

Attributes of desert tortoise populations at the National Training Center, Central Mojave Desert, California, USA

K.H. Berry^{a,*}, T.Y. Bailey^b, K.M. Anderson^c

^a*United States Department of the Interior, Geological Survey, Western Ecological Research Center, 22835 Calle San Juan de Los Lagos, Moreno Valley, CA 92553, USA*

^b*619 Pinon Ct., Ridgecrest, CA 93555, USA*

^c*324½ 15th Street, Seal Beach, CA 90740, USA*

Received 6 December 2004; received in revised form 15 May 2006; accepted 30 July 2006
Available online 14 November 2006

Abstract

We sampled 21 study plots for desert tortoises (*Gopherus agassizii*) at the National Training Center, Fort Irwin, California. Each plot was sampled once between 1997 and 2003 to obtain a snapshot of population attributes, status, and relationships between tortoise densities and human activities. Densities ranged from <1 to 28 tortoises km⁻²; overall, tortoises were uncommon to rare at 16 of the 21 plots. Tortoise densities were negatively correlated with death rates, infectious disease (mycoplasmosis), surface disturbance and trash. Health status of tortoises was correlated with some anthropogenic uses. The presence of infectious disease in tortoises was negatively correlated with distances from offices, the Ft. Irwin cantonment, and paved roads. Also, significantly more tortoises with shell disease were found on plots with current and recent military use than on plots with no history of military use. Factors contributing to or causing deaths of tortoises included vehicles, vandalism, predation, mycoplasmosis and shell diseases. Annual death rates for subadult and adult tortoises ranged from 1.9% to 95.2% for the 4 years preceding surveys. Deaths from anthropogenic sources were significantly correlated with surface disturbances, trash, military ordnance, and proximity to offices and paved roads—typical characteristics of military training areas. Published by Elsevier Ltd.

Keywords: *Gopherus agassizii*; Military training; Disease; Roads; Trash; Chelonians

*Corresponding author.

E-mail address: kristin_berry@usgs.gov (K.H. Berry).

1. Introduction

The desert tortoise, *Gopherus agassizii*, occurs in the south-western United States (US) and adjacent Mexico. In the US, the tortoise is a federally listed, threatened species with a Recovery Plan and designated critical habitat (Fish and Wildlife Service (FWS), 1990, 1994). The tortoise is treated as an indicator, umbrella, and flagship species (definitions in Simberloff, 1997) for ecosystem health in large parts of the Mojave and Sonoran deserts by US government agencies. Several management plans have been developed with objectives of recovering tortoise populations and habitat (Berry, 1997).

The desert tortoise is a long-lived species and may require 12–25 years to reach reproductive maturity in the Mojave Desert (Woodbury and Hardy, 1948; Hardy, 1976; Turner et al., 1987). Females may lay from 0 to 3 clutches year⁻¹, with fecundity generally lower in younger and smaller females than in older, larger females (Turner et al., 1986; Mueller et al., 1998; Wallis et al., 1999; McLuckie and Fridell, 2002). The survivorship of juveniles to reproductive maturity is not well understood but must be sufficient to replace adults (Turner et al., 1987). Like some other species of turtles, the desert tortoise is vulnerable to environmental and anthropogenic stressors because of its combined life-history traits of longevity, delayed sexual maturity, low fecundity, and low survivorship of nests and juveniles (Congdon et al., 1993; Fish and Wildlife Service (FWS), 1994).

One region where the tortoise historically has experienced population declines and habitat loss is the West Mojave Recovery Unit (Fish and Wildlife Service (FWS), 1994; Berry and Medica, 1995; Brown et al., 1999). This Recovery Unit occupies the western, central, and southern parts of the Mojave Desert in California. In the central Mojave Desert, the National Training Center (NTC) at Fort Irwin encompasses >2600 km² of land and contains habitat for the desert tortoise (Brussard et al., 1994; Krzysik, 1997). The NTC has been used for >60 years for military activities. It was first established as a military facility in 1940 and formally designated as the Department of the Army's NTC in 1979. In 1994, the FWS delineated ~81 km² of critical habitat for the tortoise in the southern part of NTC (Fish and Wildlife Service (FWS), 1994; Fig. 1).

The first systematic surveys for desert tortoises on the NTC were conducted in 1983 and 1989 with the objectives of determining distribution and relative abundance in several management areas (Krzysik, 1997). The survey technique involved counting tortoise signs (live tortoises, scat, cover sites, shell-skeletal remains [scutes and bones], etc.) on strip transects. Surveys also were conducted within a 140 km² study area along the southern boundary of the NTC in 1995 to model desert tortoise habitat requirements (Andersen et al., 2000).

Our objectives were part of the Army's efforts to: determine population attributes (e.g. density, size class structure, sex ratios, causes of death, and death rates), and health status of tortoise populations within specific management areas of the NTC; compare population attributes in areas with different management histories; and identify anthropogenic factors which may affect health and well-being of the tortoises. We sampled tortoise populations during a single season when they were most likely to be above-ground and active, thus providing a "snapshot" of the population. The habitats were also sampled for anthropogenic disturbances. We hypothesized that tortoise populations would have higher population densities and lower death rates in undisturbed areas, remote from human contact, and higher death rates where human contacts with tortoises were common and land was chronically affected by anthropogenic activities. We also

Download English Version:

<https://daneshyari.com/en/article/4394880>

Download Persian Version:

<https://daneshyari.com/article/4394880>

[Daneshyari.com](https://daneshyari.com)