

CONSERVATION UPDATE

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SLOW BUT STEADY: Desert Tortoise Recovery

Allyson Walsh, Ph.D.,
Associate Director, Applied Animal Ecology

It's my first trip to a parched land where the scenery is hot and prickly to the touch. I've driven to the Mojave Desert to discover more about the rocky road to recovery facing the threatened Mojave desert tortoise. Getting out of the car, the heat instantly feels unforgiving, and through the settling dust of the dirt road, a cascade of questions springs to my mind. Where did I pack my sunscreen? What is happening to the Mojave population of the desert tortoise? Has the threat of disease been satisfactorily abated? Has loss of habitat been slowed and degraded lands restored to improve animal health and productivity? Are reintroductions of tortoises monitored and improved upon to advance the recovery process? I've arrived at the Desert Tortoise Conservation Center, Las Vegas, and I have a hunch the San Diego Zoo Global team will help me find my answers. And my sunscreen.

SPRING 2012

(Continued on page 2)

Desert tortoises, found throughout Utah and the Mojave and Sonoran Deserts of California, Nevada, Arizona, and Mexico were listed as a threatened species in 1989. Across their range, tortoises are found at very low densities, even in formerly heavily occupied areas. Key factors contributing to their decline include disease and development. In partnership with the U.S. Fish and Wildlife Service, the U.S. Bureau of Land Management, and the Nevada Department of Wildlife, San Diego Zoo Global operates the Desert Tortoise Conservation Center. It is situated within an 11,014-acre management area representing one of the last large, intact tracts of natural desert habitat in the Las Vegas Valley. The center temporarily holds formerly wild and pet tortoises (either removed from the path of development or unwanted), and provides a hub for training and scientific work focused on disease, husbandry, nutrition, and reintroduction back to the wild.

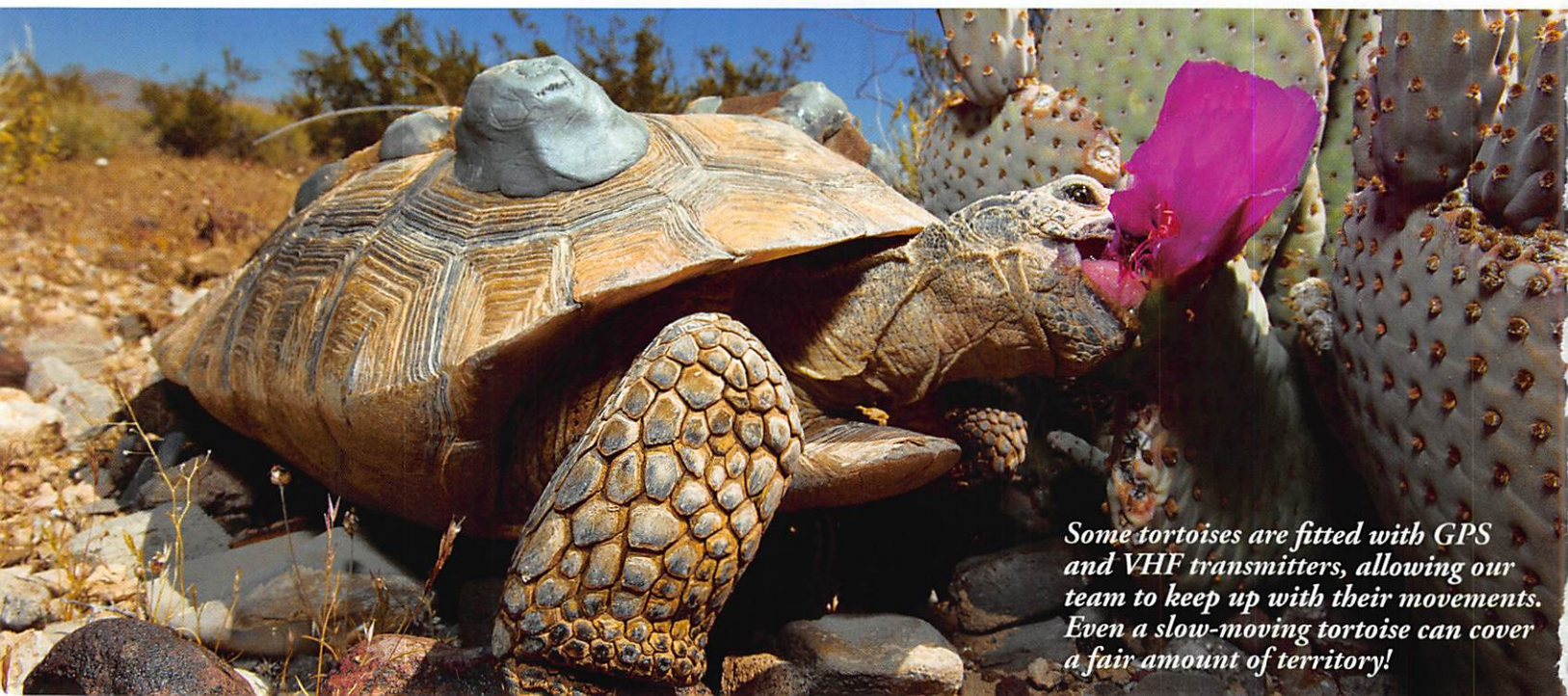
SHE EXPLAINS THAT THE TORTOISES ARE ATTRACTED TO PINK FLOWERS IN THE WILD, AND AS SHE WALKS AMONG THEM DISTRIBUTING TORTOISE CHOW, THEY FOLLOW HER PINK FOOTSTEPS!

Walking around the center, exemplary care, recovery-based research, and training efforts are evident. Research coordinator Angie Covert highlights recent improvements to living conditions and veterinary care. Our pathology postdoctoral fellow, Dr. Josephine Braun, is correlating clinical signs and diagnostic test results to identify the criteria that best predict which tortoises are most suitable for release. Feeding the tortoises in the early morning sunshine, I notice that Marisa Musso, one of the research assistants caring for the tortoises, has pink shoelaces on. She explains that the tortoises are attracted to pink flowers

in the wild, and as she walks among them distributing tortoise chow, they follow her pink footsteps!

Last year, we repatriated just over 500 tortoises into protected areas, some with GPS and VHF tracking devices. Accompanying postdoctoral researcher Dr. Jennifer Germano into the wilds of Nevada, I hope to find out how some of the translocated animals are faring. Dusty, sunburned, and thirsty after two hours of hiking and radiotracking our targets, I wonder out loud how far can a tortoise possibly travel? Jen recounts the story of Hillary, no ordinary tortoise. Hillary ran off the moment she was translocated and, living up to her name, took 10 days to climb to the top of a mountain. After 10 days of climbing after her, to Jen's surprise Hillary came back down in just one day! At the end of the day, I have my own love story to tell. Locating one male snuggled up in a burrow with two females (one with a radio tag and one without) seems a clear indication that our translocated animals are faring well and successfully striking up relationships with the locals.

Looking around the center one last time before I hit the road and return to San Diego, I'm struck by all the possibilities and answers this place holds. As a facility for the refinement of reintroduction techniques, we can assist in areas with low population densities and bolster tortoise recovery. We are also a place where biologists are trained in the safe and proper handling of tortoises, ensuring standard data collection practices and guaranteeing a new generation of tortoise experts. Through outreach, we can educate visitors, students, and teachers about what they can do to help. Our vision is to transform the center into a world-class facility that supports research and education not only for the desert tortoise but also for the Mojave Desert as a whole. For now, slowly but steadily, we are assisting in the recovery of this iconic desert species and keeping the desert ecosystem functioning. Looking ahead, it's good to know that there is still so much more we can contribute. 🌱



Some tortoises are fitted with GPS and VHF transmitters, allowing our team to keep up with their movements. Even a slow-moving tortoise can cover a fair amount of territory!

MEET A CONSERVATION RESEARCHER

LARISA GOKOOL

Research Associate, Wildlife Disease Labs,
Desert Tortoise Conservation Center



Pathology technician Larisa Gokool is a long way from home. Although she applied for a position at San Diego Zoo Global's Desert Tortoise Conservation Center in Las Vegas on a whim, she never dreamed she would be living that far west on a wide, flat desert. Larisa grew up south of Boston and graduated from Northeastern University, with a bachelor's degree in biology

(concentration in wildlife) and a minor in psychology. It was a bit of a culture shock moving to Las Vegas—she admits that seeing tumbleweeds blowing by in real life instead of just in cartoons still gives her pause—but she has adapted well.

As a youngster, Larisa was inspired by the accomplishments of primatologists Jane Goodall, Dian Fossey, and Biruté Galdikas. Later, when she discovered ethology, toying with the idea of art school was out and biology was in. A favorite professor motivated her to stay with science, even though, she admits, it wasn't her strong suit: "I knew I would have to study and work extra hard to follow my dream, and now all the hard work has paid off." Then she

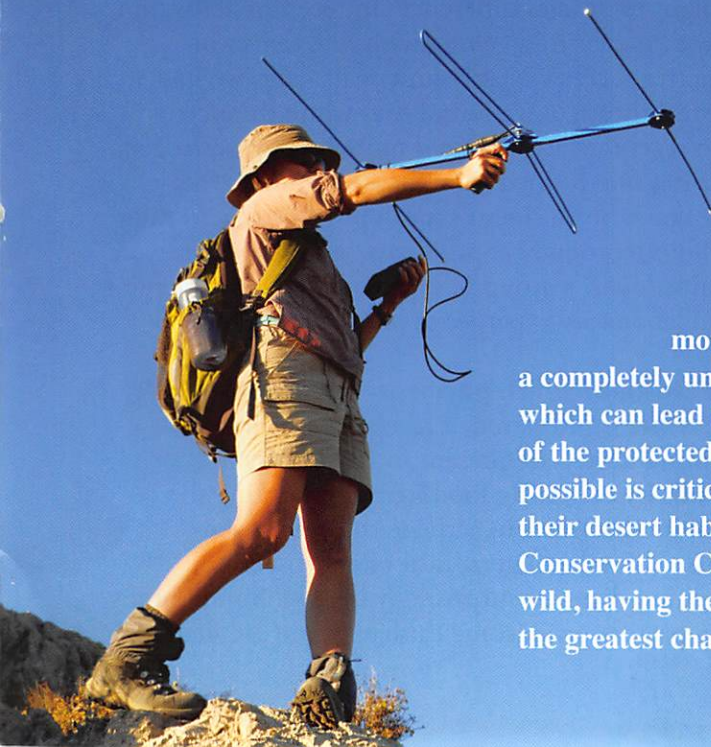
adds, "I am thankful that I get to help save a threatened species, the desert tortoise."

Her favorite quote by President John F. Kennedy—"Those who dare to fail miserably can achieve greatly"—has helped her take a road less traveled. One of her favorite adventures was being a volunteer with Operation Wallacea in Indonesia where she took part in bird speciation fieldwork. "We caught, measured, tagged, and released birds," Larisa said. "It was so amazing to release a tagged bird out of my own hands!" These days, when not performing a necropsy, a favorite part of her job is feeding the tortoises: "They stare at you so adoringly, even if it's the food bucket they really want!"

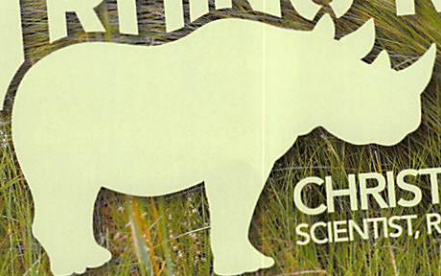
JENNIFER GERMANO, Ph.D.,

Postdoctoral Associate, Applied Animal Ecology,
Desert Tortoise Conservation Center

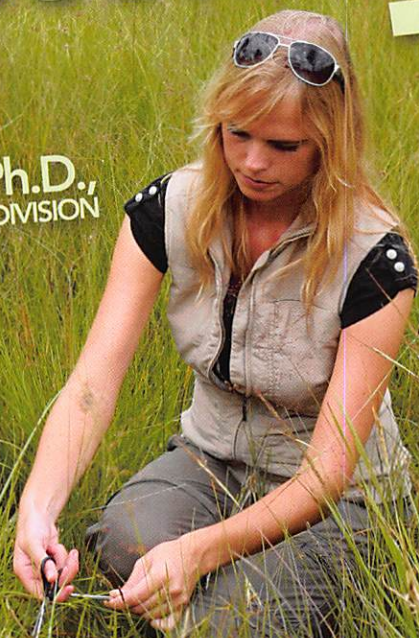
In the spring of 2011, I joined the team at the Desert Tortoise Conservation Center to research how different factors affect the movement of desert tortoises following translocation. The majority of my time is spent in the field, where I use radiotelemetry to track the movements and survival of our released tortoises. Before coming to Las Vegas, I completed a bachelor's degree at Miami University and did my graduate work at the University of Otago in New Zealand, looking at captive breeding and translocations of critically endangered frogs. What many people don't realize is that translocations (moving an animal either from a zoo or out of harm's way to a new location in the wild) are not easy conservation solutions: the moves can be very stressful on animals. Often when released into a completely unfamiliar environment, animals spend a lot of time wandering, which can lead to higher mortality rates or can mean that they may move out of the protected area. Figuring out how to make translocations as successful as possible is critical, since every year more and more desert tortoises are moved as their desert habitat is destroyed. Plus, as San Diego Zoo Global's Desert Tortoise Conservation Center rescues and rehabilitates tortoises to release back into the wild, having the best strategies for release will help ensure that our tortoises have the greatest chance to make a positive impact on wild populations.



WORKING TOGETHER TO PROMOTE RHINO REPRODUCTION



CHRISTOPHER TUBBS, Ph.D.,
SCIENTIST, REPRODUCTIVE PHYSIOLOGY DIVISION



One step closer to solving a rhino reproductive mystery: Dr. Annemieke van der Goot collects samples of spear grass from South Africa's Lapalala Wilderness Reserve. These samples will be sent back to the Institute's Reproductive Physiology lab to be analyzed for phytoestrogen content.

TWO

years ago, in the Spring 2010 issue of *Conservation Update*, I shared the Reproductive Physiology Division's research on a long-standing conservation problem: Why do zoo-born female southern white rhinoceros fail to reproduce? This work is now coming to fruition, with the help of some terrific collaborators around the world.

We have focused on compounds called phytoestrogens that are produced by plants such as soy and alfalfa, commonly fed to rhinos in zoos. Phytoestrogens get their name (*phyto* = plant) because an animal's body "sees" phytoestrogens as the natural hormone estrogen. This is because phytoestrogens activate the receptors that regulate estrogen function. Normal estrogen function is precisely controlled. However, inappropriate estrogen—such as signaling by foreign chemicals like phytoestrogens—can cause permanent reproductive damage in some species.

Our research started in the lab, measuring how strongly phytoestrogens activate white rhinoceros estrogen receptors. We performed the same experiments using greater one-horned rhinoceros estrogen receptors. Both the African and Asian rhino species receive similar diets in zoos, but unlike white rhinos, greater one-horned rhinos reproduce well in a zoo setting. We suspected

there might be species differences in receptor activation by phytoestrogens to go along with differences in reproductive success. Nearly four years later, we had a major breakthrough: we found that white rhinoceros estrogen receptors are activated more by phytoestrogens than greater one-horned rhinoceros receptors! This is exciting news, but it doesn't mean phytoestrogens cause white rhino reproductive problems. To prove that, we have teamed with a group of eager collaborators, merging field and laboratory expertise to tackle the problem.

Because we know which phytoestrogens most strongly activate white rhino estrogen receptors, we are now determining if they are present in rhino diets in zoos. We do this by collecting food items and testing the ability of food extracts to activate rhino estrogen receptors. This takes a great deal of effort, because captive rhino diets are surprisingly diverse. Some rhinos graze on pasture grass, some eat hay, some eat alfalfa,