



Identifying Habitat Associations of the Sonoran Desert Tortoise

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Introduction

Man-made disturbances to Sonoran desert tortoise (*Gopherus morafkai*) habitat in southern Arizona has the potential to cause direct tortoise mortality or severely degrade the preferred habitats this species utilizes. In fact, the Sonoran desert tortoise is a candidate species for Endangered Species Act listing, due in part to habitat loss and fragmentation. Continued research into understanding the habitat associations of this species will help inform management decisions on important areas to conserve for the Sonoran desert tortoise.

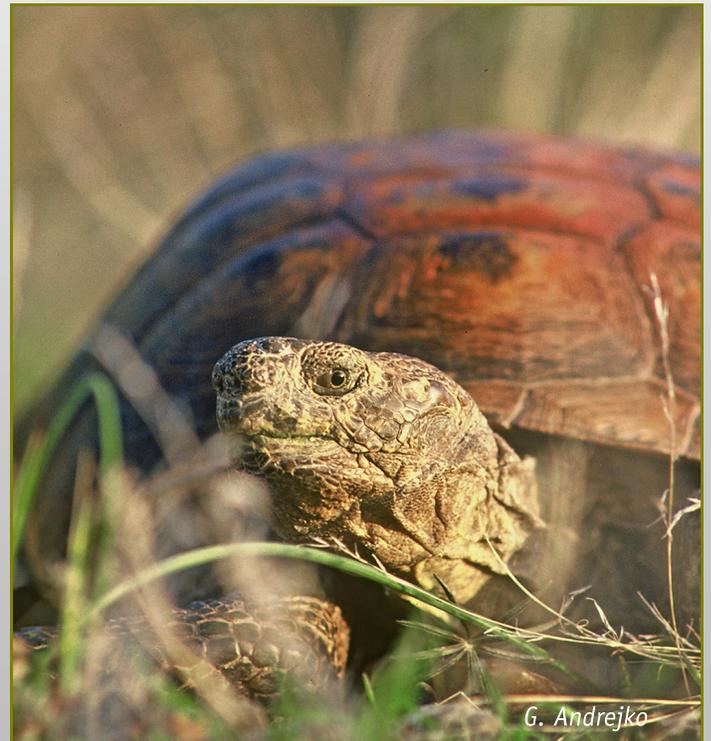
While increasing development may contribute to localized declines, military lands still offer potential refuge for this species. These lands offer habitat for Sonoran desert tortoises with limited public access. However, conflicts can arise between Department of Defense (DoD) activities and conservation and management of this and other species.

One way to reduce such conflicts is to identify specific habitats preferred by the desert tortoise. This will allow wildlife managers to focus on conserving areas of quality habitat, while still allowing for regular military activities to occur on areas of lower-quality habitats. But what are these habitats exactly? Biologists with the Arizona Game

and Fish Department's Wildlife Contracts Branch set out to answer this very question.

Study Objectives

In order to better understand desert tortoise habitat requirements, Wildlife Contracts Branch biologists developed a landscape-level habitat model that predicts quality desert tortoise habitat, and tested it on the Yu-



Identifying habitats preferred by the Sonoran desert tortoise will be critical towards conserving the species throughout its native range in the Sonoran Desert.

ma Proving Ground and Barry M. Goldwater Range. Combined, these two areas represent the largest tract of contiguous undisturbed habitat in the Sonoran Desert, and also include desert tortoise habitat at the edge of the species' distribution in Arizona.

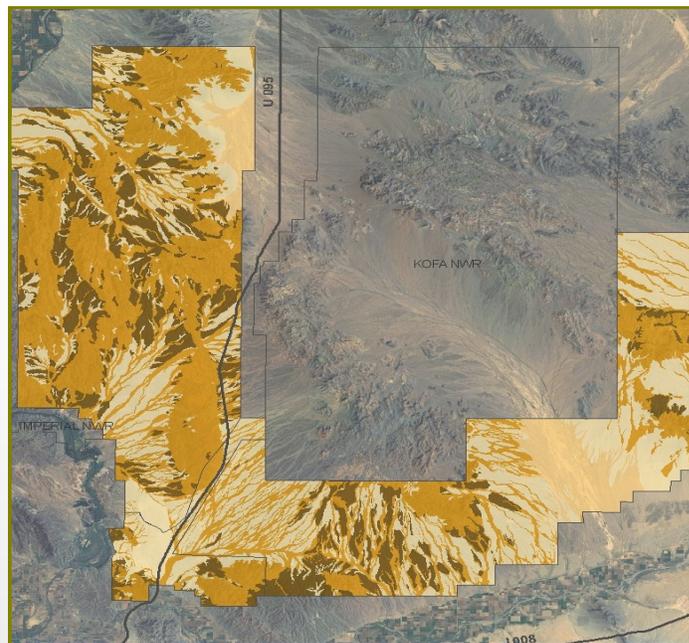
The model used a variety of habitat characteristics, such as soil type and shelter availability, to predict the likelihood of desert tortoise presence or "occupancy." Ultimately, the occupancy model will serve as a tool that could inform land management decisions and help foster the coexistence between continuing military operations and this emblematic Sonoran Desert species.

Study Methods

Based on previous research, Wildlife Contracts Branch biologists hypothesized that desert tortoise occupancy would vary according to the soil type found within habitats. To test this, a team of biologists performed extensive desert tortoise surveys to identify habitat use within the two military installations and to create a model that would predict where Sonoran desert tortoises may be found in this area.

Covering 711 three-hectare plots, biologists conducted standardized surveys for tortoises and their sign, such as tracks, scat, and carcasses. Study plots equally represented the 14 different soil sub-groups identified by the Natural Resources Conservation Service that would occur within the study area.

In addition to these intensive surveys, biologists employed radio telemetry and global positioning systems (GPS) tracking units at BMGR to track individual tortoises and to help determine their habitat preferences. These data further validated the occupancy model.



A habitat model of YPG developed for this project identified potential tortoise habitats. Darker areas demonstrate habitats preferred by the species.

Management Implications

Occupancy patterns of the desert tortoise observed by this study show that on these DoD lands this species' habitat preferences are most often associated with areas that contain soil with high levels of calcium carbonate (caliche). This soil type may provide the Sonoran desert tortoise — a burrowing species — with adequate shelter stability.

As a result of this intensive study, Wildlife Contracts Branch biologists have produced an effective tool that wildlife managers can use to offer guidelines on where to hold certain activities or developments, which may help reduce impacts to desert tortoise populations. By identifying the occupied habitats, Department of Defense activities can continue with minimal adverse effects to this species.

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