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Publication Brief

Comparison of Management Strategies Indicates Protection Benefits Desert Tortoises

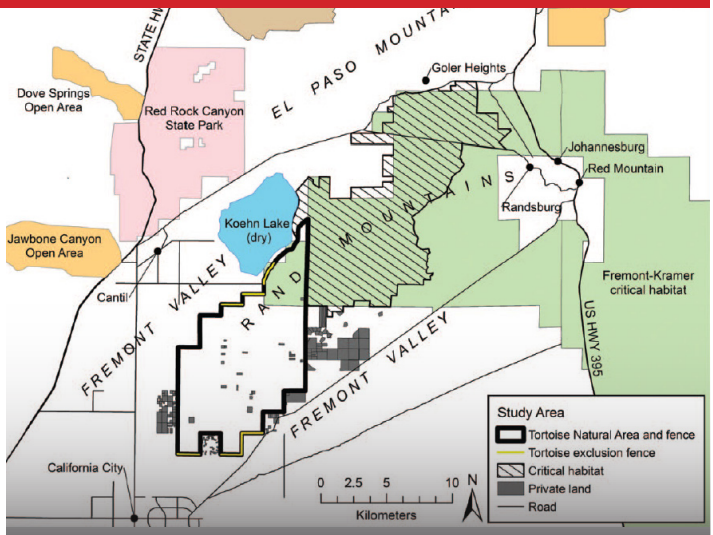
In a USGS-led study, biologists surveyed desert tortoises (*Gopherus agassizii*) in three areas of the western Mojave Desert with differing land management histories. Publishing in *Herpetological Monographs*, they reported that tortoise densities were highest and death rates were lowest in the area with the longest and most comprehensive history of protection.

The study was conducted on three adjacent areas with different management histories: the **Desert Tortoise Research Natural Area**, which has the longest history of land protection of the three, including vehicle, mining, and livestock exclusion, and tortoise fencing since 1980; federally designated **critical habitat** where tortoise protection and land management regulations exist and were partially implemented in the 1990s; and nearby **private lands** with no history of land use prohibitions or tortoise fencing.

Throughout the study area and across all three management-type areas, tortoise abundance was higher in areas with diverse perennial vegetation communities. Notably, the **Natural Area**—which had the longest history of protection—had significantly more live tortoises and lower death rates than the other two areas. The **critical habitat**—which had fewer years of protection—was observed to have lower tortoise densities and higher death rates. The **private lands**—which had no history of protection—also had low tortoise densities and high death rates.

The scientists modeled human activities potentially affecting tortoise abundance. At the **Natural Area**, they observed no positive or negative associations between tortoise abundance and human uses such as sheep grazing, recreational vehicle tracks, trash, and debris from firearms. In contrast, in **critical habitat**, tortoise abundance was negatively affected by vehicles, but positively associated with firearms debris. On **private lands**, tortoise abundance was negatively associated with sheep grazing, but positively associated with trash. The associations with trash and firearm debris are likely detrimental, since tortoises are attracted to trash and may eat it, and much of the tortoise sign in the critical habitat was comprised of dead animals. Tortoise remains located during the study showed evidence of predation by ravens and canids and trauma from gunshot and vehicles.

This Brief Refers To:
Berry, KH, LM Lyren, JL Yee, TY Bailey. 2014. **Protection benefits desert tortoise (*Gopherus agassizii*) abundance: the influence of three management strategies on a threatened species.** *Herpetological Monographs* 28(1):66-92.
http://www.werc.usgs.gov/ProductDetails.aspx?ID=5134



General location of the study area and the three interconnected management areas in the western Mojave Desert, eastern Kern County, California. Figure 1 of Berry et al. 2014.

MANAGEMENT IMPLICATIONS

- Desert tortoises are long-lived and require many years to reach maturity. By evaluating abundance, death rates, and causes of mortality in the context of historic management strategies, we can learn about successful methods to recover the species.
- The Desert Tortoise Research Natural Area—with a history of strong protective management actions such as the protective fence and exclusion of sheep grazing and recreational vehicles—supports higher tortoise densities and lower mortality rates when compared to areas with fewer and more recent protections or no protections.
- Recovering desert tortoise populations requires reducing mortality rates. Vehicle kills, shooting, and predation were identified as causes of death. Ravens and canids (feral/domestic dogs, coyotes, kit foxes) injured or killed tortoises in this study. Resource managers can use the findings to institute actions to reduce tortoise deaths.

RESEARCH CONTACT

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