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TROUT CANYON 2014 AND 2015 POST-TRANSLOCATION SURVEYS
November 2016

Introduction

Starting in 2014, an emphasis of the Desert Tortoise Recovery Office (DTRO) was to use all suitable captive tortoises at the Desert Tortoise Conservation Center (DTCC) in implementing the population augmentation strategy outlined in the 2011 recovery plan. To prepare for these projects, we worked with the Bureau of Land Management (BLM) to approve recipient sites in addition to the Large Scale Translocation Site. The first of these sites was the Greater Trout Canyon area in Clark County, Nevada (Averill-Murray et al. 2013). The Trout Canyon translocation site was narrowed from that described in USFWS (2013; 59,000 acres [239 km²]) to only include lands below the 1,250-m elevational contour (=30,188 acres [122 km²]). We coordinated with the San Diego Zoo (ZSSD) to release a total of 747 tortoises at Trout Canyon in 2013 and 2014 (serology for *Mycoplasma agassizii*: 48.3% positive, 23.4% negative, 5.3% suspect, 23.0% too small to test). These additions resulted in an estimated post-translocation density at the site of 5.9 adult tortoises/km² (Table 1).

Table 1. Pre- and post-translocation density and abundance of adult desert tortoises at the Trout Canyon translocation site (122 km²).

Pre-translocation abundance	$2.9/\text{km}^2 * 122 \text{ km}^2 = 354 \text{ adult tortoises}$
Releases in 2013 and 2014	369 adult tortoises + 378 juvenile tortoises
Estimated post-translocation density	$(354 + 369)/122 \text{ km}^2 = 5.9 \text{ adults/km}^2$

The DTRO coordinated survey crews to complete surveys starting the year after first translocations. We conducted mark-recapture surveys in Trout Canyon, Nevada, to contrast survivorship of translocated and resident tortoises. The University of Nevada, Las Vegas (UNLV) and U.S. Geological Survey (USGS) conducted surveys to characterize vegetation starting in the same area (results from the 2013 survey by UNLV are available in a separate report). We hypothesized that with the tortoise exclusion fencing installed along Nevada State Route 160 (NV-160) in 2007, the area would support more tortoises and would not be limited by habitat quality. Tortoise survivorship and habitat characteristics would be characterized to describe their concordance after the translocation.

Methods

Through this study we are investigating the relative survivorship of translocated and resident adult tortoises. To this end, we contracted surveyors from Great Basin Institute (GBI) to survey the translocation site, marking any residents they encountered. Translocated animals were marked before release by the ZSSD between spring 2013 and fall 2014.

After 2 days of refresher training on handling tortoises and specialized training on notching and hydrating tortoises, surveyors walked transects between NV-160 in the south and the 1250-m elevation line in the north. Tortoises at least 180-mm midline carapace length (“adults”) were given an epoxied paper tag and notches to match the tag number (see release summary, Table 2). Translocatees from the DTCC released in 2013 and 2014 were tagged and notched separately by ZSSD staff. No further translocations are planned after 2014, but follow-up recapture surveys will allow us to estimate survivorship for resident and translocated tortoises over time. The U.S. Geological Survey (USGS) is conducting surveys to characterize vegetation, anticipating that food plant patterns may influence annual tortoise survivorship.

Table 2. Counts of tortoises released in 2013 and 2014.

	2013	2014	Total
≥ 180 mm MCL	217	152	369
<180 mm MCL	257	121	378
Total	474	273	747

Results and Discussion

In 2014, 204 animals were found over ~2500 km of transects; 170 of these were at least 180 mm MCL (Table 2). In 2015, 111 animals were found over ~2600 km of transects (Table 3). So far, no signs of unusual rates of mortality have been observed, but detailed survival analysis is planned after at least one additional year of survey (scheduled for spring 2018). Research and monitoring of the effects of disease status on post-translocation behavior and survival are ongoing by the ZSSD and will be reported separately.

Table 3. Survey results from 2014 and 2015.

		Survey Year	
		2014	2015
Translocated	2013	35	18
	2014	6	13
Residents	New marks	107	47
	Marked 2013	6	4
	Marked 2014	12	4
	Marked 2015		1
Total marked		164	85
Juveniles or in burrows and not marked		40	26

Reference

Averill-Murray, R.C., K.J. Field, L.J. Allison, C. Engel, J. Perry, J.M. Germano, J. Braun, and N. Lamberski. 2013. Translocation Plan: Greater Trout Canyon Area, Clark County, Nevada. Revised and updated on August 20, 2013. U.S. Fish and Wildlife Service, Desert Tortoise Recovery Office, Reno, Nevada.