of the survey area, suitable desert tortoise habitat, and the extent and location of the natural and artificial barriers. A majority of the upland habitat was considered suitable for the desert tortoise (Figure 2). The Colorado River floodplain was considered unsuitable habitat.

A Trimble GeoExplorer 3 GPS unit was used in conjunction with flagging, a Garmin GPSMAP® 60CSx GPS unit, and a compass to ensure that the entire survey area was covered and to maintain proper orientation and spacing between transects. On relatively level terrain, the group of five to six surveyors walked parallel transects aligned east-west or north-south in the UTM coordinate system. A surveyor at one end of the group served as the navigator and used the UTM readout of the GPS unit to maintain a constant northing or easting for the transects. At the end of each transect, the starting point was shifted 50 to 60 meters (depending on the number of surveyors) using the UTM readout. In areas where obstacles such as mountains, compressor station facilities, and canyons prevented the surveyors from walking linear transects, the ten-meter spacing was maintained by using the navigation feature on the map-screen of the GPS unit. This feature plotted the survey transect curves as the surveyors walked and allowed the navigator to determine which areas had already been surveyed and to maintain the appropriate ten-meter spacing between transect centerlines.

Due to safety concerns and a lack of suitable habitat, the steep slopes of the Chemehuevi Mountains that surround the Debris Ravine in the southeast corner of the survey area were excluded from the survey (Figure 2). The heavily disturbed staging area immediately east and adjacent to the compressor station (also adjacent to the Transwestern Meter Station) was also not surveyed because it had almost no vegetation and consisted of loose spoil piles and stored equipment. Portions of the survey area containing drainages that were densely vegetated with tamarisk were also not surveyed.

During the surveys, any burrows with a large enough entrance to accommodate a desert tortoise were inspected using a mirror to reflect sunlight into their far ends. A Peeper 2000™ video probe was used instead of a mirror when the far end was not visible from the entrance. The biologists maneuvered the video probe through burrows with opening sizes of 10 to 30 cm. The inside of the burrows could be seen on a head-mounted video display as the biologist navigated the four-meter-long video probe into the burrows.

Results

No live desert tortoises were detected within the survey area or within the potential tortoise migration habitat outside of the survey area, and no sign of recent presence was found during the surveys. One additional set of disarticulated, scattered tortoise shell bone fragments was documented during the 2009 survey (Appendix A, photos 5 and 6). The finding was originally made on September 24, 2008 and reported to the USFWS and BLM on October 2, 2008 (G. Santolo, pers. comm. 2008). The set was located northeast of the Topock Compressor Station near a wood post on the eastern edge of a wash (Appendix A, Photo 7; Figure 2). The *Keys and Figures for Estimating Time Since Death for Shell-skeletal Remains of Desert Tortoises* (Berry and Woodman 1984) was used to try to determine the approximate age of the bone remains found during our surveys. However, these keys could only confirm that all of the tortoise remains were at least four years old. Photos of the tortoise remains were sent to Paul Collins (Santa Barbara Natural History Museum Vertebrate Zoology Curator) who believes that the remains were at least ten years old; and that judging by their appearance, condition, and location, they were probably much older than that (P. Collins, pers. comm. 2009). A summary of the tortoise sign found between 2004 and 2009 is provided in Table 1. Appendix D contains the 2009 negative survey data.

Five burrows with the correct size and shape to accommodate a desert tortoise were found and recorded during the 2005, 2006, and 2007 surveys (Figure 2). These same burrows were still present and in good condition during the 2009 survey (Appendix A, Photo 8). At the time of their discovery, the burrows were categorized as Class 6 (possible desert tortoise burrows in good condition) using the index for desert tortoise sign provided in the Protocol (USFWS 1992). However, since we have not detected any tortoise scat or tracks within these burrows, or anywhere in the survey area, for over the past five years, we now assume

Table 1. Summary of desert tortoise sign detected in the survey area from 2004 - 2009.

Type of Find	Year	Class[1,2]	Size (centimeters)	End visible? Depth (D) (centimeters)	Entrance Direction	(UTM N)[3]	(UTM E)[3]	Comments
Shell remains	2004	5	Not available	Not applicable	Not applicable	3845166	728963	Shell bone fragments originally found by CH2M HILL biologists.
Shell remains	2004	5	Not available	Not applicable	Not applicable	3845111	729510	Sell bone fragments found by CH2M HILL biologists.
Shell remains	2005	5	W = 0.5 – 4	Not applicable	Not applicable	3845091	727776	13 bone fragments found in shallow wash. Appear to be bones under scutes. Edges are serrated. Surfaces on top and bottom are peeling. Coloration is white and bones are completely ossified.
Burrow	2005	6	H = 10 W = 18	Yes; D = 61 cm	NW	3844621	729382	Although very unlikely to be a tortoise burrow, it had a large enough entrance to accommodate one. No tortoise sign in or around the burrow.
Burrow	2005	6	H = 15 W = 25	Yes; D = 30 cm	E	3844900	727670	Although very unlikely to be a tortoise burrow, it had a large enough entrance to accommodate one. No tortoise sign in or around the burrow.
Shell remains	2006	5	W = 2.5 – 15	Not applicable	Not applicable	3844533	729001	This adult male DETO carcass consisted of 14 scattered plastron and carapace bone fragments. The edges of these pieces were serrated and the coloration was white. The external scutes had peeled off and were not present.
Burrow	2006	6	H = 30 W = 58	Yes; D = 79	NW	3844178	728603	Although very unlikely to be a tortoise burrow, it had the approximate size and shape to accommodate one. No tortoise sign in or around the burrow.
Burrow	2006	6	H = 20 W = 41	Yes; D = 178	NW	3844342	728741	Although very unlikely to be a tortoise burrow, it had a large enough entrance to accommodate one. No tortoise sign in or around the burrow.

Type of Find	Year	Class[1,2]	Size (centimeters)	End visible? Depth (D) (centimeters)	Entrance Direction	(UTM N)[3]	(UTM E)[3]	Comments
Burrow	2007	6	H = 15 W = 25	Yes; D = 25 cm	SW	3844377	728700	Although very unlikely to be a tortoise burrow, it had a large enough entrance to accommodate one. No tortoise sign in or around the burrow.
Shell Remains	2009	5	3 bone fragments: 1) 5.5 x 5 2) 3.5 x 3.5 3) 3.5 x 2.5	Not available	Not applicable	3844356	729694	Three plastron bone fragments. Edges are serrated. Surfaces on top and bottom are peeling. Coloration is white and bones are completely ossified (Appendix A, Photo 5).

1. Burrow Class:
   1 = currently active, with tortoise or recent tortoise sign
   2 = good condition, definitely tortoise, no evidence of recent use
   3 = fair condition, definitely tortoise
   4 = deteriorated, definitely tortoise
   5 = deteriorated, possibly tortoise
   6 = good condition, possibly tortoise

2. Shell Remains Class:
   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

3. UTM Zone 11, NAD 83

that these burrows are being used and maintained by coyotes or foxes. Scat from various mammals was observed throughout the survey area.

The biologists used a GPS unit to search for the four previously observed desert tortoise remains. Only three of the four shell remains were found, these included the shell remains that were first observed in May 2004, 2005, and 2006 (Figure 2). The shell bone fragments found in November 2004 were not found in 2009.

Incidental Plant and Wildlife Observations

We observed a variety of plant and wildlife species during each of the desert tortoise surveys. A list of the plant species incidentally observed during the annual surveys conducted between 2005 and 2009 is provided in Appendix B; a list of incidentally observed animals is provided in Appendix C. Observed wildlife species included numerous birds, reptiles (e.g. coach-whip snake [*Masticophis flagellum*]), and small mammals (e.g. desert cottontail [*Sylvilagus audubon*ii], black-tailed jackrabbit [*Lepus californicus*], and kit fox [*Vulpes macrotis*]). Signs of wildlife species observed included lesser nighthawk (*Chordeiles acutipennis*) eggs, and bat guano and insect remains in Bat Cave Wash.

Discussion and Conclusion

Similar to those of the 2005, 2006, 2007, and 2008 surveys, the results of the 2009 survey indicate desert tortoises are absent in the survey area. The desert tortoise carcass and four sets of highly deteriorated bone shell fragments (Figure 2; Table 1) found in previous surveys may indicate historical use of the survey area. However, no desert tortoise scats, tracks, or other evidence of live tortoises or recent tortoise use was observed anywhere within the survey area or within the potential tortoise migration habitat located outside of the survey area.

The survey area has been highly disturbed by numerous uses and is fragmented by the AT&SF Railroad and Interstate 40. Railroads and highways with moderate to heavy traffic, such as the AT&SF Railroad and Interstate 40, are known causes of mortality for desert tortoises. Linear transportation features contribute to habitat degradation; facilitate the dispersal of invasive weeds; encourage increases in the population of the common raven (*Corvus corax*); alter the dynamics of rainwater runoff; and provide human access and use (Boarman and Sazaki 1996). Interstate 40 runs east-west through the central portion of the survey area, and U.S. Route 95 runs north-south, approximately 9 km to the west. These highways have fragmented and possibly isolated the habitat within the survey area and surrounding vicinity. Because construction of U.S. 95 began in the 1930s and construction of Interstate 40 began in the late 1940s, these paved roads have likely negatively affected desert tortoise populations within the survey area for many decades.

The five sets of shell remains found since 2004 are all very old, disarticulated and weathered (Figure 2; Table 1). Although we could not determine how long the tortoise bones have been laying on the surface of the ground, it is reasonable that the bones have been exposed (i.e. out on the ground) for at least 10 years, and probably much longer. Bones in the desert take a long time to degrade due partly to extremely dry weather

conditions (P. Collins, pers. comm. 2009). It is possible that the bones we found predate the degraded habitat conditions currently observed on the survey area.

There are no California Natural Diversity Database (CNDDB) records within 15 km of the survey area. The nearest CNDDB desert tortoise occurrence is an enormous polygon that includes the Chemehuevi Valley west of U.S. Route 95 and Interstate 40 (Figure 1; CDFG 2009). This occurrence was recorded in 1987 and the presence of desert tortoise is listed as 'presumed extant'. The western boundary of this occurrence polygon is within 16 km of the survey area.

In the unlikely event that a desert tortoise is discovered in the future, the protective measures of the *Programmatic Biological Assessment for Pacific Gas and Electric Topock Compressor Station Remedial and Investigative Actions* (CH2M HILL 2007) are in place to protect the desert tortoise.

References

Berry, K. H. and A. P. Woodman. 1984. Keys and Figures for Estimating Time Since Death for Shell-skeletal Remains of Desert Tortoises.

Boarman, W. I. and M. Sazaki. 1996. Highway mortality in desert tortoises and small vertebrates: success of barrier fences and culverts. Pages 169 - 173 in Transportation and wildlife: reducing wildlife mortality and improving wildlife passageways across transportation corridors. G. Evink, D. Zeigler, P. Garrett, and J. Berry, editors. U.S. Department of Transportation, Federal Highway Administration, Washington, DC.

CDFG. 2009. Natural Diversity Data Base (RareFind 3; CNDDB). Electronic database. Wildlife and Habitat Data Analysis Branch. Sacramento, California.

CH2M HILL. 2007. Programmatic Biological Assessment for Pacific Gas and Electric Topock Compressor Station Remedial and Investigative Actions. January.

Garcia and Associates (GANDA). 2005. Desert Tortoise Presence/Absence Surveys for the PG&E Compressor Station Expanded Groundwater Extraction and Treatment System, Topock, California. June.

GANDA. 2006. Desert Tortoise Presence/Absence Surveys for the PG&E Compressor Station Expanded Groundwater Extraction and Treatment System, Topock, California. June.

GANDA. 2007. Desert Tortoise Presence/Absence Surveys for the PG&E Topock Compressor Station. July.

GANDA. 2008. Desert Tortoise Presence/Absence Surveys for the PG&E Topock Compressor Station. May.

USFWS (United States Fish and Wildlife Service). 1992. Field Survey Protocol for any Federal Action that May Occur Within the Range of the Desert Tortoise. January 1992.

Personal Communications

Collins, Paul. Vertebrate Zoology Department Curator, Santa Barbara Museum of Natural History. Email correspondence with Rob Gilman (GANDA biologist). August 4, 2009.

Marr, Carrie. U.S. Fish and Wildlife Service (USFWS). Conversation with Gary Santolo (Senior Scientist CH2M HILL). October 2008.

Santolo, Gary. CH2M HILL. Email communication to Cathy Wolff-White (BLM), Carrie Marr (UFWS), and Cindi Hall (UFWS). October 2, 2008.

Wolff-White, Cathy. Bureau of Land Management (BLM). Conversation with Gary Santolo (Senior Scientist, CH2M HILL). October 2008.

Appendix A

Photographs

Photo 1. The majority of the survey area is dissected by myriad washes that exist between the Colorado River to the north and the Chemehuevi Mountains to the south.

Photo 2: View of the Colorado River, taken in the northern portion of the survey area.

Photo 3. View of the steep Chemehuevi Mountains and drainages, taken in the southern portion of the survey area.

Photo 4. The AT&SF Railroad runs east-west through the central portion of the survey area, roughly paralleling Interstate 40.

Photo 5. A close-up of tortoise plastron bone shell fragments. Note: this photo was taken at the location where fragments were found.

Photo 6. A close-up of the same tortoise plastron bone shell fragments illustrated in Photo 5.

Photo 7. The tortoise plastron bones were found to the left of the wooden stake.

Photo 8. Potential desert tortoise burrow located in 2006.

Appendix B

Incidentally Observed Plant Species

Table B-1: Dicots incidentally observed during the desert tortoise survey.

Latin Name	Common Name
DICOTS	
AMARANTHACEAE	**amaranth family**
Amaranthus sp.	Pigweed
Tidestromia oblongifolia	Honeysweet
ASCLEPIADACEAE	**milkweed family**
Asclepias subulata	rush milkweed
Sarcostemma cynanchoides ssp. *hartwegii*	climbing milkweed
ASTERACEAE	**sunflower family**
Ambrosia dumosa	Bursage
Atrichoseris platyphylla	gravel-ghost
Baccharis sarathroides	broom bacharis
Bebbia juncea	Sweetbush
Chaenactis carphoclinia	pebble pincushion
Chaenactis stevioides	desert pincushion
Encelia farinosa	brittlebush
Eriophyllum wallacei	Wallace's eriophyllum
Geraea cansescens	desert sunflower
Hymenoclea salsola	Cheesebush
Lactuca serriola	prickly lettuce
Palafoxia arida	Spanish needle
Perityle emoryi	emory rock daisy
Peucephyllum schottii	pygmy-cedar
Psathyrotes ramosissima	velvet turtleback
Stephanomeria pauciflora	Skeletonweed
Trichoptilium incisum	Yellowhead
BORAGINACEAE	**borage family**
Amsinckia tessellata	Devil's lettuce
Cryptantha angustifolia	narrow leaved cryptantha
Cryptantha circumscissa	cushion cryptantha
Cryptantha decipiens	cushion cryptantha
Cryptantha maritima	gravelbar cryptantha
Tiquilia plicata	fanleaf crinklemat
BRASSICACEAE	**mustard family**
Descurrania pinnata	tansy mustard
Descurrania pinnata	tansy mustard
Lepidium sp.	Pepperweed
Brassica tournefortii	
CACTACEAE	**cactus family**
Cylindropuntia c.f. *achanthocarpa*	buckhorn cholla

Latin Name	Common Name
Cylindropuntia echinocarpa	silver cholla
Cylindropuntia ramosissima	pencil cholla
Echinocereus engelmannii	hedgehog cactus
Ferocactus cylindraceus var *cylindraceus*	california barrel cactus
Opuntia basilaris var *basilaris*	beavertail
Mammillaria dioica	fish hook cactus
CHENOPODIACEAE	**goosefoot family**
Atriplex spinifera	spinescale
Atriplex sp.	saltbush
Salsola tragus	russian thistle
CUCURBITACEAE	**gourd family**
Cucurbita palmata	coyote gourd
EUPHORBIACEAE	**spurge family**
Chamaesyce micromera	desert spurge
FABACEAE	**legume family**
Acacia greggii	catclaw acacia
Cercidium microphyllum	palo verde
Dalea mollis	silk dalea
Lupinus arizonicus	Arizona lupine
Prosopis glandulosa var *torreyana*	honey mesquite
Psorothamnus spinosus	smoketree
FOUQUIERIACEAE	**ocotillo family**
*Fouquieria splendens*ssp *splendens*	ocotillo
HYDROPHYLLACEAE	**waterleaf family**
Phacelia crenulata ssp *crenulata*	notch-leaved phacelia
Phacelia sp	
KRAMERIACEAE	**rhatany family**
Krameria grayi	white ratany
LAMIACEAE	**mint family**
Hyptis emoryi	desert-lavender
Salazaria mexicana	bladder sage
Salvia columbariae	chia
LOASACEAE	
Mentzelia c.f. *albicaulis*	
Mentzelia sp	
MALVACEAE	**mallow family**

Latin Name	Common Name
Sphaeralcea ambigua var *ambigua*	apricot mallow
NYCTAGINACEAE	
Boerhavia sp.	spiderling
ONAGRACEAE	**evening primrose family**
Camissonia boothii	Booth's evening primrose
Camissonia breivipes	yellow cups
Camissonia cardiophylla var *cardiophylla*	heartleaf sun-cup
Camissonia claviformis	clavate fruited primrose
PAPAVERACEAE	
Eschscholzia minutiflora	pygmy poppy
PLANTAGINACEAE	**plantain family**
Plantago ovata	desert indianwheat
POLEMONIACEAE	**phlox family**
Gilia sp	
Langloisia setosissima ssp *setosissima*	bristly langloisia
POLYGONACEAE	**buckwheat family**
Chorizanthe brevicornu var *brevicornu*	brittle spineflower
Chorizanthe corrugata	wrinkled spineflower
Chorizanthe rigida	spiney rigid herb
Eriogonum deflexum var *deflexum*	flatcrown buckwheat
Eriogonum inflatum var *inflatum*	desert trumpet
Eriogonum trichopes	little desert buckwheat
Oxytheca perfoliata	round-leaf spineflower
SCROPHULARIACEAE	**Figwort family**
Mimulus bigelovii	Bigelow's monkeyflower
Mohavea confertiflora	ghost flower
SOLONACEAE	**Nightshade family**
Lycium torreyi	wolfberry
Nicotiana obtusifolia	desert tobacco
Physalis crassifolia	thick-leaf ground cherry
TAMARICACEAE	**Tamarisk family**
Tamarix ramosissima	tamarisk
ZYGOPHYLLACEAE	
Larrea tridentata	creosote bush

Table B-2: Monocots incidentally observed during the desert tortoise survey.

Latin Name	Common Name
MONOCOTS	
LILIACEAE	**Lily family**
Hesperocallis undulata	desert lily
POACEAE	**Grass family**
Aristida adsensionis	six-weeks three awn
Avena barbata	slender wildoat
Bromus arizonicus	Arizona brome
Bromus catharticus	rescue grass
Bromus madritensis sp *rubens*	red brome
Cynodon dactylon	bermuda grass
Distichlis spicata	saltgrass
Elytrigia repens	quackgrass
Erioneuron pulchellum	fluff grass
Pennisetum villosum	feathertop
Phalaris arundinacea	reed canary grass
Phleum pratatense	cultivated timothy
Schismus arabicus	Arabian schismus
Vulpia microstachys var *microstachys*	desert fescue
Vulpia octoflora	six weeks fescue

Appendix C

Incidentally Observed Wildlife Species

Table C-1: Reptiles incidentally observed during the desert tortoise survey.

Latin Name	Common Name	2005	2006	2007	2008	2009
Masticophis flagellum	Coachwhip		x	x	x	x
Dipsosaurus dorsalis	desert iguana	x	x		x	x
Sauromalus obesus	common chuckwalla	x				
Uta stansburiana	common side-blotched lizard	x	x		x	x
Phrynosoma platyrhinos	desert horned lizard	x				
Cnemidophorus tigris	western whiptail	x	x	x	x	x
Salvadora hexalepis	western patch-nosed snake	x	x		x	
Crotalus atrox	Western diamond-backed rattlesnake		x			
Crotalus mitchellii	speckled rattlesnake	x			x	
Crotalus scutulatus	Mojave rattlesnake		x			

Table C-2: Birds incidentally observed during the desert tortoise survey.

Latin Name	Common Name	2005	2006	2007	2008	2009
Phalacrocorax auritus	double-crested cormorant			x		
Ardea herodias	great blue heron			x		
Ardea alba	great egret			x		x
Cathartes aura	turkey vulture	x	x	x	x	x
Branta canadensis	Canada goose			x		
Buteo jamaicensis	red-tailed hawk		x	x	x	x
Falco sparverius	American kestrel		x	x	x	x
Pandion haliaetus	osprey			x		
Callipepla californica	California quail		x	x		
Callipepla gambelii	Gambel's quail	x	x	x	x	x
Charadrius vociferus	killdeer		x	x	x	x
Streptopelia decaocto	Eurasian collared dove			x	x	x
Columba livia	rock pigeon	x	x	x	x	x
Zenaida asiatica	white-winged dove	x	x	x	x	x
Zenaida macroura	mourning dove	x	x	x	x	x
Tyto alba	barn owl			x		
Bubo virginianus	great horned owl			x		
Geococcyx californianus	greater roadrunner		x	x	x	x
Aeronautes saxatalis	white-throated swift			x		
Chordeiles acutipennis	lesser nighthawk	x	x	x	x	x
Picoides scalaris	ladder-backed woodpecker	x				
Archilochus alexandri	black-chinned hummingbird		x	x	x	x
Calypte costae	Costa's hummingbird		x			

Latin Name	Common Name	2005	2006	2007	2008	2009
Sayornis saya	Say's phoebe	x	x	x	x	x
Ceryle alcyon	belted kingfisher			x		x
Contopus sordidulus	western wood pewee			x		
Empidonax sp.	flycatcher			x	x	x
Empidonax wrightii	gray flycatcher			x		
Myiarchus cinerascens	ash-throated flycatcher	x	x	x	x	x
Tyrannus verticalis	western kingbird	x	x	x	x	x
Lanius ludovicianus	loggerhead shrike	x	x	x		x
Corvus corax	common raven	x	x	x		
Stelgidopteryx serripennis	northern rough-winged swallow	x	x	x	x	x
Riparia riparia	bank swallow		x	x	x	x
Vireo bellii	Bell's vireo			x		
Auriparus flaviceps	verdin	x	x	x	x	x
Campylorhynchus brunneicapillus	cactus wren			x	x	x
Salpinctes obsoletus	rock wren				x	
Catherpes mexicanus	canyon wren		x	x		
Thryomanes bewickii	Bewick's wren	x				
Cistothorus palustris	marsh wren			x		
Polioptila caerulea	blue-gray gnatcatcher			x	x	x
Polioptila melanura	black-tailed gnatcatcher	x	x	x	x	x
Vermivora luciae	Lucy's warbler	x		x		
Vermivora celata	Orange-crowned warbler			x	x	x
Dendroica petechia	yellow warbler		x	x	x	x
Oporornis tolmiei	MacGillivray's Warbler			x		
Spizella breweri	Brewer's sparrow			x		
Geothlypis trichas	common yellowthroat	x	x	x		
Wilsonia pusilla	Wilson's warbler		x	x	x	x
Chondestes grammacus	lark sparrow			x		
Piranga ludoviciana	western tanager			x		
Pipilo chlorurus	green-tailed towhee			x		
Pipilo aberti	Abert's towhee		x	x	x	x
Amphispiza bilineata	black-throated sparrow	x	x	x	x	x
Zonotrichia leucophrys	white-crowned sparrow			x		x
Icterus bullockii	Bullock's oriole			x		
Agelaius phoeniceus	red-winged blackbird		x	x	x	x

Latin Name	Common Name	2005	2006	2007	2008	2009
Carpodacus mexicanus	house finch			x	x	x
Quiscalus mexicanus	great-tailed grackle	x	x	x	x	x
Pheucticus melanocephalus	Black-headed grosbeak			x		
Passer domesticus	house sparrow		x	x		x

Table C-3: Mammals incidentally observed during the desert tortoise survey.

Latin Name	Common Name	2005	2006	2007	2008	2009
Sylvilagus audubonii	desert cottontail	x	x	x	x	x
Lepus californicus	black-tailed jackrabbit	x	x	x	x	x
Ammospermophilus leucurus	antelope ground squirrel	x	x	x	x	x
Spermophilus beecheyi	California ground squirrel			x		
Neotoma lepida	desert woodrat	x				
Vulpes macrotis	kit fox		x		x	x
Equus asinus	burro		x	x	x	x

Appendix D

Field Data Forms

Desert Tortoise Survey Results

Date: 3/31/09

Begin time: 0800

End time: 1600

Weather conditions: Clear & Sunny

Temp High: 82°F

Surveyors: R. Gilman, J. Brooks, C. Scott, J. Finck, R. Wilming

⊗ Notes: No new DETO finds.

GPS ID #	Type of find	Class*	Size (cm)	Sex	Direction of burrow entrance	UTM Coordinates (NAD 83)	Photo Number	Comments/ Description and condition of find
⊗								

* See reverse

Desert Tortoise Survey Results

Date: 4/1/09

Begin time: 0800

End time: 0330

Weather conditions: Clear & Sunny
Temp. High: 83°F

Surveyors: R. Gilman, J. Brooks, C. Scott, J. Finck, R. Wilming

(X) Notes: No new deto finds.

GPS ID #	Type of find	Class*	Size (cm)	Sex	Direction of burrow entrance	UTM Coordinates (NAD 83)	Photo Number	Comments/ Description and condition of find
(X)								

* See reverse

Desert Tortoise Survey Results

Date: 4/2/09

Begin time: 0800

End time: 1600

Weather conditions: Clear & Sunny
Temp. High: 86° F

Surveyors: R. Gilman, J. Brooks, C. Scott, J. Finck, R. Wilming

(X) Notes: No new deto finds.

GPS ID #	Type of find	Class*	Size (cm)	Sex	Direction of burrow entrance	UTM Coordinates (NAD 83)	Photo Number	Comments/ Description and condition of find
(X)								

* See reverse

Desert Tortoise Survey Results

Date: 4/3/09

Begin time: 0800

End time: 1330

Weather conditions: Clear & Sunny
Temp. High: 73°F

Surveyors: R. Gilman, J. Brooks, C. Scott, J. Finck, R. Wilming

(X) Notes: No new deto finds.

GPS ID #	Type of find	Class*	Size (cm)	Sex	Direction of burrow entrance	UTM Coordinates (NAD 83)	Photo Number	Comments/ Description and condition of find
(X)								

* See reverse

Desert Tortoise Survey Results

Date: 4/6/09

Begin time: 0800

End time: 1630

Weather conditions: Clear & Sunny
Temp. High: 83°F

Surveyors: R. Gilman, J. Brooks, M. Vamstad
C. Scott, J. Finck, R. Wilming

(X) Notes: No new DETO finds.

GPS ID #	Type of find	Class*	Size (cm)	Sex	Direction of burrow entrance	UTM Coordinates (NAD 83)	Photo Number	Comments/ Description and condition of find
(X)								

* See reverse

Desert Tortoise Survey Results

Date: 4/7/09

Begin time: 0800

End time: 1600

Weather conditions: Clear and sunny. Temp. high: 91°F

Surveyors: R. Gilman, J. Brooks, M. Vamstad C. Scott, J. Finck, R. Wilming

(X) Notes: No new DETO finds.

GPS ID #	Type of find	Class*	Size (cm)	Sex	Direction of burrow entrance	UTM Coordinates (NAD 83)	Photo Number	Comments/ Description and condition of find
(X)								

* See reverse

Desert Tortoise Survey Results

Date: 4/8/09 Weather conditions: Clear & sunny Surveyors: R. Gilman, J. Brooks, C. Scott, J. Finck, R. Wilming

Begin time: 0800 Temp. high: 74°F

End time: 1330 Notes: 1 New tortoise find for 2009.

GPS ID #	Type of find	Class*	Size (cm)	Sex	Direction of burrow entrance	UTM Coordinates (NAD 83)	Photo Number	Comments/ Description and condition of find
(*) —	Carcass	5	1) 5x6.5 2) 3.5x3.5 3) 3.5x2.5	—	—	3844356 729694	Wilming	Located NE of compressor station near a wood post on the eastern edge of a wash. 3 plasteron bone fragments (old). {Size of the 3 plasteron bone fragments.

* See reverse

(*) Note: This find was originally made on 9/24/08 and reported to USFWS and BLM on 10/2/08.

BURROWS

Class:
- 1 = Currently active, with tortoise or recent tortoise sign.
- 2 = Good condition, definitely tortoise, no evidence of recent use.
- 3 = Fair condition, definitely tortoise.
- 4 = Deteriorated, definitely tortoise.
- 5 = Deteriorated, possibly tortoise.
- 6 = Good condition, possibly tortoise.

SCATS

Class:
- 1 = Wet (not from rain or dew) or freshly dried, obvious odor.
- 2 = Dry with glaze and some odor; no bleaching (dark brown).
- 3 = Dry without glaze or odor; light brown; tightly packed material.
- 4 = Dry without glaze or odor; yellow; loose material; scaly appearance.
- 5 = Dry without glaze or odor; bleached (white); consists only of plant material.

CARCASS

Class:
- 1 = Fresh or putrid.
- 2 = Normal color, scutes adhering to bone.
- 3 = Scutes have peeled off bone.
- 4 = Bones falling apart, growth rings or scutes are peeling.
- 5 = Disarticulated and scattered.

LIVE TORTOISE

Condition:
- 1 = Healthy
- 2 = Evidence of URDS
- 3 = Shell cracked
- 4 = Peeling Scutes
- 5 = Ticks
- 6 = Other

Activity:
- A = Foraging
- B = Traveling
- C = Basking in sun
- D = in burrow
- E = Digging burrow
- F = Other:

Source of key:
USFWS 1992 Field Survey Protocol for any Federal Action that May Occur within the Range of the Desert Tortoise.