Stump Springs Desert Tortoise Translocation Recipient Site Survey
Clark County, Nevada

Final Project Report

11 December 2014

Prepared By:
Kirsten Dutcher
The Great Basin Institute
3903 Raymert Drive
Las Vegas, NV. 89121
(702) 433-2600

CONTRACT TITLE:	Stump Springs Desert Tortoise Translocation Recipient Site Survey
PROJECT NUMBER:	2009-GBI-803C
REPORTING DATE:	11 December 2014
PI:	Scott Cambrin, Senior Biologist, Desert Conservation Program
DELIVERABLE:	Final Project Report (D07)

EXECUTIVE SUMMARY

Project Number: 2009-GBI-803C
Contract Title: Stump Springs Desert Tortoise Translocation Recipient Site Survey

This report documents the Stump Springs Mojave desert tortoise (*Gopherus agassizii*) translocation recipient site survey done by the Great Basin Institute (GBI) in fall 2014. The Clark County Desert Conservation Program (DCP) and the U.S. Fish and Wildlife Service (FWS) plan to use this area in the future as a translocation site for displaced tortoises. GBI was contracted by the DCP to conduct transect surveys, telemetry, and health assessments for desert tortoise in Stump Springs prior to any translocation effort.

In collaboration with FWS, GBI provided desert tortoise handling and field training, field data collection, logistical support, quality assurance/quality control (QA/QC) data checks, and GIS mapping. GBI hired a support staff consisting of a project coordinator responsible for QA/QC-GIS, and a field crew consisting of one crew supervisor, seven survey technicians, one telemetry supervisor, and one telemetry technician.

The study design included surveying approximately 1,000 km of transects across the translocation area. Transects were spaced 50 m apart, walked at cardinal bearings of 90° or 270°, in a randomized walk order. Surveyors walked two transects each day from 7 through 22 October 2014. Tortoises found were equipped with a temporary transmitter and paper tag with a unique number, provided that the tortoise was accessible and the ambient shaded temperature was below 35ºC. Telemetry surveys began 2 October 2014 and ran concurrently with transect surveys to capture expected visibility. Complete health assessments, including collection of biological samples, were conducted 25 October 2014 and followed standardized FWS protocols.

Transects teams found nine live tortoises. Of the live observations none were recaptures and none were found opportunistically. Full health assessments were completed on five tortoises. Surveyors found 110 carcasses, none of which had been previously tagged. Telemetry surveys collected 239 observations on 13 animals over the course of the study.

INTRODUCTION

Project Background

The Mojave desert tortoise (*Gopherus agassizii*) is federally listed as threatened under the Endangered Species Act (USFWS 1990) and is a priority species for conservation under the Multiple Species Habitat Conservation Plan in Clark County, Nevada (Clark County 2000). The Clark County Desert Conservation Program (DCP) and the U.S. Fish and Wildlife Service (FWS) plan to use the Stump Springs Recipient Site as a future location to translocate displaced tortoises. This document provides information on materials and methods employed during data collection and management as well as results for this study.

Project Description

Beginning September 2014, the Great Basin Institute (GBI) was contracted by the DCP to monitor the density of desert tortoises in Stump Springs. The project study site occupies approximately 78,300 acres of Bureau of Land Management land in western Clark County, along the California-Nevada border. To the northeast lies State Highway 160. The Spring Mountains are east of the site.

The already established telemetry site, used to assess tortoise visibility, is located in Trout Canyon, across State Highway 160.

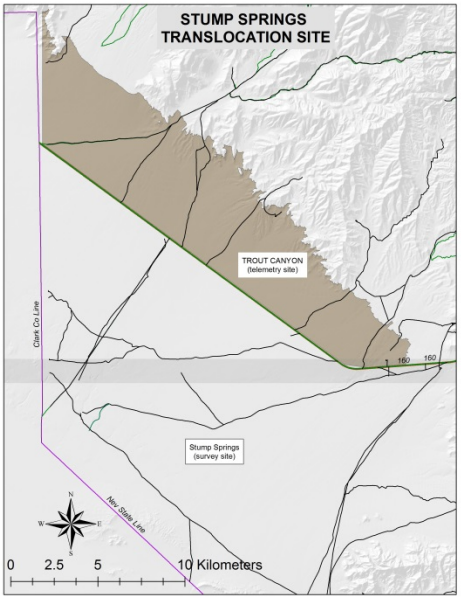

Figure 1. Location of the Stump Springs Translocation Recipient Site and Trout Canyon Telemetry Site (Clark County 2014)

Preseason preparation took place in August, crew training in August and September, and surveys in October. GBI hired an experienced support staff including a project coordinator responsible for QA/QC-GIS, and a field crew consisting of one crew supervisor, seven survey technicians, one telemetry supervisor, and one telemetry technicians. Data collection consisted of 216 assigned transect surveys (for a total of approximately 1,000 km walked) to estimate population density, radio-telemetry to capture expected visibility, and health assessments.

Project Goals and Objectives

The overarching objectives of the Stump Springs Translocation Recipient Site Surveys were to:

- •Determine an estimate of pre-translocation abundance
- •Provide baseline health assessment data on resident tortoises
- •Establish an appropriate translocation site for tortoises

The specific goals of the desert tortoise transect surveys, telemetry, and health assessments were to:

- •Record data on live tortoises and carcasses found to determine abundance
- •Assess the visibility of tortoises in order to calibrate the results of transect surveys
- •Record the health condition of resident tortoises

METHODS AND MATERIALS

Transects

The study design included surveying approximately 1,000 km of transects across the translocation area. Due to the shape of Stump Springs, each transect was of variable length and walked at a cardinal bearing of 90° or 270°. Transects were 50 m apart and randomized in a walk order; however each biologist completed a pair of neighboring transects in a standard work day and walked near another surveyor to increase safety. Surveys began 7 October 2014 and were conducted throughout the month, beginning at 6:45 AM with progressively later start times as needed, but never before 30 minutes after sunrise. Biologists used a Garmin Global Positioning System (GPS), set to Universal Transverse Mercator (UTM), North American Datum 83 (NAD83), Zone 11 North to locate transect start points and record spatial data. All data were collected in both hardcopy and electronic format. Electronic data were recorded on a Trimble Juno unit (Juno) set to UTM, NAD83, Zone 11 North.

Live tortoises were recorded as transect tortoises if they were found while the observer walked a transect line, or as opportunistic if they were observed elsewhere while working. For all tortoises, if the ambient shaded temperature was below 35ºC and the tortoise was available, field staff recorded data on median carapace length (MCL), determined sex (provided the MCL was greater than 180 mm), and attached a transmitter. When possible, all live tortoises were marked using a paper tag with a unique FWS number. Tortoises were handled with minimal contact by one individual wearing gloves. All equipment that came into contact with the animal was disinfected with a Chlorhexidine and water solution (one ounce concentrated Chlorhexidine per one gallon of water). When tortoise carcasses were encountered, they were recorded along with additional data, such as whether the carcass was intact or disarticulated, and MCL for intact carcasses.

Telemetry

Telemetered tortoises were monitored prior to transects (beginning 2 October 2014) in order to determine initial start times for surveys. Telemetry was also conducted concurrently with transects, with coordinated start and end times. During transect surveys telemetry monitoring began at or before transect start times and continued until all transects were completed or 4 PM, whichever came first. In Trout Canyon, 13 tortoises were monitored by one biologist, using a VHF receiver and directional antenna. Data were collected electronically and with hardcopy.

Health Assessment

Biologists qualified to conduct health assessments located animals found during transect surveys using the radio-frequency and GPS coordinates from transect surveys. Health assessments were conducted on the 25 October 2014 and followed standardized protocols that included body condition scoring, clinical signs of disease, palpation of the coelomic cavity, weight, MCL, presence of ectoparasites, blood samples, and oral cavity swabs (USFWS 2013). If a tortoise was more than 12 inches in a burrow, or otherwise inaccessible, two additional attempts were made to locate the animal.

Data Processing

At the end of every field day, biologists exchanged and reviewed paper and electronic data to verify and correct the data. Data download from each Juno into a Pendragon collection database occurred bi-weekly. Data were then uploaded from the Pendragon collection database into an Access correction database where they were verified, examined for errors, and corrected using automated QA/QC scripts and visual checks.

RESULTS

Objectives Completed

During the fall 2014 monitoring season:

- •1,000 km of transect surveys were completed at Stump Springs
  - 216 transect lines walked
  - Surveys occurred 7 through 22 October 2014
- •Data collected on live tortoises and carcasses found during transect surveys, prior to translocation
  - Nine total live tortoises found on transect
  - 110 carcasses found
- •Visibility of resident tortoises in Trout Canyon, conducted during transect surveys to calibrate results
  - 13 telemetered tortoises tracked
  - Monitoring took place 2 through 22 October 2014
- •Baseline health assessments completed on resident tortoises
  - Five health assessments completed
  - Health assessments were conducted on 25 October 2014

Transects

All transects were completed by 22 October 2014. The final database shows a total of 247 transects walked (Table 1). This total includes interrupted (labeled as "transect#.1" and "transect#.2") and shortened transects, which were sometimes due to terrain or time limitations. Two of these transects were shortened due to State Highway 160. Additionally, three transects were interrupted more than once. Occasionally, a transect was recorded as interrupted if it was started in the mid-line, but completed the same day. In this case, the transect is complete and not missing any sections.

Table 1. Summary of transects assigned and walked during the 2014 field season.

Transects Assigned	Total Number of Transect Walked	Transects Interrupted	Transects Interrupted Twice	Transects Interrupted (Start Point)	Transects Interrupted (Time/Terrain)	Transect Shortened (no Interruption)
216	247	28	3	26	2	9

Tortoises and Carcasses

A total of nine live tortoises were observed on transect. Of the total number found none were recaptures (Table 2). Of the total handled, 0% voided (0 of 6).

Table 2. Tortoises observed by field crews while walking transects and opportunistically during the 2014 field season.

	Transect Tortoises	Opportunistic Tortoises	Recaptures
Telemetry Receiver Attached	6	0	0
No Telemetry Receiver Attached	3	0	0
Total	**9**	**0**	**0**

A total of 110 tortoise carcasses were observed by field crews while on transect (Table 3). Most (73%) were not disarticulated.

Table 3. Tortoise carcasses observed by field crews while walking transect during the 2014 field season.

	Carcasses with no Existing Tags	Carcasses with Existing Tags
Intact Carcasses	66	0
Disarticulated Carcasses	44	0
Total	**110**	**0**

Because of the low numbers of live tortoises, it is difficult to determine patterns; however seven (78%) were found in the northern portion of Stump Springs. Carcasses were scattered throughout, with fewer found in the mountainous eastern portion (Figure 2).

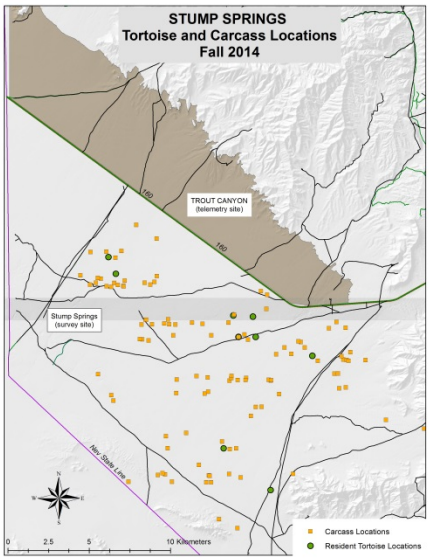

Figure 2. Locations of resident tortoises and carcasses found in the Stump Springs Translocation Recipient Site

Telemetry

During the 2014 fall field season, telemetry was conducted in Trout Canyon, on the northeast side of State Highway 160. Telemetry crews began monitoring 2 October 2014, five days before transect surveys began, in order to determine initial transect start times. Telemetry was then conducted in conjunction with transect surveys. In Trout Canyon, 13 focal animals, which were previously telemetered, were monitored (Table 4).

Table 4. Observations of tortoises by telemetry for G_0 during the 2014 field season.

Site	Tortoises Tracked	Number of Days	Total Number of Observations	Average Number of Observations per Day
TC-prior to transects	10	1	10	10.0
TC-concurrent with transects	13	11	229	20.8
Total	**13**	**12**	**239**	**19.9**

Health Assessments

Of the nine tortoises found during transect surveys, six were equipped with radio-transmitters (three could not be extracted from deep burrows). Of these, health assessments were completed on five animals (Table 5). Three attempts were made by health assessment crews to locate an animal.

Table 5. Tortoise health assessments for the 2014 field season.

Tortoises for Health Assessment	Health Assessment Completed	Health Assessment not Completed
6	5	1

Body condition scores for tortoises ranged from 3 to 4, with an overall average of 3.6 (Table 6). Of the total handled, 0% voided (0 of 5).

Table 6. Tortoise body condition scores (BCS) for the 2014 field season.

BCS	Tortoises for Health Assessment
3	2
4	3
Total	**5**

Although the sample size was small (n=5), all tortoises tested were negative for *Mycoplasma agassizii* and *M. testudenium* (Table 7). Of these animals all had normal respiration, two presented with serous eye discharge, and three displayed periocular swelling. One tortoise with periocular swelling also had an eroded naris.

Table 7. ELISA test results for the 2014 field season.

ELISA Result	*Mycoplasma agassizii*	*Mycoplasma testudenium*
Positive	0	0
Suspect	0	0
Negative	5	5
Total	**5**	**5**

DISCUSSION

Overall, crews were successful in implementing protocols and covering terrain in Stump Springs. Over 1,000 km of transect were walked during the season, and of the 216 transects assigned eleven were shortened, either in the middle (interruption) or at one end. No tortoises found were recaptures, and the low number of residents seen on transect may be indicative of a small resident population, or the product of survey season (fall versus spring). However, a relatively large number of carcasses were located. Almost ¾ of these carcasses were not disarticulated, implying they are fresher, and that there may have been a recent population decline.

Telemetry observations corresponded well with transect surveys and were helpful in determining transect start times. Biologists were able to track tortoises repeatedly throughout the day, and were able to monitor most focal animals repeatedly.

Every health assessment attempted was completed by the health assessment crew. Only animals that could be reached (83%) underwent a health assessment. As the season continued, low temperatures decreased the number of animals that were out of burrows, and one tortoise was unable to be reached. The ratio of live tortoises to carcasses was ca. 1:18; however, ELISA results indicate a low seroprevalence of *Mycoplasma agassizii* and *M. testudenium* in the population.

CONCLUSION

Over 1,000 km were effectively surveyed in Stump Springs before the fall season concluded, with successful results. In an effort to reduce risk to surveyors working alone in uneven terrain, in sometimes remote locations, transects were clustered to allow biologists to walk neighboring transects. Telemetry monitoring corresponded well with transect walk times and dates and was an effective tool in determining start times and tortoise visibility. Data transfer from surveyors to health assessment crews was accomplished without complication. All health assessments attempted were fully completed and included all biological samples.

There were few data collection errors this season, largely due to the training and experience of crew members. Data errors were corrected within the correction database and submitted to the DCP. All result deliverables were met.

RECOMMENDATIONS

- Transects should continue to be walked in pairs of two biologists as this increases safety in the field and provides an added measure of security for crew members
- Set up transect start points (for any future project) north to south, south to north, or west to east, avoiding east to west orientation, as this leads to biologists walking directly into the sun on the first transect of the day
    - East to west orientation can be walked in reverse, but this can be more logistically challenging, as time or terrain constraints may prevent transect walkers from reaching their initial transect start point

LITERATURE CITED

Clark County. 2014. Translocation Plan; Northeast Boulder City Conservation Easement, Clark County, Nevada. August 2014.

Clark County. 2000. Final Clark County Multiple Species Habitat Conservation Plan and Environmental Impact Statement for Issuance of a Permit to Allow Incidental Take of 79 Species in Clark County, Nevada. September 2000.

U.S. Fish and Wildlife Service. 2013. Health assessment procedures for the Mojave desert tortoise (*Gopherus agassizii*): a handbook pertinent to translocation. Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada.

USFWS (U.S. Fish and Wildlife Service). 1990. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Mojave Population of the Desert Tortoise. Federal Register 55:12178–12191.