



# Gopher Tortoises and Test Ranges: Developing an Understanding for the Wildlife-Habitat Relationships of this Novel Habitat

## Background:

The Gopher Tortoise (*Gopherus polyphemus*) is federally listed as threatened under the Endangered Species Act (ESA) in the western portion of its range and is a candidate for listing in the eastern portion. It primarily inhabits longleaf pine-dominated sandhills, but also occurs in disturbed areas including large expanses of treeless areas (test ranges) used for munitions testing and training exercises. Tortoise burrows provide shelter and habitat for dozens of commensals, including several imperiled species. This study compared tortoise population structure and burrow commensal use between test ranges and forested sites on Eglin Air Force Base (Eglin), a large military installation with the highest potential Gopher Tortoise habitat (155,600 ha) of all Department of Defense lands.



**Figure 1.** Adult Gopher Tortoise in habitat on Eglin Air Force Base. (Photo by W. Moore)

## Objectives:

Our objectives were to (1) use burrow surveys to compare age-size distributions and activity between test range and forested sites, (2) determine if vegetation, habitat type, or management, explain variation in burrow densities among sites, and (3) use camera traps to compare burrow commensal communities.

## Summary of Approach:

Tortoise burrow surveys were conducted at 8 test ranges and 4 forested sites on Eglin Air Force Base and camera trapping was performed at burrows in each site. Vegetation surveys (Daubenmire cover classes) were conducted at the site-wide and burrow-scale. Management practices for each site were determined through interviews and GIS data compilation.

## Benefit:

Investigating Gopher Tortoise burrow densities across sites allows us to assess the contribution of test ranges to the overall population, while assessment of commensals allows us to evaluate the value of military landscapes for biodiversity. This research can inform management plans to improve ecological conditions that promote population growth, while also minimizing impacts to the military mission.

## Accomplishments:

Available habitat on test range sites might have been more favorable to tortoises because of a higher percent cover of grasses and lower cover of shrubs and litter compared to forested sites. Burrow density was higher on test range as compared to forested sites, but did not differ significantly with plant species richness or with management activity. There was high variability across test range sites in burrow density, but one test range site had the highest burrow density and the highest ratio of young- to adult-sized burrows of any of the 12 sites, suggesting that test ranges can provide highly productive habitat for gopher tortoises. On average, tortoise burrows on test ranges support a lower diversity of commensals than those on forested sites. However, the federally petitioned Gopher Frog (*Lithobates capito*) had more occurrences on test ranges, although this may be an artifact of breeding pond locations. The occurrences and richness of potential predators of tortoise eggs and juveniles were lower on test sites, suggesting a potential advantage to nesting at those sites.

Conversations with habitat managers yielded valuable insight into the challenges and constraints of test range habitat maintenance. Preliminary results suggest that test ranges can provide suitable habitat for tortoises, and for some commensals, but that timing and frequency of management may cause problems for young age classes. If management activities occur during the nesting season, especially if disturbance is repeated, these activities might cause complete reproductive failure by destroying nests.

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