The Voice of the Arizona Chapter of The Wildlife Society

THE ARIZONA WILDLIFER

2025 Issue 1 | Follow us on X (Twitter)! | Like us on Facebook! | Winter Edition

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The President's Message

AZTWS Chapter President Chris Carrillo

Happy new year and welcome to 2025!!! It has been a busy year, and working with the Arizona Chapter of The Wildlife Society (AZTWS) Board has been very rewarding. I have learned a lot during this past year, and I appreciate all the work the Board does to keep the Chapter moving in the right direction. As I have stated in the past, the AZTWS has great members who possess a variety of skills, knowledge, and experience. And it's each of you who contribute to the success of the AZTWS Chapter. We have all benefited from the sharing of information, and it benefits not only other Chapter members but Arizona's wildlife. The newsletter is one example of the ways that our membership can share information about things happening with Arizona's wildlife. I encourage you all to submit articles when you see the call for submissions. This newsletter could not be prepared without your contributions and without your involvement and dedication. So thank you for your continued support to Arizona's wildlife conservation!!!

As a reminder, the 2025 Joint Annual Meeting (JAM) of the Arizona and New Mexico chapters of The Wildlife Society and American Fisheries Society will be held in Albuquerque, NM, at The Clyde Hotel from February 6–8, 2025. Registration is open and can be found at https://wildlife.org/nm-chapter/annual-meeting.

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Presidents Message cont...

The AZTWS still has vacant committee chair volunteer positions available. These include Continuing Education, Diversity, Memorial Garden, Historian, and Conservation Affairs. Please consider nominating yourself or a colleague for a chair position. Feel free to ask any board member or reach out to incoming President Holly Hicks if you have questions about positions and duties.

I hope you enjoy the articles in this issue of the newsletter. If you have an interesting article or exciting project to write about, please submit those to our Newsletter Editor, Tiffany Sprague (aztwseditor@gmail.com). Suggestions for improvement on any aspect of the Arizona Chapter of The Wildlife Society, or ideas for engaging our members, are always welcome; feel free to send me your comments at Chris.D.Carrillo@usda.gov, AZTWS Chapter President.

Sincerely,
Chris Carrillo

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Come JAM with Us!

2025 Joint Annual Meeting
February 6–8, 2025
Albuquerque, New Mexico

Register today! Early bird prices end January 17.

Book your hotel room at The Clyde Hotel.

Submit an abstract for an oral or poster presentation.

Check out the agenda!

Learn more and stay tuned for additional details at https://wildlife.org/nm-chapter/annual-meeting.

We look forward to seeing you there!

Regional News

Southwest Section Tracks

By Kathy Granillo,
TWS Southwest Section Representative

Southwest Section Representative Kathy Granillo with a wolf pup.

Greetings from central New Mexico. We had a wonderful rain/snow event a few weeks ago, but nothing since. It is shaping up to be a dry winter. May you stay hydrated and consider how to help wildlife and their habitats do the same.

I hope that many of you were able to attend The Wildlife Society's Annual Conference in Baltimore, MD. We had about 1800 attendees and the usual mix of scientific sessions, plenaries, posters, working group meetings, and socials. A highlight for me was the Aldo Leopold Memorial Award presentation by the 2023 winner, Carol Chambers. As most of you know, Carol is a Past President of TWS, past Southwest Representative to Council, and active member of the Arizona Chapter. She gave an inspiring talk about her career path and her legacy. She encouraged everyone to think about what their own legacies are and will be, using the life history of an old-growth (legacy) ponderosa pine tree as a metaphor.

As we enter the new calendar year, I encourage you all to give some thought to who else would be a deserving recipient of the Aldo Leopold Memorial Award. As it says on the awards website (https://wildlife.org/awards)

> "The nominee should have a well-established and distinguished career that has been of undoubted significance to the cause of wildlife conservation. The award is only given to an individual, and the nominee must be living. You are encouraged to consider individuals not only from our traditional professional realm, but also those who bring their skills and talents to wildlife conservation from across society and across the world."

There are also many other TWS awards looking for nominees—please visit the website and learn about these awards and think about who you know who would be a good nominee. Recognizing deserving individuals through an award can only happen if someone takes the time to nominate that person. If you need help writing a nomination, please reach out to your Chapter or Section Boards. Speaking of Chapters and Sections, these groups are also seeking nominees for the awards given at those levels. Please help recognize your fellow biologists.

Another place I recently found a reminder of legacy was in the Wildlife Vocalizations by Elise Couillard. She wrote that wildlife leaders "have become…consumed with how wildlife should fit conveniently into the human way of life and less concerned by how human behavior is often negatively impacting every ecosystem on the planet…. There is only one world—we share it with everything. The world is not our playground. It's not our greenspace to trash. It's not 'ours' at all. We are responsible for our behaviors…. We should be the leaders in recognizing that reducing our consumption and pollution will not only directly benefit wildlife and wildlands, but it will serve as a powerful catalyst for all humans to follow suit."

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I look forward to seeing many of you at the JAM. Registration is open for this meeting. Visit the NMTWS website for more details. Please feel free to chat with me at these events or to drop me an email, about any and all things TWS.

Please feel free to contact me at KGBirder55@gmail.com.

Get Involved!

AZTWS has open vacancies for Committee Chair positions. Join us and make a difference in your Arizona wildlife community. The following positions are available:

1. *Continuing Education Chair* — This position works with a committee to review applications for the Continuing Education Fund and grant awards. The purpose of the fund is to provide career enhancement opportunities for Chapter members.
2. *Conservation Affairs Chair* — This position includes review of regulatory, planning, environmental, and other issues related to wildlife and their habitat in Arizona. Duties include soliciting, recommending, and preparation of materials related to conservation issues.
3. *Diversity* — This position helps the Chapter promote engagement from all people interested in wildlife careers and activities.
4. *Historian* — This position is responsible for archiving Chapter documents and periodically summarizing the history of the Chapter.
5. *Memorial Garden* — This position manages activity related to the Wildlife Memorial Garden, which is dedicated to individuals who have lost their lives while working for Arizona's wildlife resources.

Please contact us at aztws@gmail.com to learn more about any of these roles.

Our Neck of the Woods...

Road Ecology Study in the Sonoran Desert

By Brian Blais, Wildlife Biologist

My colleagues and I recently published a study about aridland road ecology, available open access in the journal *Royal Society Open Science* (Blais et al. 2024). This work stemmed from a project that began in 2018, focused on the biodiverse Sonoran Desert, and covered rural intergrades around Phoenix and Tucson, Arizona. The following is a modified summary of the paper from a version first published by the Tucson Herpetological Society, one of the project's funders.

Western diamondback rattlesnakes (*Crotalus atrox*) can be a common observance during evening road cruise surveys in Arizona's Sonoran Desert. Credit: Brian Blais

As human growth and urbanization expands, densities of linear infrastructure (e.g., roads) can soon follow. This can affect wildlife directly (e.g., roadkill) and indirectly (e.g., road avoidance behaviors). To briefly recap the field of road ecology—the relationships between roadways and biota—studies have occurred globally with much focus on temperate/tropical climates, on one or few target species (especially mammalian carnivores and large megafauna), and on high-traffic roadways such as highways. Aridland ecosystems have received less attention in road ecology as well as community assemblages (i.e., multi-species, especially amphibians and reptiles) and along lower functional class roads such as connectors and local roads. Lower traffic roadways often comprise the gradient between natu-

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I spy with my little eye…. Some species, such as this Couch's spadefoot (*Scaphiopus couchii*), can be difficult to see on roadways. Credit: Brian Blais

ral and developed areas known as the wildland-urban interface (WUI). A better understanding of roadway effects on wildlife and how they respond can inform natural resource and transportation management strategies to mitigate vehicle-wildlife conflicts and conserve biodiversity while facilitating human needs and growth.

We performed more than 200 low-speed (<30 mph), vehicle-based surveys (i.e., "road-cruising") to observe vertebrate animals along the WUI of southern Arizona's Sonoran Desert Ecoregion, 2018–2023. The purpose of this study was to assess the anthropogenic (human-induced), environmental, and temporal (seasonal) factors that influence roadkill of vertebrate animals. We derived eight routes (average = 22 km) that were comprised of roads no greater than "collector" classification, contained sparse to modest residential densities, and were absent of commercial development, i.e., we focused on rural zones with and without transit connectors and areas in suburban transition. We surveyed between April and November each year, starting at least 30 minutes after sunset—these timeframes correspond to peak daily and seasonal activity periods of much Sonoran Desert fauna. For example, many reptiles and mammals use nocturnal strategies to avoid the summertime heat, and amphibians utilize the rainy summer monsoon season for most of their surface activities. Post-sunset surveys also encompass many diurnal species heading to roost as well as rousing nocturnal species.

Our efforts (~4,800 km driven) yielded n = 2,019 vertebrates, of which 28.5% were roadkill including 179 amphibians, 177 reptiles, and 220 endothermic ("warm blooded") vertebrates —we combined birds with mammals due to ecological similarities and limited samples of the former. Routes in more developed/urbanized areas (versus rural) were associated with fewer overall detections along roadways and increased roadkill of endotherms. Rural areas lacking high-volume road classification types yielded more detections of wildlife and the lowest rates of traffic and roadkill. Traffic volume was strongly associated with reduced abundance along roadways and increased roadkill of all vertebrate groups. Roadkill rates increased when traffic rates equaled or exceeded 20 vehicles per hour. Our models predicted that at roughly 50 vehicles/hour, vertebrate occurrences reduced to less than one. Reptiles

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(snakes and lizards) were most susceptible to traffic, with about 52% being roadkill; detrimental effects began at only 15 vehicles/hour for this group. Daily low temperature and/or relative humidity were also associated with roadkill of vertebrate groups to various extents, and amphibian roadkill was influenced by the seasonal monsoon period.

The key findings of this study encompass environmental and anthropogenic factors that influence roadkill, which can be used to better inform transportation and wildlife management strategies. As human populations grow and resulting urbanization sprawls into rural or undeveloped areas, it compounds challenges to ecosystems and wildlife therein. This study shows that rural areas along aridland WUIs like the Sonoran Desert support a diverse array of species. However, increases in both development extent and traffic volume leads to increased roadkill. Other indirect effects across numerous species can also impact population dynamics in the long term. The effects from urbanization and traffic

This Sonoran gophersnake (*Pituophis catenifer*) was detected dead along the shoulder edge of a low-traffic road near Tucson. The ample width of this road (wider than pictured) suggests a driver may have intentionally swerved to strike the animal. Credit: Brian Blais

can be amplified during key environmental periods, such as the summertime monsoon season. As aridland climates become warmer and drier, it may drive behavioral shifts in species and render more value on important hydrological features and migration corridors.

This study comes at a key time for the Sonoran Desert. One of the most biodiverse deserts in the world, the Sonoran (and much of the Southwest) is likely to get hotter and drier with climate change. Precipitation patterns and extreme weather events are expected to be more intense when they occur. Many Sonoran Desert flora and fauna are already experiencing rapid disturbances along with the gradual changes. Additionally, anthropogenic demands for water and land for development can further strain natural resources. The Interstate-11 corridor, which aims to connect Canada to Mexico, is currently in development planning stages in southern Arizona (http://i11study.com/Arizona). The developers' preferred "West" option near Tucson would create a new highway west of the existing I-10 and bisect or come adjacent with numerous important biodiversity and cultural preserves, such as Ironwood Forest National Monument, Saguaro National Park, Santa Cruz River Valley, and Tohono O'odham Nation.

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The I-11 West option would cross some of the roads (and putative wildlife hotspots) we surveyed for this project as well as complete an encirclement of Saguaro National Park (West District) by high-volume roadways. We acknowledge the economic prosperity of expanding infrastructure and promoting human advancement, but should it come as a sacrifice to invaluable and irreplaceable natural resources when planning can be better mitigated to prevent functional ecosystem losses? In support of our principal findings that increased urbanization and traffic yield increased roadkill that may threaten long-term population dynamics, the I-11 West option would assuredly be detrimental to numerous ecosystem functions and values. To balance and protect key natural resource areas while accommodating growth, we recommend that developers consider their other "East" alternative to expand the existing I-10/I-19 corridor in the Tucson region (i.e., reject the preferred West option), as well as carefully consider placement of high-traffic roadway options respective of other important natural areas north of Tucson (e.g., Hassayampa ecosystems, Sonoran Desert National Monument). More broadly, we recommend that transportation and wildlife managers mitigate or avoid developing or expanding linear infrastructure near natural areas that possess high biodiversity, valuable waterways or migration corridors, and populations of threatened or road-vulnerable species.

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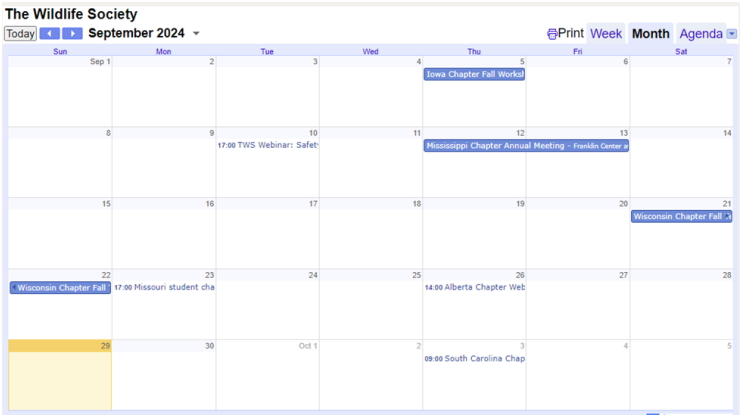
Check It Out!

The parent society has a new events calendar! This resource includes the dates of upcoming TWS annual conferences, webinars, and deadlines, as well as Section, Chapter, and Working Group meetings/events. The hope is that this new tool will provide a more comprehensive picture of upcoming TWS events/deadlines across all levels of the society.



Looking for Local Opportunities?

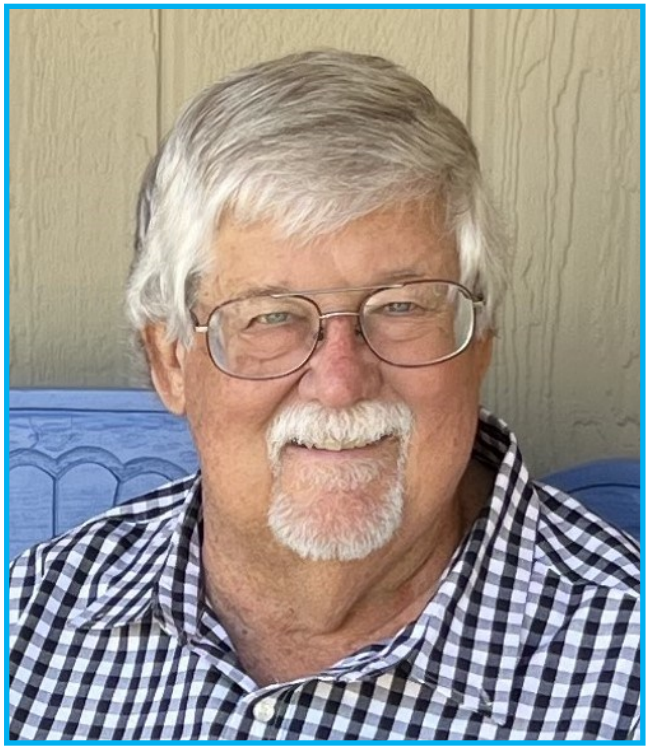
Check out the AZTWS website for events, volunteer opportunities, and jobs based in Arizona!

Do you have an opportunity to share? Send it to Blue Martin at bbmarti5@asu.edu.

Submit an AZTWS award nomination! We encourage you to nominate deserving individuals for future awards. You can lean more about our awards and past winners at https://aztws.com/past-award-winners. Submit nominations at any time to Awards Committee Chair Holly Hicks.

Remembering Kerry Baldwin

By Cheryl Charles, PhD, Trustee, Arizona-Sonora Desert Museum



Born in Arizona in 1951, Kerry Baldwin passed away of natural causes at his home in Tucson in October 2024. With his passing, Arizona and the world have lost a true champion of our diverse and precious natural heritage. Kerry was a visionary leader, accomplished professional, and generous community member. He was a rare combination of knowledge and skills as an organizational manager, wildlife biologist, and educator. He dedicated his decades-long career to identifying, conserving, enhancing, and caring for natural habitats, especially in Arizona, while simultaneously educating people of all ages about their importance at local, national, and international levels.

Kerry studied Natural Resources Management and Wildlife Ecology from 1971–1979 at University of Arizona in Tucson. During those years, he earned both an undergraduate degree and a Masters in natural resources management and wildlife ecology.

In 1976, he began work at the Arizona Game and Fish Department in Phoenix, starting initially as an Education Officer. By 1979, he was Branch Chief of Education. He held that role until his retirement from the agency in 2004 after 28 years of service. During his tenure with the Department, he helped found and guide the award-winning and internationally-recognized wildlife education program, Project WILD. Decades later, that project is still widely available throughout the United States, Canada, and other parts of the world. Kerry also contributed to environmental education and natural resource management exchange programs in Canada, the Middle East, and Zambia, Africa.

Not well suited to "retirement," he moved back to Tucson in 2004 and was hired to be Superintendent of Natural Resources for the Pima County Department of Natural Resources, Parks and Recreation, a role he held until 2016. That position functioned as an Assistant Director over the Natural Resources Division with responsibilities for the County Natural Resource Parks, including Tucson Mountain Park, Colossal Cave Mountain Park and Agua Caliente Park, as well as having the primary responsibility for implementing the Conservation Land Management Program of the Sonoran Desert Conservation Plan. Kerry had a key role in implementing the voter-approved $165 million conservation land acquisition program established in 2004. Under his leadership, the Division had responsibility for more than 145 different biologically important properties covering more than 250,000 acres in Pima County while also providing environmental education and rangelands resource management programs.

Of his many continuing contributions, Kerry served for more than 20 years as an advisor to the Wildlife for Tomorrow Foundation, an official partner of the Arizona Game and Fish Department. He was a lifetime member of the Tucson Trap and Skeet Club, mentoring young people and winning awards for his marksmanship. He also served recently as a trustee and member of the executive committee for

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the internationally-acclaimed Arizona-Sonora Desert Museum from 2019 to 2023. His activities, awards, and contributions are too many to list. One last example: Kerry was helping to finish the final report for a major research project in which he was one of the principal investigators, "Bobcats in Tucson," at the time of his death. That project provides valuable insights into the adaptations of urban bobcats in a changing environment.

Kerry was predeceased by his parents, Minnie and Harold Baldwin. He is survived by his sister, Linda Reynolds, and his two nephews, James and Jonathan Reynolds. Memorial services to recognize and celebrate Kerry Baldwin's many accomplishments will be held on February 15–16. For those who choose to do so, charitable contributions in Kerry's memory may be made to two Tucson-based organizations he valued and helped to support, the Arizona-Sonora Desert Museum and the Arizona Land and Water Trust.

* *

You're Invited to Celebrate the Life and Contributions of Kerry Baldwin

Saturday, February 15, 2025, at 2 p.m.
Arizona Game and Fish Department Headquarters Building
5000 W. Carefree Highway
Phoenix, AZ 85086

Sunday, February 16, 2025, at 2 p.m.
Arizona Sonora Desert Museum
2021 N Kinney Road
Tucson, AZ 85743

Come to one or both events!
Contact Cheryl Charles to RSVP and for more information at cherylcharles01@gmail.com.

Arizona Named Chapter of the Year for 2024

By Sarah Rinkevich, AZTWS Past President

The Wildlife Society named the Arizona Chapter the 2024 Chapter of the Year! AZTWS accomplished so many things in 2023 and 2024 that were part of the reason for this prestigious award from the parent society. The award was presented at the TWS Annual Conference on October 20, 2024, in Baltimore, MD. A summary of the AZTWS's achievements that helped the Chapter be selected for this award are as follows:

Left to right: TWS CEO Ed Arnett, AZTWS Past President Sarah Rinkevich, AZTWS Board Member Vicki Olmstead, and TWS Past President Bob Lanka

2024 Joint Annual Meeting

The AZTWS hosted the 2024 Joint Annual Meeting (JAM) between the Arizona and New Mexico chapters of The Wildlife Society and American Fisheries Society on February 1–3, 2024, in Flagstaff, AZ. The conference was well attended with 400 state, federal, Tribal, and other participants registered. The theme of the plenary session was "Wildlife Stewardship on Tribal Lands," during which Gloria Tom, Director of Navajo Nation's Department of Fish and Wildlife provided an overview of wildlife and fisheries management on the Navajo Nation, highlighting both successes and challenges the Nation has faced over the past 20 to 30 years. The two other speakers included Twila Cassadore with San Carlos Apache Tribe, who spoke on Indigenous food sovereignty and Indigenous food traditions throughout the Western Apache Tribes, and Dr. Serra Hoagland of the Laguna Pueblo, who spoke on Tribal Wildlife Stewardship as a model for sustainability.

Student Wildlife Techniques Workshop

On April 22, 2023, AZTWS and the Arizona Game and Fish Department hosted the 10th annual Wildlife Techniques Workshop. The intent of this annual workshop is to provide young professionals and students enrolled in wildlife-related programs at local colleges and universities with hands-on training opportunities to familiarizes them with wildlife tools and techniques used to capture, restrain, track, and observe wildlife. The workshop provided students a unique and valuable opportunity to handle equipment used by wildlife professionals that most students had only read about prior to attending the event.

In 2023, 32 students and young professionals registered for the workshop from a variety of schools, including Northern Arizona University, Arizona State University, University of Arizona, and Grand Canyon University. More than a dozen instructors and organizers provided their professional expertise to make the event a major success for AZTWS. Without the dedication of these individuals, the Wildlife Techniques Workshop would not have been possible. As a result of their participation, Arizona wildlife students and professionals have additional skill sets that will facilitate their transition into profession-

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al service. In addition to being a fun event, the Wildlife Techniques Workshop provides an educational experience and a networking opportunity for the attendees.

Every student learned firsthand various techniques used to conduct fish surveys. The group also instructed students in radio-telemetry methods and darting, and everyone experienced shooting a net gun. There were other unique opportunities to learn tips for tracking animals and trap styles from small Sherman's to large bear traps. After completing this full day of training, the students left with a better understanding of the work of wildlife professionals and the tools and techniques available to them in the field for safe and effective wildlife management. In addition, they reaped the benefits of learning about wildlife in Arizona from a group of knowledgeable and experienced professionals.

AZ BioBlitz

The AZTWS helps lead and support bioblitzes across the state. In 2022, AZTWS and the Arizona Game and Fish Department teamed up to sponsor the Hassayampa Ecosystems BioBlitz. The blitz area spanned the White Tank, Vulture, and Belmont mountains west of Phoenix, as well as the Hassayampa River and plains that connect those ranges. There were 110 public "Blitzers" who filled 179 spots in 41 excursions led by 52 wildlife biologists and master naturalists. In addition, 91 folks submitted 2,049 observations into iNaturalist, documenting at least 491 species with the help of 317 identifiers. In eBird, 77 species were identified on 39 lists by 13 eBird members. There were also 14,658 images collected from two remote cameras and acoustic data stations that recorded bat and amphibian calls.

In addition to the 24-hour blitz, the event included a campfire/campout welcome and a post-event virtual recap and awards meeting. Participants received a printed booklet with information on numerous aspects of BioBlitz efforts, including how-to information and species accounts. They also received an AZBioBlitz comb (for cactus spine removal).

AZTWS Student Chapters

In 2023, AZTWS Student Liaison Holly Hicks provided guidance to students in the form of report writing, contributions to the Student Voice in the Chapter's quarterly newsletter, and assistance in completion of grants to receive travel reimbursements. Currently in Arizona, there are three active student chapters (University of Arizona, Arizona State University, and Northern Arizona University). AZTWS provides information on volunteer opportunities, upcoming events, Chapter obligations, and JAM opportunities. Officers for each student chapter are offered free membership to AZTWS. Throughout the year, AZTWS also provides advice to students working on career opportunities and resume building. Holly works with officers on reports and travel reimbursement applications. The Student Voice is a common section in the quarterly newsletter, and Holly has encouraged and worked with students to submit articles. Holly also has continued to provide reminders to officers of their obligations to their state chapter and current and upcoming volunteer opportunities. During the AZTWS's Business Meeting at the JAM, Student Chapters were given the opportunity to provide their reports.

Exploring Landscape-Level Effects of Habitat Fragmentation on Nicaraguan Bats

By José Gabriel Martínez-Fonseca, Wildlife Ecologist, Northern Arizona University

Nicaragua is home to more than 100 bat species from nine families. This uncommon leucistic individual of the relatively common lesser dog-like bat (*Peropteryx macrotis*) was found during a survey in 2024. Credit: José G. Martínez-Fonseca

Nicaragua, despite its small area, is an extremely bat diverse country with more than 100 species, more than twice the species that occur in the United States. Sadly, as in many other tropical countries around the world, Nicaragua is suffering great rates of deforestation. How wildlife, such as bats, respond to fragmentation in forest habitat is extremely important for management and conservation of this diverse taxa. Some species can be extirpated by habitat fragmentation while others can benefit from such anthropogenic changes.

In the tropics, bats in the Phyllostomidae are believed to vary in their response to forest fragmentation. Fruit-eating bats in the subfamily Stenodermatinae are found in greater proportions in fragmented and urban habitats. Other species including the animalivorous species in the subfamily Phyllostominae are believed to select for unfragmented forest areas. Quantifying these differences has proven to be a challenging task, especially because bats and landscapes are so diverse. However, large sample sizes in a large area can provide insights into relationships between bats and forest fragmentation.

To better understand the types of landscape conditions that facilitate maintaining the greatest amount of biodiversity, Dr. Carol Chambers, our team members, and I have been working for more than 10 years in Nicaragua, sampling bats in as many sites as possible across the country. We started with compiling data from our own sampling efforts and those of colleagues. This occurrence dataset now contains more than 850 sample locations with captures of 20,000 bats. This huge dataset could not be possible without collaborating with many Nicaraguan and international researchers.

After obtaining these samples, we next chose focal species. We selected six bat species that we hoped would offer a spectrum of habitat generalists to specialist. Jamaican and great fruit-eating bats (*Artibeus jamaicensis* and *A. lituratus*, respectively) are two medium-sized, fruit-eating species that are often regarded as habitat generalists; they are also some of the most common species in the Neotropics. In contrast, the great spear- and pale-nosed bats (*Phyllostomus hastatus* and *P. discolor*, respectively) are omnivorous, feeding on a variety of fruits, pollen, and small invertebrates and vertebrates. The final two species were the woolly false vampire and spectral bats (*Chrotopterus auritus* and *Vampyrum spectrum*, respectively), species known for their carnivorous behavior and large size.

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The Caribbean pine savanna in northeast Nicaragua might not resemble the typical vegetation of a tropical country. This area had never been sampled for bats until 2024. Credit: José G. Martínez-Fonseca

With the help of FRAGTATS software and GIS tools, we calculated more than 1200 combinations of metrics that reflected the composition (forest types) and configuration (habitat patch arrangements) at six spatial scales (from 100 m to 6000 m) from each capture location for each species. We then used a machine learning analysis approach to create models that best explained the occurrence of these species. These methods allowed us to test for thousands of variable combinations and explore these complex interactions.

As a result, we found some novel, quantifiable insights on habitat selection for these species. We found that *Artibeus* strongly selected for highly fragmented forest conditions, but also there was evidence of a fine gradient of selection among all the other species. Even between the two *Artibeus* (fruit eating bats), the largest of the two species (*A. lituratus*) selected for a "coarser" level of forest fragmentation (larger patch sizes) than the smaller species (*A. jamaicensis*), which was able to utilize much smaller forest patches. Likewise, the spatial scales that were more significant for all six species showed that the greater level of specialization seemed to correlate with smaller spatial scales, suggesting that the range of movement and sensitivity to changes in their environment is much finer.

This level of resolution and extent (covering the entirety of the country) is unprecedented in Central America. Our datasets (bat captures and forest habitat) provide a great deal of information to work with and this opens our minds to more questions. For now, we are working on publishing these first findings. Although we know that one-solution-fits-all is unlikely or impossible, we do expect that in the future we can determine best landscape configurations to maximize bat species diversity or at least optimize habitat for certain groups. This new quantitative method can directly inform conservation of the remaining forest patches and improve the connectivity not just for bats but for other wildlife species. Additionally, because ecology of many bat species in the Neotropics is poorly known, this novel information is useful

During a busy night of fieldwork, James Hernandez, a biology student at the National University of Nicaragua, helped process more than 170 fruit-eating bats. Credit: José G. Martínez-Fonseca

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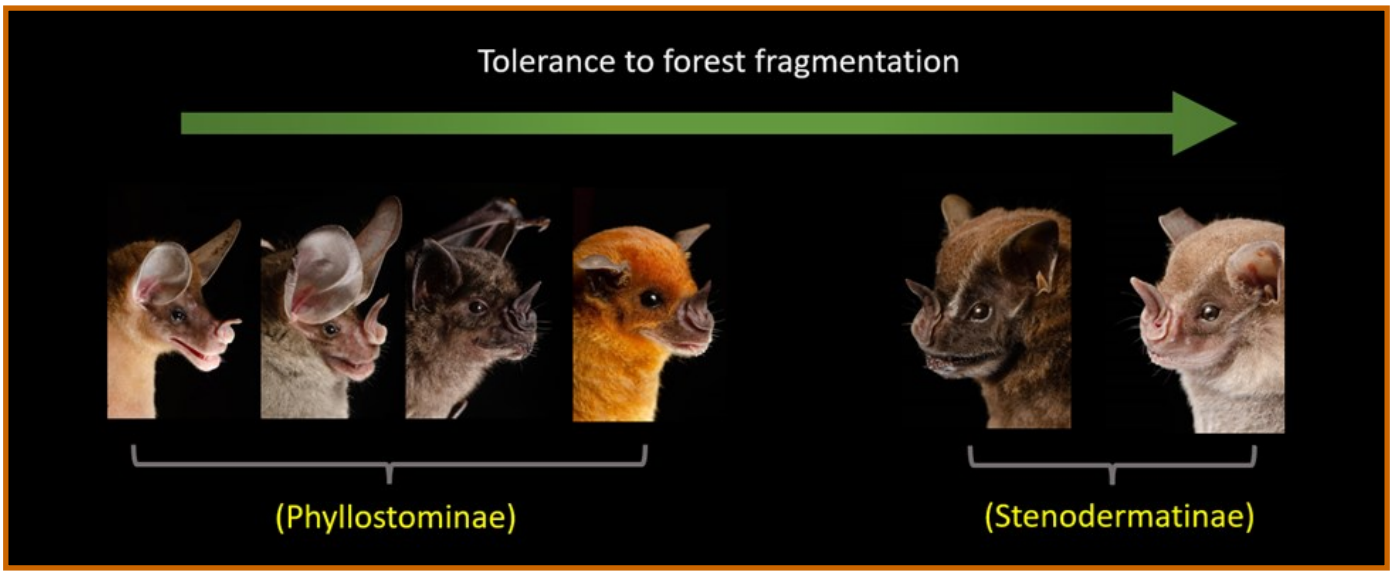
in neighboring countries in Central and South America where similar conditions and environmental issues are common.

This project has had many benefits in Nicaragua. It allowed us to conduct research in the country and offered the opportunity to train local biologists and students (including me in my early career days). During the many years of work of creating the bat occurrence database, we recorded a dozen new bat species for the country, improved our knowledge of dozens more bat species within Nicaragua, and updated the country's checklist. We also created material for use in bat conservation and environmental education. Finally, one of the most important outcomes has been that this project has facilitated the exchange and collaboration between foreign and local researchers as well as among Nicaraguan researchers, which had been a barrier in past years.



The study's findings show a clear and quantifiable selection for bat species in two different subfamilies of leaf-nosed bat (Phyllostomatidae) to varying levels of forest fragmentation. From left to right (less fragmentation to more): *Vampyrum spectrum*, *Chrotopterus auratus*, *Phyllostomus hastatus*, *P. discolor*, *Artibeus lituratus*, *A. jamaicensis*. Credit: José G. Martínez-Fonseca

I personally continue working on maintaining and curating the bat dataset. This year, thanks to a grant from The Rufford Foundation, we added 35 new localities, most of which were from regions within the country that had never been sampled before. Our team recorded bat species number 112 for the country and potentially rediscovered an endemic species only known from specimens collected 50 years ago. In addition to that, we documented range extensions for a dozen of other species.

As a Nicaraguan, I continue my commitment to seek funding and collaborate with researchers, students, and conservationists in Nicaragua. Raising awareness about pressing conservation issues that affects not only bats but all kinds of wildlife in these unique and mega diverse ecosystems.

An AZTWS Continuing Education Grant provided support for travel to the North American Society for Bat Research symposium in Guadalajara, Mexico, to present this research.

Arizona Game and Fish Department and Mexico Make Prairie Dog History

By Glen Dickens, President of Arizona Wildlife Federation and Vice President of Arizona Antelope Foundation

This article first appeared on the Arizona Wildlife Federation blog.

Mexico state and federal team with staff from Arizona Game and Fish Department. Credit: Betty Dickens

Tuesday, October 29, 2024, marked a wildlife restoration milestone when Arizona Game and Fish Department (AZGFD) biologists and volunteers delivered 98 healthy black-tailed prairie dogs (BTPD) to private ranch grasslands north of Cananea, Sonora. This reintroduction effort was possible because of the growth and success of reintroduced BTPD colonies in the Bureau of Land Management's Las Cienegas National Conservation Area near Sonoita, Arizona.

Historically, Arizona was home to two of the five species of prairie dogs: the Gunnison's and the black-tailed. While the Gunnison's of northern Arizona survived efforts to remove them through poisoning from the 1920s through the 1950s, by 1960 black-tailed prairie dogs had been successfully removed from their entire range of 740,000 acres of grasslands in Santa Cruz, Pima, Cochise, and Graham counties. In response to a National Wildlife Federation 1998 petition to list the BTPD as threatened under the Endangered Species Act, a western states recovery action plan was put in place in 2009. As a result of that National Management Plan, Arizona agreed to reintroduce BTPD to 7,100 acres in at least three counties to help the recovery of the species.

In 2008, this effort (funded by the National Fish and Wildlife Foundation) began in earnest in Arizona when BTPD trapped in New Mexico were re-introduced to the BLM's Las Cienegas National Conservation Area. As of 2024, six colonies have been established in this grassland zone.

In 2011, in an effort to provide genetic diversity to the then three Las Cienegas growing colonies, the AZGFD, in cooperation with the Secretariat of Environment Natural Resources and Fisheries Mexico

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AZGFD staff prepare to release 98 prairie dogs into their new home. Credit: Betty Dickens

(SEMARNAT), Comisión de Ecología y Desarrollo Sustentable del Estado de Sonora (CEDES), and a private landowner/rancher in Sonora, Mexico, captured 60 BTPD in Sonora and distributed them equally to each of the three new and growing colonies in Las Cienegas. Due to circumstances that occurred over the next several years, the colony on the private ranch in Sonora failed.

Thus, this fall's effort to return and re-establish BTPD on the same Sonoran ranch has been on the books for quite some time. The AZGFD set up camp near the sponsor colony to be trapped on October 17th to begin pre-baiting the prairie dogs. Trapping occurred on the 25th and 26th of October.

To successfully trap and relocate prairie dogs, it is important to understand their biology. Behaviorally, all prairie dog colonies are comprised of multiple social units, referred to as coteries. A prairie dog coterie is a family unit of prairie dogs who live together within the boundary of a colony. Coteries are made up of one or two breeding males, several breeding females, and their young. In recognition of this social order and behavior, AZGFD biologists go to great lengths to identify and actually flag these family groups prior to trapping to ensure that they are caged and transported together and released as a family unit into their respective new home's holding cage and artificial burrow.

A black-tailed prairie dog enjoys a carrot treat while awaiting its release. Credit: Betty Dickens

By Sunday night, all 98 BTPDs were snug in their respective transport cages and ready for transport in two vans (they received both alfalfa pellets and carrots while in their transport cages…they simply love carrots!). On October 27th, biologists and other personnel from Mexico's two wildlife agencies and their Department of Agriculture arrived. The next morning, everyone caravanned south in five vehicles to Douglas to cross into Sonora at the Agua Prieta port of entry. The necessary inspections and paperwork took several hours to complete (prairie dogs had never been imported to Mexico!). Finally, at 2 p.m., with permitting completed, we headed southwest to the city of Cananea to overnight.

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Perrito and Paco help transport a coterie of black-tailed prairie dogs. Credit: Betty Dickens

Arising early Tuesday morning, October 29th, the group headed north from Cananea in the dark for the hour-and-a-half drive to the ranch release site. The site had been prepared in advance by SEMINART and CEDES biologists with 25 cages and artificial burrows. Over the next several hours, the process of quietly removing the prairie dogs from the van and putting the individual family coteries into their respectively numbered and flagged artificial burrows occurred. By 3 p.m., the restoration mission was completed!

To this long-retired AZGFD wildlife biologist who began mapping the Gunnison's prairie dogs in 1980, who worked on the reintroduction of the black-footed ferrets in 1996, and who encouraged the reintroduction of the BTPD to southeastern Arizona in the late 1990s, this was a moving event. I shed many a tear as I observed the respect and care that was demonstrated by each and every biologist, from both of our countries, to re-establish this little, keystone grassland species. It's not small stuff!

A coterie of black-tailed prairie dogs are released into their new home. Credit: Betty Dickens

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Want to share your Arizona wildlife stories and perspectives? Please consider submitting **articles**, **stories**, **project updates**, **events**, and **pictures** for upcoming newsletters!
AZTWS welcomes all contributors.

The Arizona Wildlifer Deadlines

Issue	Deadline
Spring 2025	**Mar 21, 2025**
Summer 2025	**Jun 20, 2025**

Email submissions at any time to aztwseditor@gmail.com.

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- Support others and help increase representation in Arizona's natural resource fields by **gifting a AZTWS membership** (1-year)—details here.
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- Our parent society, TWS, emphasizes important resources for **diversity, equity, and inclusion** throughout the wildlife profession. AZTWS also strives to uphold these values.
- Want to get more involved with your Chapter? Check out the information available on our Facebook, X (Twitter), and website for opportunities.
- AZTWS has vacancies for several Committee Chair positions. See page 4 for details.
- Have questions for us? Contact us here.

Western banded geckos (*Coleonyx variegatus*) are an infrequent sighting in urban areas but can be seen on rural roads in the Sonoran Desert. Credit: Scott Sprague