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Predators, Denuded Patches Affect Desert Tortoise Density in the Northwest Mojave Desert

USGS researchers conducted a survey of an isolated population of Agassiz's desert tortoise (*Gopherus agassizii*) living in the southeastern portion of China Lake Naval Air Weapons Station. These animals offered researchers an opportunity to evaluate a tortoise population at a site inaccessible to the public, and to analyze how human and natural variables affect local population trends. The survey results are published in the journal *Herpetological Monographs*.

Researchers conducted spring and fall surveys in 2010, recording live and dead tortoises and tortoise sign. For live tortoises and sign, they measured distances from roads and areas denuded of vegetation from testing of munitions, and measured densities of ordnance fragments, common ravens, and mammalian predators.

The surveyors found relatively high numbers of young tortoises and female adults and overall good health. However, the small size, limited distribution, and low density of this population could limit its potential for growth. A lack of young, small adult tortoises, and the numbers of recently dead juvenile and immature tortoises suggest that few juveniles have survived to reach adulthood during the last several years. Carcasses showed signs of traumatic deaths typical of those caused by common ravens, coyotes, and stray dogs.

Statistical models suggest that distance to paved roads and denuded areas and densities of mammalian predator signs were best predictors of tortoise sign. The locations and densities of live tortoises and tortoise sign were lower near roads and denuded areas and higher for distances 100–300 m beyond. Other important predictors of tortoise sign were common ravens (negative) and slope (positive). The findings are consistent with published findings elsewhere on road traffic and tortoise depletion; roads as an attractant to ravens; and the importance of vegetation cover for tortoise survival.

Management Implications

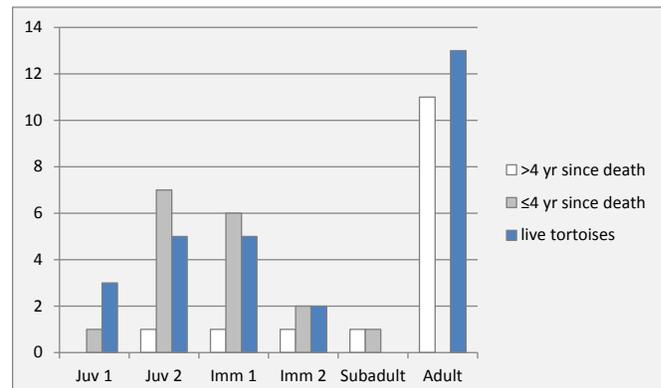
- Multiple factors, including distance to roads and denuded areas, mammalian predator sign, and common ravens, affect abundance of tortoise sign and live tortoises. These factors can have complex interactions that vary over time and space.
- While the existing tortoise population appears healthy, the age and size trends suggest that young tortoise survival in recent years has been low due to predator pressure. Increased predator numbers are likely due to the long-term increase in man-made structures and food sources.
- The multiple impacts observed and their effects on tortoises at China Lake are typical of lands managed by government agencies throughout the tortoise's geographic range. The long-term persistence of this and other population fragments is in doubt unless impacts are reduced or mitigated.

THIS BRIEF REFERS TO:

Berry, KH, JL Yee, AA Coble, WM Perry, TA Shields. 2013. Multiple factors affect a population of Agassiz's desert tortoise (*Gopherus agassizii*) in the northwestern Mojave Desert. *Herpetological Monographs* 27: 87-109.
doi: 10.1655/HERPMONOGRAPHS-D-13-00002

<http://www.werc.usgs.gov/ProductDetails.aspx?ID=4992>

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Distribution across age classes of live and dead tortoises observed in the study.