



DESERT TORTOISE COUNCIL NEWSLETTER

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Desert Tortoise Paternity Assignments Highlight Unexpected Shortcomings of Common Conservation Strategy

By Jacob Brogan, *Smithsonian.com*

New Smithsonian Study Reveals Reduced Effectiveness of Translocation on Vulnerable North American Species

In April, U.S. Marines in California completed a mission years in the making. In order to establish a new training center, they arranged for biologists to carefully transfer 1,100-some desert tortoises, a threatened species, from one area to another.

While it may have been a peculiar project for the marines, the method—known as translocation—has previously been undertaken to mitigate the effect of solar energy farms and other developments on tortoises throughout the region. And it's a common practice for the

preservation of other species as well. On the surface, such translocations constitute a valuable effort to protect animals facing habitat loss or other dangers. Now, however, newly published research suggests that the technique may not be as effective as some have assumed, at least where the tortoises are concerned.

After a translocation effort—whatever the species involved—researchers normally evaluate a handful of important indicators: Are the animals healthy? Are they finding food and establishing home ranges? Are they reproducing? In some species, however, that last question begets another, one that has rarely been studied in any depth: Are males and fe-



Two male desert tortoises square off to fight near the United States Army's Fort Irwin Army National Training Center. According to the study's authors, translocated males may not be breeding because resident males are competitively excluding the new males. Photo by Joel Strong.

males reproducing at the same rates? If not, even a successful move may be disrupting a species in otherwise unnoticed ways.

In 2012, a group of researchers—including Kevin P. Mulder and Robert C. Fleischer of the Smithsonian

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Letter from the Editor

Included in this better-late-than-never issue of the Desert Tortoise Council Newsletter are articles about two recent publications featuring the use of genetic techniques, several important announcements from the Desert Tortoise Council, and a list of recent publications (since our last accounting in Issue 41[1]). This

issue also features bios for two of our Board of Directors officers—Becky Jones and Joe Probst—who serve critical roles.

In February 2018, I will assume responsibilities as Chair of the Desert Tortoise Council Board of Directors and will be stepping down from my position as Editor of the Newsletter. That

said, the Board of Directors is looking for a qualified person who could take on those responsibilities. If you have an interest, please contact me!



Michael Tuma
michaeltuma@deserttortoise.org



Photo by Heather Parks

DTC Attends 26th Annual Kern River Valley Bioregions Festival

Ed LaRue spent an eventful day representing the Desert Tortoise Council in Circle Park in Kernville, California for the Bioregions Festival during the 2017 Earth Day celebration on April 22, 2017. According to the event organizer, the Bioregions Festival has occurred continuously, mostly at the nearby Kern River Preserve in Weldon, since 1992. U.S. Forest Service, California State Parks, California Department of Fish and Wildlife, Kerncrest Audubon, The Wildlands Con-

servancy, Keepers of the Kern, Friends of the California Condor Wild and Free, and several other environmental organizations interfaced with several hundred visitors during the day-long event located just 100 yards from the engorged Kern River. A local rafting spokesperson indicated there had not been so much water in the Kern River since 1986, and that Lake Isabella has mostly filled up after near-depletion from prolonged drought conditions.



Children showed their appreciation for desert tortoises by wearing their favorite tortoise attire to the Bioregions Festival.

Desert Tortoise Council Board of Directors member Ed LaRue stationed a shade canopy and products table, and spoke to more than 100 interested members of the public. At a nearby tent, two volunteers with The Wildlands Conservancy were displaying a pet desert tortoise. LaRue sold about \$160 worth of merchandise including t-shirts, coffee mugs, stickers, and bandanas

sporting the Desert Tortoise Council's tortoise logo. The Council has rarely attended such events, but in the spirit of public outreach this may be the first in a series of such events, as Board member Mari Quillman intends to perform a similar service at The Wildlife Society's annual meetings in Albuquerque, New Mexico in September 2017.



More than 100 members of the public attended the Bioregions Festival in Kernville, California on April 22, 2017.

Desert Tortoise Paternity Assignments Highlight Unexpected Shortcomings (continued)

Conservation Biology Institutes' Center for Conservation Genomics—set out to do just that. As they explain in a paper about their work published recently in the journal *Biological Conservation*, their sample population was another group of Agassiz's desert tortoises that had been moved four years before from one area near Fort Irwin in California to another.

While translocation efforts sometimes shift animals into areas uninhabited by others of their own kind, there were already established “resident” tortoises living in the new region. The researchers could see that both the translocated and resident females were laying eggs, but it wasn't immediately clear whether the two populations were mingling.

The paper's authors suggest that it might have something to do with dominance hierarchies (above, two males fighting) among the members of the species. (Joel Strong)

To find out, they undertook a form of analysis known as microsatellite genotyping, a technique that's also used in human paternity testing and forensics. As Fleischer told me, microsatellites are “highly variable” genetic sites in an organism's genetic code. “Every individual is going to have their own DNA fingerprint if you look at more than a few of these markers combined. They're so variable that virtually every individual that we sampled would have a different genotype across the 16 markers that we used,” Fleischer said.

To determine who had fa-



The Smithsonian Conservation Biology Institute study is the first to use genetic methods to look at whether males of a translocated population are successfully reproducing and integrating their genes into a resident group. Photo by Andrew Walde.

thered the 92 tortoise hatchlings, the researchers used a process of elimination. They had gathered genetic data for most of the translocated males, but just a third of the resident males. Using that data, they found that 35 of the hatchlings had resident tortoise fathers. They couldn't find a match for the remaining 57—which meant it was most likely they were also fathered by resident tortoises, just ones that hadn't had their genetics scanned.

In other words, while the translocated female tortoises seemed to be reproductively healthy, the translocated males were having no luck at all.

While the translocated female tortoises seemed to be reproductively healthy, the translocated males (above) were having no luck at all. (Walde Research & Environmental Consulting)

It's hard to say why the translocated males have seemingly been excluded from the breeding pool. “These males were still alive and living around the females, they just apparently weren't getting any of the matings, or the matings weren't working,” Fleischer says. Apart from a very slightly smaller average size, however, there was relatively little to distinguish them from the residents. The paper's authors suggest that it might have something to do with dominance hierarchies among the members of the species. They also speculate that the females' apparent capacity for sperm storage and selection may play a role.

Whatever the reason, one of the paper's co-authors, research ecologist Andrew Walde



A new study from the Smithsonian Conservation Biology Institute found that translocated male desert tortoises are failing in one key way—they are reproducing at a much, much lower rate than resident males. The findings suggest that for some species, translocation may not be as effective a tool to rescue populations at risk, or bolster genetic diversity and health, as previously thought. Photo by Andrew Walde.

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Researchers Sequence Genome of Agassiz's Desert Tortoise

by Enrico de Lazaro, *Sci-News.com*

An Arizona State University-led team of scientists has sequenced the genome of Agassiz's desert tortoise (*Gopherus agassizii*), a long-lived species native to the Mojave Desert. The results could help the animal survive an increasing number of threats.

Agassiz's desert tortoise, one of six species of desert tortoises estimated to have arisen in North America about 35 million years ago, can be found in California, Nevada, Utah and Arizona.

Also known as the Mojave desert tortoise, this species has been heavily impacted by habitat loss, a respiratory tract disease, and other anthropogenic factors. For instance, in one area of the species' range density declined from about 225 individuals/km² in 1979 to about 75 individuals/km² in 1992.

Agassiz's desert tortoise is listed as 'threatened' under the U.S. Endangered Species Act and is considered 'vulnerable' by the International Union for Conservation of Nature (IUCN).

To aid conservation efforts for preserving the genetic diversity of this species, Arizona State University Professor Kenro Kusumi and co-authors generated a whole genome reference sequence with an annotation based on deep transcriptome sequences of adult skeletal muscle, lung, brain, and blood.

"The Mojave desert tortoise genome is an important re-

source for the conservation of this species, particularly because this population is suffering from a serious disease," said lead author Dr. Marc Tollis, also from Arizona State University.

"Researchers don't yet fully understand its cause or what makes tortoises susceptible to it."

"Decoding this genome will help us catalog which tortoise genes are evolving quickly enough to help them overcome this threat."

The researchers obtained the genetic data for a particular tortoise specimen, assembled and annotated the genome and learned about the evolutionary history of tortoises.

"Decoding a genome has gotten technically a lot easier," Prof. Kusumi said.

"What's challenging now is decoding the information in the tortoise genome. We can use clues from similarities with the mouse and human genomes."

"Finding the proverbial 'needle in the haystack' would be to identify the genes that direct the immune response to infectious disease, as well as the ability to survive the harsh conditions of the Mojave Desert."

"It's important for us to learn where tortoise diversity is located across its geographic range," he added.

"Identifying hotspots of genetic diversity helps manage the species from a conservation

standpoint and preserve tortoise populations that could respond better to unknown challenges in the years ahead."

The team is also analyzing the genetic differences between Agassiz's desert tortoise and its sister species, Morafka's desert tortoise (*Gopherus morafkai*).

"My hope is that this study will enable other agencies to ask new questions, questions they would not have been able to ask without this research," said co-author Dr. Greer Dolby, also from Arizona State University.

"For instance, 'what immune genes do tortoises have to fight pathogens? How does their

immune system function in an environment with lots of threats? And, how might a changing environment impact this?' These are important questions to answer in managing the species. Now, we can begin investigating."

The findings were published online May 31, 2017 in the journal [PLoS ONE](https://doi.org/10.1371/journal.pone.0177708):

Tollis, M., D. F. DeNardo, J. A. Cornelius, G. A. Dolby, T. Edwards, B. T. Henen, A. E. Karl, R. W. Murphy, and K. Kusumi. The Agassiz's desert tortoise genome provides a resource for the conservation of a threatened species. *PLoS ONE* 12 (5): e0177708; doi: 10.1371/journal.pone.0177708



Agassiz's desert tortoise. Photo: Scott Trageser

Council Offers Authorized Biologist Training

by Peter Woodman

Two consistent requests from students of the Introduction to Field Techniques Workshop have been for opportunities to gain relevant field experience and for hands-on practice with desert tortoises. To that end, between September 11 and 15, 2017 the Desert Tortoise Council, in conjunction with Federal (US Fish and Wildlife Service and Bureau of Land Management) and State (California Department of Fish and Wildlife, Nevada Department of Wildlife, and Arizona Department of Game and

Fish) agencies conducted the first Authorized Biologist Training in Primm, Nevada. The purpose of the class was to assist attendees with meeting the requirements of an Authorized Biologist (AB).

Students participating in the class were required to meet a nominal set of experience requirements, and 27 applicants were accepted to the class. The training included both classroom and field instruction. Topics covered in the classroom sessions included topics specific requirements of an AB



Participants of the Authorized Biologist Training prepare for field training exercises. Photo by Bruce Palmer.

as well as background information on population trends, revegetation, and responsibilities for sensitive and state-listed species in California and Nevada. In the field, instructors provided coaching, demonstrations and lessons about tortoise sign while conducting various survey techniques, GPS navigation, and hands-on practice burrow excavation with a student-teacher ratio around 5:1. The high student teacher ratio provided the students with ample opportunity for interaction, instruction, hands-on practice, including basic tortoise processing, and tools of the trade. Thirty captive tortoises were available for the class to weigh, measure as well as learning how they move and how rambunctious they can be. It also allowed instructors to gauge appropriately the students' level of knowledge and abilities.

To meet certification standards each student was tested in the field and in the classroom. The field instructors and USFWS representatives evaluated each student for particular category

of instruction and approval.

In addition to the classroom instructors the Council would like to acknowledge the six field instructors (Paul Frank, Cynthia Furman, Kelly Herbinson, Corey Mitchell, Rachel Woodard, and Peter Woodman), USFWS personnel (Roy Averill-Murray and Scott Hoffman), and DTC Board Members (Cristina Jones, Bruce Palmer, and Peter Woodman). Terry Christopher provided Great Basin Institute's facilities for much of the fieldwork.



Instructor Peter Woodman provides a classroom lecture during the Authorized Biologist Training in Primm, Nevada. Photo by Bruce Palmer.



A student approaches a juvenile Agassiz's desert tortoise during the field portion of the Authorized Biologist Training. Photo by Bruce Palmer.



Photo by Bruce Palmer.

Nevada Bans Commercial Reptile Collection

by Kaitlyn Miller

On Sep. 23, the Nevada Board of Wildlife Commissioners voted 6-1 to ban the commercial collection of reptiles in Nevada. After Jan. 1, 2018, the state will no longer allow the unrestricted take of reptiles for private profit.

As noted in a presentation to the board by Jason Jones, the herpetologist for the Wildlife Diversity Division of the Nevada Department of Wildlife, there have been population declines in the top eight species of reptiles collected, including

are spreading to previously unexploited areas.

On Sep. 21 a group of nearly 50 scientists sent a letter to the Board of Wildlife Commissioners encouraging the ban. The letter highlighted the essential role reptiles play in the desert ecosystem. “These snakes and lizards are an important part of the desert food web, consuming insects and other invertebrates while acting as prey for mid- to upper-level predators.” Globally, climate change, over-exploitation, and habitat loss are leading to localized extinc-



Chuckwalla (*Sauromalus ater*). Photo: Nevada Department of Wildlife



Desert horned lizard (*Phrynosoma platyrhinos*). Photo: Jason L. Jones

the chuckwalla (*Sauromalus ater*) and desert-horned lizard (*Phrynosoma platyrhinos*). These eight species make up 98% of the reptiles collected by commercial collectors. Over the last 30 years, commercial collectors have reported removing more than 420,000 reptiles from Nevada. Nevada Department of Wildlife data suggest that reptile density may be decreasing in places that have been heavily collected from, and the impacts of collecting

tions and then broader declines in reptiles populations. According to a memo from Jennifer Newmark, the Wildlife Diversity Division Administrator at the Nevada Department of Wildlife, the unlimited commercial collection of reptiles is particularly concerning for a variety of reasons including: the low dispersal ability of reptiles due to habitat and temperature constraints; the collection of reptiles year round includes

reproductive time periods, which reduces reproductive output; and the collection itself is an added source of mortality to individual reptiles.

Until this ban goes into effect, Nevada will continue to be the only state in the region that allows for unrestricted take for commercial collection. Utah, Arizona, Idaho (with one exception on private land), and California all prohibit the commercial collection of reptiles in their states. New Mexico and Texas, both allow some com-

mercial collection, but it is regulated. Nevada will continue to allow the regulated take of reptiles for hobby collecting.

Before the new regulation is permanently adopted the Nevada Board of Wildlife Commissioners will host a public workshop and second hearing. In the meantime wildlife officials have stopped issuing new permits and will not renew annual permits.

This article is reprinted courtesy of The Wildlife Society. The original article may be found on their [website](#).



Long-nosed leopard lizard (*Phrynosoma platyrhinos*). Photo: Nevada Department of Wildlife

Recent Publications

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Desert Tortoise Paternity Assignments Highlight Unexpected Shortcomings (continued)

told me these results were “absolutely shocking.” Without genetic analysis, it’s the sort of thing that would have gone unnoticed. “It throws into question thousands of publications on translocation that have seen success because their animals were alive or they were reproducing,” Walde says.

Brad Shaffer, a distinguished professor in the department of ecology and evolutionary biology and the Institute of Environment and Sustainability, as well as director of the La Kretz Center for California Science at University of California, Los Angeles, says he thinks the results were both interesting and important, in part because it serves as a reminder that simply transporting animals from one place to another isn’t enough. “It’s relatively easy to build momentum and get the work done to move them. But there’s often less incentive for

the long-term monitoring,” he says. This study underscores the importance of that work, since it suggests, as Fleischer puts it: “mitigation methods like translocation don’t always work as well as we assume.”

While the translocated female tortoises seemed to be reproductively healthy, the translocated males (above) were having no luck at all. (Walde Research & Environmental Consulting)

It’s hard to say why the translocated males have seemingly been excluded from the breeding pool. “These males were still alive and living around the females, they just apparently weren’t getting any of the matings, or the matings weren’t working,” Fleischer says. Apart from a very slightly smaller average size, however, there was relatively little to distinguish them from the residents.



Unlike the males in the SCBI study, the female translocated tortoises reproduced successfully at the same rate as the resident females. Photo by Meagan Harless.

The paper’s authors suggest that it might have something to do with dominance hierarchies among the members of the species. They also speculate that the females’ apparent capacity for sperm storage and selection may play a role.

Whatever the reason, one of the paper’s co-authors, research ecologist Andrew Walde told me these results were “absolutely shocking.” Without genetic analysis, it’s the sort of thing that would have gone unnoticed. “It throws into question thousands of publications on translocation that have seen success because their animals were alive or they were reproducing,” Walde says.

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The original publication is:

Mulder, Kevin P., Andrew D. Walde, William I. Boarman, A. Peter Woodman, Emily K. Latch, and Robert C. Fleischer. 2017. No paternal genetic integration in desert tortoises (*Gopherus agassizii*) following translocation into an existing population. *Biological Conservation* 210, Part A:318–324. <https://doi.org/10.1016/j.biocon.2017.04.030>



In 2008, Smithsonian Conservation Biology Institute field collaborators worked with the United States Army National Training Center at Fort Irwin to move 184 female tortoises, 293 males and 93 juveniles out of the way of the expanding base into nearby desert habitat that already had tortoises. Photo by Walde Research & Environmental Consulting.

Publication Announcement

DTC Publishes Best Management Practices, a Guide for Project Proponents, Resource Agencies

The Desert Tortoise Council recently published a new Best Management Practices document to assist and support individuals/organizations preparing Biological Assessments, federal agencies preparing Biological Opinions, and project proponents in understanding the potential requirements and in the siting of their projects to reduce impacts and costs. The document is intended to assist project proponents during project planning, assist federal action agencies that are proposing projects within the range of the desert tortoise, and serve as a compilation of frequently implemented BMPs

that the US Fish and Wildlife Service (USFWS) may draw upon when preparing project consultation documents under section 7(a)(2) of the ESA. The document includes a flow chart depicting the decision process by the federal action agencies and USFWS, and detailed descriptions of recommended best management practices for implementing projects in desert tortoise habitat.

The Best Management Practices document is free for download from the [DTC website](#).



Symposium Announcement

2018 Annual Symposium Announced

The Desert Tortoise Council recently announced plans and a call for papers for the 2018 Annual Symposium, to be held February 23–25, 2018 at Sam's Town Hotel & Gambling Hall in Las Vegas, Nevada. The call for Papers is on the [Desert Tortoise Council website](#).

The Program for the 2018 Symposium includes plans for a Special Session on Saturday focused on the rare, threatened, endangered, and other sensitive small animals occurring in desert tortoise habitat. Featured species include the endemic Mohave ground squirrel,

burrowing owls, kit foxes, declining species of desert song birds, and gila monsters. Other planned sessions include results of recent translocation and headstarting research and many other topics. On Saturday evening, Dr. Jim Andre will provide a short program on rare, threatened and endangered desert wildflowers and plants, emphasizing those occurring in desert tortoise habitat. More information about the Annual Symposium, including registration and hotel information, may be found on the [Desert Tortoise Council website](#).



2017 Desert Tortoise Council Symposium at Sam's Town.

Grant & Award Announcements

New Lockheed Martin Diversity Grant

A recent gift from Lockheed Martin has allowed the Desert Tortoise Council to establish a grant to fund research by minority and international students. While the Council fa-

vors grant applications for research that contributes to the understanding, management and conservation of tortoises of the genus *Gopherus* in the southwestern United States and

Mexico (*G. agassizii*, *G. morafkai*, *G. evgoodei*, *G. berlandieri*, and *G. flavomarginatus*), the Council will consider proposals for similar research on other imperiled chelonian species

across the globe. Grant applications are due December 1, 2017. Details of the grant, including application, are located on the [Desert Tortoise Council website](#).

2018 Morafka Memorial Research Award

The Desert Tortoise Council is now accepting applications for the 2018 David J. Morafka Memorial Research Award. The award was established, with the aid of several donors, to help support research that contributes to the understanding, management and conservation of tortoises of the genus *Gopherus* (*G. agassizii*, *G. morafkai*, *G. evgoodei*, *G. berlandieri*, and *G. flavomarginatus*) in the southwestern United States and Mexico. Applicants must be associated with a recognized institution (e.g., university, museum, government agency, non-governmental organization) and may be graduate stu-

dents, post-doctoral students, or other researchers. Applications will be evaluated on the basis of the potential of the research to contribute to the biological knowledge of one or more of the above gopher tortoise species, and to their management and conservation. The \$2,000 award will be presented to the winning applicant at the Desert Tortoise Council's Annual Symposium in February 2018. Applications are due December 1, 2017.

Please visit the [Desert Tortoise Council website](#) for full information about the award, as well as application procedures and documents.



David J. Morafka was a graduate of the University of Southern California and a professor at California State University, Dominguez Hills. His research interests included evolutionary biology, biogeography, and herpetology. He was an expert in the biology of the bolsón tortoise and Agassiz's desert tortoise, as well as the ecogeography of the Chihuahuan Desert and neonatology of tortoises.

2018 Glenn R. Stewart Student Travel Fund

The Desert Tortoise Council is now accepting applications for the Glenn R. Stewart Student Travel Fund. This fund was established to support students working with North American *Gopherus* tortoises by assisting with their travel costs to attend and participate at the 2018 Desert Tortoise Council Symposium. The fund will support up to \$500 (each) in travel costs for up to two students. Applicants must be enrolled in a recognized educational institution and may be a

high school, undergraduate, graduate, or post-doctoral student. The student applicant must be a member of the Desert Tortoise Council, must present an oral presentation or poster at the 2018 Symposium. Applications are due November 17, 2017.

Please visit the [Desert Tortoise Council website](#) for full information about the fund, as well as application procedures and documents.



The Glenn R. Stewart Student Travel Fund was established to honor Dr. Glenn R. Stewart, co-founder of the Desert Tortoise Council, and tireless supporter of students.

Board of Directors Spotlight

Becky Jones

Rebecca (Becky) Jones is an Environment Scientist with the California Department of Fish and Wildlife (CDFW). She started working for the state as a seasonal employee in 1978 while attending San Jose State, where she received her Bachelor's degree in Wildlife Zoology with a Concentration in Wildlife Management and Conservation. After working seasonally with the California Department of Food and Agriculture (CDFA) she returned to school to pursue a Master's degree in entomology. After graduating she returned to work for the CDFA as an Economic Entomologist before transitioning to the CDFW. Since joining the CDFW in 1992 she has been working

with desert tortoises, Mohave ground squirrels, and other sensitive resources on projects throughout the California desert. Since 1998 Becky has served as the desert tortoise lead for CDFW. In this position, she reviews environmental documents, writes incidental take permits for desert tortoise and Mohave ground squirrel, and writes research permits for desert tortoise.

Becky has been a Member of the DTC Board of Directors since 2000. During her time with the council, she has been the Junior Co-Chair and Senior Co-Chair and currently serves as Corresponding Secretary. She has also chaired the government panel and given presentations at previous symposia, and served as a presenter for DTC training workshops.



Joe Probst

Joe Probst was born in Munich, Germany in 1949, and emigrated to the United States in 1973. Prior to emigrating, he obtained a Masters in Hotel and Restaurant Management in 1972 from Stuttgart University, and worked most of his career in the United States in the hotel and restaurant industry (with several stints in sales). Joe most recently worked in residential solar sales, and is now enjoying retirement.

Joe is married to Becky Jones, another Desert Tortoise Council Board of Directors Member and Officer. Joe and Becky met in early 2009 and they married later that year. Joe became interested in desert tortoises through Becky's introduction to them, and he immediately felt the urge to be involved in

conservation of the species. Joe accompanied Becky to several Board of Director meetings as a guest in 2009, as well as to the 2010 DTC Symposium. Joe said the experience of attending those board meetings really opened his eyes to the plight of the species, remarking "I think anyone with some first-hand information would realize that desert tortoises are on the verge of extinction because humans infringe on their habitat and the government seems too paralyzed to do anything about it." Joe officially joined the Desert Tortoise Council in 2011, and has served in the office of Treasurer since joining the Board of Directors in 2014. He also provides auctioneering services during our Annual Symposium Auction.



Back Page Announcements

Position Announcement: DTC Newsletter Editor

The Desert Tortoise Council is seeking a highly motivated member of our community to become the next Editor of our Newsletter. This is a volunteer position, and an excellent opportunity for the right person.

The position involves compiling articles pertinent to our readership, including requesting permission to reprint previously published works and soliciting original stories from our membership; communi-

cating and coordinating with the Board of Directors; and publishing up to four issues of the Newsletter per year. The ideal person would have experience with writing, editing, and layout using Microsoft Publish-

er. Interested persons should submit a letter of interest to: newsletter@deserttortoise.org.

Sponsors Sought for DTC Newsletter

Interested in getting more exposure for your organization by sponsoring a non-profit? Consider advertising in the next issue of the Desert Tortoise Council Newsletter! The Council is currently seeking sponsors for upcoming issues

of the Newsletter, which is published quarterly, distributed via email to more than 500 of our members and past members, and available for free download from our website (www.deserttortoise.org/newsletter.html).

We are offering the following sponsorship levels:

Silver: Your organization's name mentioned in the sponsorship section of the Newsletter for 4 issues (\$100).

Gold: Your organization's logo

presented in the sponsorship section of the Newsletter for 4 issues (\$250).

For more information on becoming a sponsor of the Desert Tortoise Council Newsletter, please contact newsletter@deserttortoise.org.

Follow the Desert Tortoise Council on Social Media:



Council Mission

The Desert Tortoise Council was established in 1975 to promote conservation of the desert tortoise in the deserts of the southwestern United States and Mexico. The Council is a private, non-profit organization comprised of hundreds of professionals and laypersons who share a common concern for desert tortoises in the wild and a commitment to advancing the public's understanding of the species. For the purposes of the Council, desert tortoise includes the species complex in the southwestern United States and in Mexico, currently referred to as Gopherus agassizii, Gopherus morafkai, and Gopherus evgoodei.

Board of Directors & Staff

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Bruce Palmer, *Chairperson*
Michael Tuma, *Chairperson-elect*
Joe Probst, *Treasurer*
Ed LaRue, *Recording Secretary*
Becky Jones, *Corresponding Secretary*
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Mary A. Cohen

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Bianca Cirimele

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