

## ACTIONABLE SCIENCE

# Desert Tortoise Habitat Restoration Methods for the Eastern Mojave

# UNLV

The Bureau of Land Management oversees 10,600 hectares (26,000 acres) of Eastern Mojave desert near Las Vegas, Nevada, as a special area to receive desert tortoise translocations. This site is characterized by valleys of desert scrub and mountain ranges that extend through southern Nevada and southeastern California. Translocated Mojave desert tortoises (*Gopherus agassizii*) are released at this protected site in an effort to increase tortoise populations. Both winter and summer precipitation are critical for the survival and establishment numerous annual and perennial plants that provide forage and cover for this threatened species.



## KEY ISSUES ADDRESSED

Passive establishment of perennial and annual vegetation is limited by feral horses and domestic burros that forage on native vegetation, competition with invasive plant species that increase fire frequency, and soil moisture limitations for germination. Reductions in native vegetation cover resulted in Mojave desert tortoise habitat degradation. Specifically, less perennial shrub cover is available to provide thermal refugia, and remaining annual plant communities have decreased forage quality. For several years, research did not link desert tortoise population size with improvements to habitat and forage quality, which limited the development of successful active revegetation strategies designed to benefit desert tortoises..

## PROJECT GOALS

- Increase perennial and annual plant density to improve desert tortoise habitat and forage quality
- Use a controlled field experiment to test watering, seeding, and herbivore exclusion treatments on native plant density
- Identify active revegetation strategies that improve habitat quality

## MICROHABITAT CREATION

Plant litter and soil nutrients accumulate below perennial plants, creating 'Fertile Islands' that enhance recruitment of annual plants and provide thermal refugia for tortoises.



Artificial Watering/E. Cayenne Engel

## PROJECT HIGHLIGHTS

**Baseline Analysis:** Pre-experimental vegetation surveys characterized the plant community composition and density of native perennial and annual plant species in tortoise habitat.

**Multifactor Experiment:** A 14-hectare split-split plot experiment was established in 2013 to test the effect of whole plot watering (present or absent), subplot seeding (no seeding, bare, and pelletized seeds), and sub-subplot fencing (present or absent) on the establishment of perennial and annual species.

**Native Plant Seeding:** Seeded Subplots were sown with bare seeds (non-pelletized) or pelletized seeds coated in Gro-Coat®. Perennial cheesebush and winterfat shrubs were seeded at densities of 5,000 and 1,700 seeds per m<sup>2</sup> in attempt to increase plant cover. Desert globemallow and the desert plantain were seeded at a density of 13,000 and 5,300 seeds per m<sup>2</sup>, respectively, to increase forage.

**Vegetation Monitoring:** Plant density, frequency and cover measurements were collected at 3, 10, 12 and 20-months post-treatment.

## Collaborators

- US Bureau of Land Management
- Natural Resource Conservation LLC

## Funding Partners

- US Bureau of Land Management
- University of Nevada-Las Vegas

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## LESSONS LEARNED

Pre-treatment plant communities were characterized by two herbaceous species (non-native Arabian schismus and native desert plantain) and two shrub species (creosote bush and white bursage). Post-treatment, the density of non-seeded native annual plants increased in seeded and fenced plots. Annual plant species increased, improving forage quality. Results show irrigation can increase native plant species richness and plantain density. Pelletized seeds and fencing treatments also increase desert plantain density. Treatments were unable to establish winterfat seedlings on plots. Seeding with bare cheesebush seeds and pelletized globemallow seeds resulted in highest initial plant densities. However, cheesebush and globemallow were absent 20-months post-treatment. Treatments did not impact the density of invasive Arabian schismus.

## NEXT STEPS

- Monitor desert tortoise population size after active habitat restoration
- Test for the effects of improved forage quality on desert tortoise population size at the patch, home range, and landscape level
- Identify an irrigation regime that stimulates germination
- Identify techniques that lead to successful perennial shrub establishment

## PROJECT RESOURCES

For more information on this project, contact Scott Abella: [scott.abella@unlv.edu](mailto:scott.abella@unlv.edu)

For additional project resources and case studies, visit the Collaborative Conservation and Adaptation Strategy Toolbox: [WWW.DESERTLCC.ORG/RESOURCE/CCAST](http://WWW.DESERTLCC.ORG/RESOURCE/CCAST)



Mojave Desert Tortoise/Scott R. Abella