# Habitat Evaluation for Sonoran Desert Tortoise (*Gopherus morafkai*) along the Proposed Right-of-Way for the Loop 202 South Mountain Freeway

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### **RECOMMENDED CITATION**

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#### **Project Synopsis**

This project's primary purpose was to conduct a preliminary survey to determine habitat suitability for Sonoran Desert Tortoise (Gopherus morafkai; SDT) within and adjacent to the proposed right-of-way (ROW) for the State Route 202 Loop (SR 202L) South Mountain Freeway. Additional goals were to collect information on roadkill along Pecos Road and evaluate potential wildlife crossing locations between the South Mountain Park/Preserve and the Sierra Estrella Mountains. Using a map of potential SDT habitat, we created a 1-km buffer around the ROW and conducted 11 days of foot surveys within our study area. During the course of our survey, we observed one live SDT, three active SDT shelters with scat, and three SDT carcasses. We conducted two road mortality surveys on Pecos Road and found no sign of SDTs. We developed a qualitative map of SDT habitat within the study area and identified those habitats that were of high, medium, and low quality. We evaluated the wildlife use and environmental characteristics of six potential wildlife passages on the SR 202L ROW. We recommend that the area be surveyed for SDTs during their active season and that up to ten SDTs be fitted with radio transmitters to gain a greater understanding of SDT use of this corridor. Additionally, we found the potential wildlife crossings to be of low or medium quality. Finally, given that Common Chuckwallas (Sauromalus ater) which occur in the South Mountain Park/Preserve (SMPP) are protected under Arizona Game and Fish Department (AGFD) Commission Order 43, we recommend that surveys to determine the extent of their habitat be conducted to avoid unintended mortality during construction.

#### Introduction

This report provides an initial evaluation of the potential for SDT habitat within the proposed SR 202L ROW. The SDT has been identified as a candidate species for Endangered Species Act (ESA) protection by the United States Fish and Wildlife Service (USFWS 2010). In their 12-month finding, the USFWS indicated that the SDT warrants protection as a distinct species under the ESA (USFWS 2012), but was precluded due to other higher listing priorities. Further, roadways were identified by the USFWS, in their 12-month finding, as a contributor to the decline of SDT populations in Arizona. Besides direct mortality, roads impede SDT movements (AIDTT 2000) and have been identified as a significant threat to Mohave Desert Tortoise (*Gopherus agassizi*) populations throughout their distribution (Berry 1986a, b, Boarman and Sazaki 1996, von Seckendorff Hoff and Marlow 2002, Boarman and Sazaki 2006).

The proposed SR 202L will bisect a potential corridor for SDT populations between the South Mountains and the Sierra Estrella Mountains (Figure 1). There are 11 records of SDT between 2000-2010 from SMPP in the AGFD Heritage Data Management System (HDMS). The nearest of these records to the SR 202L ROW is greater than 2-km. However, there have been very few surveys conducted on SDT in this region, with the most comprehensive being that of Jones (2008). This suggests that the area has not been surveyed sufficiently to know whether SDT occur around or in the ROW. Therefore, the purpose of this survey was to evaluate the ROW and a surrounding buffer for SDT presence and potential habitat for use in planning and implementation of highway construction. In addition, it is intended to provide insight regarding

other wildlife observations that may prove important in the coming stages of the development of the SR 202L.



**Figure 1.** Location of the right-of-way for the SR 202L in relation to South Mountain, Sierra Estrella, metropolitan Phoenix, ADOT predicted Sonoran Desert Tortoise habitat, and Heritage Data Management System records for the Sonoran Desert Tortoise.

## Objectives

The specific objectives of this project were to:

- 1. Conduct walking surveys to detect SDT or their sign within the predicted SDT habitat along the State Route 202L ROW; and
- 2. Develop a preliminary habitat model for SDT within the ROW based on ground surveys, expert opinion, and remotely sensed data.

## Methods

### Study Area

The study area is located in Maricopa County, Arizona and focuses on the proposed ROW for SR 202 (Figure 1). The SR 202L will be a 22-mile-long corridor that will connect Interstate 10 (I-10) south at its intersection with Pecos Rd. and north with its junction between 57<sup>th</sup> and 63<sup>rd</sup> Avenues. The proposed SR 202L crosses predicted SDT habitat south of its intersection with 51<sup>st</sup> Avenue and west of 32<sup>nd</sup> Street. Earlier analysis completed for the Arizona Department of Transportation (ADOT) Biological Evaluation for the project (ADOT 2014) modeled and converted to a shapefile potential SDT habitat by utilizing AGFD's HabiMAP<sup>TM</sup> and extending it to areas that may be suitable habitat for SDTs. To create a refined study area, we buffered the potential SDT habitat shapefile to within 1-km of the SR 202 (Figure 2), as this distance should account for the average SDT home range size (Averill-Murray et al. 2002, Hoffman et al. 2013). Because much of the southern and western portion of the study area are on Gila River Indian Community lands, we focused this effort on the northern and eastern portion of the study area.



Figure 2. Location of SR 202L right-of-way and Sonoran Desert Tortoise Study Area, in 2014.

Where we had access to conduct foot surveys, we followed traditional methodology used in detecting SDT in Arizona (Hoffman and Leavitt 2013), with the exception of spacing between

surveyors; here we maximized our effort by conducting surveys broadly across the study area. Location data was recorded in UTMs (NAD83) for all live SDT detections, SDT carcasses, scat, and active shelters. Surveyor names, weather data, start and end times, and all pertinent field notes were recorded. In addition, we recorded all wildlife sign observed.

On three dates (22, 27 and 29 OCT, 2014), road-mortality surveys were conducted along Pecos Rd. to evaluate this area of the potential project ROW. Our methodology for road-mortality surveys followed that of Leavitt and Hoffman (2014). In order to avoid loss of road mortality evidence by scavengers, all surveys began at sunrise. Surveys consisted of walking against traffic and examining the road surface, median, shoulder, and right-of-way for any remains of road-killed wildlife. All wildlife encountered was identified to the lowest taxonomic level possible, and when possible, removed to avoid re-counting.

Potential wildlife crossing areas identified by ADOT were evaluated on foot or from a nearby area of higher elevation for areas to which access was not granted. These areas were photographed and surveyed for potential wildlife currently occupying the area.

### Results

During 11 survey days and 24 person days, we detected one live SDT (Figure 3), three active SDT shelters and three SDT carcasses (Figure 4). The live tortoise was marked following standard methods (Hoffman and Leavitt 2013) and fitted with a radio transmitter. The three carcasses were estimated to be between <1 and 2 years since mortality.

Road-mortality surveys resulted in the detection of seven species (Table 1). The highest concentration of road-mortality was adjacent to the Foothills Golf Club (Figure 5).

Our evaluation of the six wildlife crossings resulted in the determination that three were of low quality and three were of medium quality (Table 2). Determinations were made after evaluating the sites for current human use, environmental conditions (*i.e.* vegetation cover, surrounding landscape, etc.), and on site wildlife observations (Figure 6 [wildlife crossing 6 was not accessible and was evaluated from a distance]).



**Figure 3.** The single Sonoran Desert Tortoise detected during Fall surveys in 2014 within South Mountain Park / Preserve.



**Figure 4.** Qualitative map of Sonoran Desert Tortoise habitat and location of all Sonoran desert tortoise sign detected within the study area for the SR 202L (Portion of map in black represents private lands where access was not granted).

Scientific Name	Common Name	Observed	Sign	Rd. Mortality
Amphibians				<b>_</b>
Lithobates berlanderi	Rio Grande Leopard Frog	-	-	3
Scaphiophus couchii	Couch's Spadefoot	-	-	1
Anaxyrus cognatus	Great Plains Toad	-	-	1
Anaxyrus punctatus	Red-spotted Toad	-	-	2
Incilius alvarius	Sonoran Desert Toad	-	-	13
Reptiles				
Coleonyx variegatus	Banded Gecko	Х	-	-
Uta stansburiana	Side-blotched Lizard	Х	-	4
Urosaurus ornatus	Ornate Tree Lizard	Х	-	-
Sceloporus magister	Desert Spiny Lizard	Х	-	1
Sauromalus ater	Common Chuckwalla	Х	Х	-
Phrynosoma solare	Regal Horned Lizard	Х	-	-
Aspidocelis tigris	Tiger Whiptail	Х	-	-
Gopherus morafkai	Sonoran Desert Tortoise	Х	Х	-
Crotalus mitchelii	Speckled Rattlesnake	Х	-	-
Crotalus tigris	Tiger Rattlesnake	Х	-	-
Salvadora hexalepis	Western Patch-nosed Snake	Х	-	-
Pituophis catenifer	Gophersnake	-	-	1
Sonora semiannulata	Western Groundsnake	-	Х	-
Mammals				
Dipodomys merriami	Merriam's Kangaroo Rat	-	-	6
Perognathus amplus	Arizona Pocket Mouse	-	-	2
Sylvilagus audobonii	Desert Cottontail	Х	-	-
Lepus californicus	Black-tailed Jackrabbit	Х	-	-
Neotoma albigula	White-throated Woodrat	Х	Х	-
Ammospermophilus	Harris's Antelope	V		
harrisii	Squirrel	Λ	-	-
Canis latrans	Coyote	Х	Х	2
Pecari tajacu	Collared Peccary	Х	Х	-
Puma concolor	Mountain Lion	-	Х	-
Xerospermophilus	Pound tailed Ground Squirrel	v		1
tereticaudus	Kound-tailed Ground Squiffer	Λ	-	1
Birds				
Auriparus flaviceps	Verdin	Х	-	-
Zonotrichia leucophrys	White-crowned Sparrow	Х	-	-
Phainopepla nitens	Phainopepla	Х	-	-
Accipiter cooperii	Cooper's Hawk	Х	-	-
Circus cyaneus	Northern Harrier	Х	-	-
Megascops kennicottii	Western Screech Owl	Х	-	-
Buteo jamaicensis	Red-tailed Hawk	Х	-	-
Cathartes aura	Turkey Vulture	Х	-	-
Falco sparverius	American Kestrel	Х	-	-
Falco mexicanus	Prairie Falcon	Х	-	-
Corvus corvax	Common Raven	Х	-	-
Campylorhynchus	Cootus Wron	v		
brunneicapillus	Cactus wren	Λ	-	-
Zenaida macroura	Mourning Dove	Х	-	-
Callipepla gambelii	Gambel's Quail	Х	-	-
Toxostoma curvirostre	Curve-billed Thrasher	Х	-	-
Melanerpes uropygialis	Gila Woodpecker	Х	-	-
Colaptes auratus	Northern Flicker	Х	-	-

Table 1. List of all wildlife observations during surveys for the SR 202L.



**Figure 5.** Map of all road mortality observed during surveys of Pecos Road within the Right-of-Way for the SR 202L. Three surveys were conducted between 22 and 29 October, 2014.

Table 2. List of wildlife crossings	s evaluated on the	e Right-of-Way	for the SR 202L
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Wildlife Crossing Number	UTMe	UTMn	Crossing Quality
1	393509	3685421	Low
2	393117	3685866	Low
3	391469	3687776	Low
4	391806	3687376	Medium
5	393743	3685175	Medium
6	394467	3684388	Medium



**Figure 6.** Photographs of five of the six potential wildlife crossings evaluated on the Right-of-Way for the SR 202L. Wildlife crossing 6 was evaluated from a distance due to lack of survey access, photo not available.

### Discussion

While we detected only one live SDT during the course of our survey, we believe a population exists within portions of the study area. In Arizona, SDT begin their winter activity season

between September and November during which they reduce activity to midday and seek overwinter shelter sites in which to brumate (Averill-Murray et al. 2002). Because this reduced surface activity coincided with our surveys, it is likely that SDT remained un-detected within the study area. In addition, ground cover by plants such as Wooly Honeysweet (*Tidestromia lanuginosa*) was very thick and may have obscured SDT scat that would have otherwise been detected.

We detected the live SDT 420-m from the nearest historic record and 1.5-km from the study area. This distance should be considered preliminary due to the lateness of these surveys and knowledge of SDT winter activity. Further, we know that SDT are capable of long-distance movements (Edwards et al. 2004) and that home ranges may be variable in size depending on season and gender (Riedle et al. 2008). As such, we recommend that as many as 10 more radio-transmitters be placed on SDT within the study area and that these SDT be tracked twice weekly.

The six potential wildlife crossings we evaluated were of low and medium quality in relation to other locations within the ROW. These areas were either too close to disturbance, agriculture, or were in unproductive (biologically) desert environment. Habitat loss and fragmentation are two of the largest natural resource-related problems globally (Lindenmayer and Fischer 2006). When landscapes become fragmented and disconnected, natural and anthropogenic disturbances may result in greater rates of localized extirpation (Soulé and Terborgh 1999). Here the potential wildlife crossings are all in low elevation desert flats and many have anthropogenic influences. The most common problems that we encountered at these crossings were off-highway vehicle use, close proximity to housing developments, agriculture, and a lack of landscape features that might direct wildlife to crossing structures, *e.g.* deep washes or ridgelines. The area contains habitat suitable for large bodied wildlife (Sturla and Leavitt 2013), such as Mountain Lions (*Puma concolor*), and may be an important corridor. Given the potential for wildlife and potential for development in this area we recommend methods that will reduce the potential for human use in wildlife crossings.

During our Pecos Road mortality surveys, we detected an area of high road-mortality adjacent to the Foothills Golf Club. In Arizona, golf courses provide resources, primarily water and grass, for many species of wildlife (Goode 2010). As a result, higher concentrations of both prey and predator species are often present. We recommend that large drainage structures with natural substrates be constructed at water crossings along this stretch of highway to reduce wildlife road mortality.

We detected numerous Common Chuckwallas and their sign during this survey. The population of common chuckwallas at South Mountain is very robust (Sullivan and Sullivan 2008). However, due to historic collection practices in the SMPP (Goode et al. 2005) this population has been designated as protected under Commission Order 43 from the AGFD. It is probable that the development of the SR 202L will result in incidental take of Common Chuckwallas and we recommend that precautions be taken in advance of this action.

The Tucson Shovel-nosed Snake (*Chionactis annulata klauberi*) is listed as vulnerable under the State Wildlife Action Plan (SWAP) in the State of Arizona (AGFD 2012). Though no Tucson shovel-nosed snakes were detected during surveys, we feel that the area around the ROW along

Pecos Road may provide habitat for the species. As with the Common Chuckwalla, we recommend that precaution be taken prior to and during construction so as to limit any incidental take of Tucson Shovel-nosed Snakes.

### Recommendations

- We found high quality SDT habitat in the ROW for the proposed SR 202L. We recommend as many as 10 more radio-transmitters be placed on SDT within the study area and that these SDT be tracked twice weekly.
- During road-mortality surveys along Pecos Rd., we detected an area of high concentration for both species diversity and abundance. We recommend that this high mortality section of roadway have large drainage structures with natural substrates constructed to provide passage along desert washes to increase wildlife permeability.
- Our evaluation of the wildlife crossings resulted in a few low and/or medium quality wildlife crossings. As such, we recommend that the wildlife crossings be developed with a focus on reducing the human impacts and potential for human encroachment into the passage. One potential way to do this would be to find measures that would insure no line of sight by humans. In addition, given the width of the SR 202L, we recommend that these crossings be developed with naturally-lit breaks in the median.
- The Common Chuckwallas that occur within South Mountain Park are protected in the State of Arizona under AGFD Commission Order 43. To plan for actions that may result in take of this species during the construction phase of this project, we recommend that a survey be completed to determine where this species may overlap within the planned ROW.
- The Tucson Shovel-nosed Snake is a Species of Greatest Conservation Need in Arizona and may occur within the planned ROW. We recommend that a survey for the species be completed prior to construction to determine its presence and that care be taken during construction to reduce incidental take.

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