Once common throughout the Mojave and Sonoran deserts of California, Nevada, and Arizona, desert tortoise populations have declined approximately 90 percent in just the last 20 years.

DID YOU KNOW?
Tortoises do not have teeth; instead, they have a beak and grind their food.

Trouble in the West

The Mojave desert tortoise *Gopherus agassizii is* one of the most beloved denizens of the western deserts of the US. Yet, despite the vastness of the American desert, the situation for the tortoise is becoming increasingly desperate: each passing year there are fewer and fewer of them to be found. It seems to be a case of "death by a thousand paper cuts," with numerous human actions eroding away at tortoise habitat: roads, solar developments, and an increase of "subsidized" predators. Subsidized predators are predator species that thrive in urbanized or human-associated habitats thanks to their ability to take advantage of resources that are associated with humans. In the deserts of the southwestern US, ravens are considered "subsidized predators" and are much more numerous today than they were historically, which is a big problem for desert tortoises.

Off to a Good Headstart

Several years ago, San Diego Zoo Wildlife Alliance began a program to understand tortoise habitat needs and develop best practices for rearing and releasing tortoises back to the wild, in areas where their future can be safeguarded. We conduct this work with a number of important partners, including the U.S. Geological Survey (USGS), the U.S. Fish & Wildlife Service, Edwards Air Force Base, and others.

In our desert tortoise conservation program, we use headstarting and translocation as tools for species recovery. The process starts out with a search for tortoise moms-to-be. We search the desert for adult female tortoises, give them small transmitters for tracking purposes, and using a mobile X-ray unit, periodically check to see if they are gravid (that is, have eggs). When they are gravid, we bring them into headstarting facilities to lay eggs for headstarting. We then return females to where they were found but keep the eggs (and eventually hatchlings) safe in our protected facility, where predators cannot reach them, and food is plentiful. They thrive here, but after one to two years, these young tortoises reach sufficient size to be less vulnerable, and the time comes for them to return to the wilderness, where they can help reestablish their species.

A Tortoise-eye View

It's a heartwarming experience to watch these tiny tortoises experience their natural desert landscape for the first time, with its whimsical Joshua trees peppering bright blue desert skies, and miles and miles of sand. But the real work comes in monitoring these animals and understanding how they use their new, wild habitat. Our work focuses on ecological factors that help make young tortoises less vulnerable to predators, such as refuge and camouflage. A two-year-old tortoise is still no match for a raven, and its main defense is to remain undetected.

This is where understanding the tortoise's perspectives comes in: we hypothesized that camouflage, in the form of rocky ground (tortoises look rather like rocks), or burrows (constructed by small mammals) that serve as refuges from predators (and inclement weather) could be vitally important to avoid ending up as a meal for a raven or some other hun-

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