



Gopher Tortoises and test ranges: developing an understanding of the wildlife-habitat relationships for this novel habitat

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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. Previous studies documented that the majority of Gopher Tortoises on Eglin occupy test ranges and high-quality sandhills. These results led us to investigate the differences in forested areas and test ranges in terms of vegetation diversity, tortoise density and recruitment, commensal diversity and abundance, as well as tortoise home range size.

Objective:

Our objectives were to (1) monitor tortoise movements using GPS transmitters to determine home range size and collect baseline data that could be used to estimate survival rates and long-distance dispersal movements, (2) conduct surveys to identify range management practices used at other military installations that support Gopher Tortoise populations, (3) continue to investigate the habitat characteristics of test ranges versus forested sandhills, (4) continue to compare age-size distributions and recruitment between test ranges and forested sites and between test range sites with different management regimes, and (5) continue to compare commensal use between test ranges and through the deployment of wildlife cameras at tortoise burrow entrances.

Summary of Approach:

We conducted vegetation and tortoise surveys at 12 test range sites on nine separate ranges and seven forested sites (seven different forested areas) on Eglin Air Force Base, and camera trapping for commensal species was performed at burrows in eight sites (four range, four forest). We assessed plant community composition and abundance at both the site-wide scale and burrow scale, and determined the density of tortoises within each survey site. GPS movement data was collected from nine tortoises over a period ranging from two weeks to five months. In addition, a survey on common test range management practices was sent to other installations.

Benefit:

By investigating Gopher Tortoise burrow densities and home ranges across sites, we documented the important contribution of test ranges and forested sites to the overall population, while assessment of commensals allowed 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:

(1) Most home range estimates reported for Gopher Tortoises in previous studies were smaller than what we observed on Eglin, despite our shorter tracking period. It was unclear whether typical home range sizes were underestimations or if Gopher Tortoises on Eglin potentially had atypically large home ranges compared to most other habitats and locations. (2) Results from the management questionnaire indicate that test range management practices vary widely, in both technique and frequency, between installations. All respondents reported that test ranges were maintained by mowing, but other techniques include herbicides, chain sawing, logging, roller-drum chopping, and prescribed fire. (3) 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. (4) Burrow density was higher on test range as compared to forested sites but did not differ significantly with plant species richness. While we found evidence of young tortoises in both habitats, test range habitats had on average a greater density of the youngest age class. (5) On average, forested sites generally had higher values of all three indices of diversity for total vertebrate burrow commensal and potential Gopher Tortoise predators. Gopher Frogs were the third most common commensal observed with more Gopher Frog observations in test ranges than forested sites.

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