Southwest PARC Annual Meeting 2026

Conference artwork of a side blotched lizard (*Uta stansburiana*) with the UT state outline, by Dalton Neuharth.

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2026 Meeting Abstracts

Patterns of Herpetofaunal Bycatch within Oil and Gas Pipeline Trenches in Southeastern New Mexico

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In southeastern New Mexico, oil and gas development is an omnipresent landscape feature. Research investigating oil and gas activities and subsequent habitat loss, landscape fragmentation, and ecosystem disruption is substantial. Yet, few studies have investigated the direct impacts of these activities. Excavations for placement of production pipelines are especially understudied, despite having a presupposed impact on biodiversity. Herpetofauna may be especially vulnerable to trap-induced mortality in trenches as many species are highly sensitive to changes in their thermal environment (i.e., poikilothermic), easily depredated without natural cover, and possess traits or behaviors that are non-conducive for escape (e.g., small body size, small home ranges, narrow activity periods). Here, we compiled data collected from daily monitoring efforts of 15 pipeline trenches constructed from January 2025 to July 2026 to assess patterns in herpetofauna bycatch and mortality. We observed a total of 573 entrapments of herpetofauna in trenches and found herpetofauna captures varied by species and across time and space. Anurans contributed the most to overall herpetofauna mortality, as 36% of all anurans observed in trenches were found deceased. Although some regulatory stipulations (e.g., requiring escape ramps) have been put in place to mitigate impacts on wildlife, intensive monitoring efforts are likely necessary to reduce impacts on herpetofauna. Future studies that quantify direct (i.e., mortality) and indirect (e.g., dispersal limitation) effects on species, or explore species vulnerability to entrapment (e.g., trait-based approaches, environmental predictors), will play an important role in the future development of effective conservation measures and mitigation strategies for these activities.
Oral presentation

Food-web and Functional Trait Community Structure of Predator Assemblages in Pine Forests with Different Management Regimes

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Anthropogenic activities in disturbance-mediated ecosystems might affect certain ecological processes that, in turn, can affect the stability and resilience of those ecosystems. In southeastern upland pine forest systems, land-use practices such as intensive silviculture and fire suppression have contributed to the loss of diversity-rich pine savannahs. Although forest management practices can alter forest structure in these systems, less is known about how

these efforts structure predator communities, or influence pathways of energy flow and the consumer–resource relationships therein. Here, we investigated the effects of forest management on 1) snake community structure utilizing taxonomic and functional approaches, and 2) trophic structure and resource use of snake communities in two pine forests under different management regimes (high vs. low-frequency). We found functional redundancy increased with increasing forest management practice frequency, despite observing differences in taxonomic diversity and community-weighted traits between snake assemblages. We also found snakes in the high-frequency site exhibited increased trophic redundancy, while snakes in the low-frequency site relied on a wider range of resources and occupied a wider range of relative trophic positions. Mixing-models of consumer-resource relationships indicated snakes were more generalized in their resource use in the high-frequency site than in the low-frequency site, utilizing a broader diversity of prey more evenly. These results suggest that mimicking natural disturbances can support snake diversity, alongside increased functional and trophic redundancy; thus, providing greater ecosystem stability and resilience in pine ecosystems. Our research further highlights the importance of incorporating functional perspectives into restoration initiatives to ensure the health of disturbance-mediated ecosystems.
Oral presentation, Invited Speaker

Movement Ecology, Management, and Conservation of Great Basin Rattlesnakes (Crotalus Oreganus Lutosus) on Military Training Lands in Northern Utah.

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The Great Basin Rattlesnake (*Crotalus oreganus lutosus*) is the only venomous reptile found on Army Garrison Camp Williams. A population and movement study was initiated in 2020 in response to human-rattlesnake interactions and substantial development around the military installation in the past 5-10 years. The objectives of this study are to both identify critical habitat features on the landscape (i.e., hibernacula) to conserve key habitats in anticipation of future development and monitor rattlesnake movement in relation to military training activities. The study is currently ongoing but 18 communal hibernacula have been identified and at least 22 adult rattlesnakes have been tracked using radio telemetry each year beginning in 2020. Advancements in transmitter and bio-logger technology has allowed us to gather more information than ever before on these secretive animals. The data collected has enabled coordination with military trainers to limit negative interactions as well as novel insight to snake behavior on the installation. This presentation will highlight interesting patterns in movement and habitat use observed to date, new technology we are using to monitor and study these animals, and how we apply it to management on an active military installation.
Oral presentation

Sharing the Desert: Human–Reptile Interactions in an Urban Sonoran Desert Landscape

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The Sonoran Desert in the arid southwestern USA, has among the highest biodiversity of reptiles and fastest growing cities in region and nation. We explore how ecological and social factors relate to paid snake removals and tortoise adoptions. As part of a team of interdisciplinary scholars, we have partnered with a business, Rattlesnake Solutions LLC, to investigate snake removals from residential yards and with AZGFD Tortoise Adoption Program to explore tortoise caretaking. For snake removals, during a 2-year period, nearly 70% of over 2,000 removals were of Western Diamond-backed Rattlesnake (*Crotalus atrox*). Snakes were frequently removed from neighborhoods with wealthier and more highly educated residents. Using a social survey of clients, we compared attitudes towards snakes in groups with different motivations (environmental vs fear). Groups with environmental motivations had more positive perceptions of snakes. Compared to snakes, testudines are not only more tolerated but often beloved. Compared to common and iconic desert wildlife, urban residents strongly support tortoise conservation. This summer we deployed a social survey of Sonoran Desert Tortoise (*Gopherus morafkai*) caretakers that has generated great enthusiasm among the tortoise community. Understanding how factors relate to both wildlife distribution and public attitudes are needed for human-wildlife co-existence and biodiversity conservation in urbanizing regions.
Oral presentation

Species Distribution Modeling for Utah's Rediscovered Desert Iguana (Dipsosaurus dorsalis)

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Desert iguanas (*Dipsosaurus dorsalis*) live in the Mojave and Sonoran Deserts of the southwestern United States. The Mojave Desert reaches its northern edge in southwestern Utah, including the Beaver Dam Wash National Conservation Area. D. dorsalis historically occupied this area, but in recent years it was unknown whether the species still occurred there, and it was set to be removed from the state's species list in 2023. An observation posted to iNaturalist, an online community science platform, confirmed the species was still present in the Beaver Dam Wash. IguanaThonTM, organized by Utah Tech University faculty, has been held annually since 2024 to involve students and the community in surveying for D. dorsalis and to better understand its distribution in Utah. Because this area sits at the edge of the species' range, conditions may differ from the core of its range, and conservation planning here needs

habitat predictions suited to this area. This project builds a presence-only species distribution model to predict suitable habitat for D. dorsalis in southwestern Utah, using climate, vegetation, and terrain variables along with occurrence records from public databases and IguanaThonTM surveys. Predictions are compared against field observations to evaluate accuracy, producing a habitat suitability map to guide where future surveys are most likely to find the species and improve conservation of this range-edge population.
Oral presentation, Student Presentation Awards Consideration

Evaluating Land Surface Temperature and Vegetation Differences Between Wild and Backyard Sonoran Desert Tortoise Habitats

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Sonoran Desert Tortoises (*Gopherus morafkai*; "tortoise") pose management challenges due to their long lifespan and growing captive population that cannot be repatriated. To manage the captive population, Arizona Game & Fish adopts out tortoises to residents with back yards, providing them with a permanent home. Like many other ectotherms, tortoises rely on various environmental components (e.g., burrows, rock shelters, and shrubs) to thermoregulate. This research examines how thermal and vegetative conditions differ between wild and residential habitats to determine if backyard tortoises need additional support to cope with climatic changes. Using adopter zip codes from 26 tortoise caretakers and 77 locations from wild tortoise GPS data from the McDowell Sonoran Conservancy, we compared land surface temperature and Normalized Difference Vegetation Index (NDVI) patterns using Landsat satellite imagery from 2021, 2022, and 2023. Residential areas exhibited higher land surface temperatures and lower NDVI values compared to wild habitats. For both wild and residential areas, land surface temperature increased between 2021 and 2022, but not between 2022 and 2023. Over time, NDVI decreased each year in wild areas but remained consistent in residential areas. This suggests backyard tortoises may experience higher surface temperatures and less green space over their lifetime compared to wild tortoises.
Oral presentation, Student Presentation Awards Consideration

Securing Habitat for Herpetofauna: The Role of Habitat Acquisition and Management in Desert Amphibian and Reptile Conservation

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Habitat loss and fragmentation remain the leading drivers of amphibian and reptile decline in the American southwest. Rapid energy development, urbanization, military land expansion, and expansive off-highway recreational activity continue to erode critical breeding, foraging, and dispersal habitat. Land trusts and habitat acquisition, protection, and management programs offer a durable, non-regulatory conservation tool by permanently protecting priority parcels through fee purchase or conservation or restrictive use easements, safeguarding herpetofaunal populations independent of shifting political or regulatory landscapes. Additionally, they have the ability for enhanced management and restoration opportunities that may not be possible within federally managed land systems. We examine the strategic role of habitat acquisition, management, and restoration in conserving amphibian and reptile sensitive species in the Mojave and Colorado Deserts. We highlight how land trusts identify and prioritize parcels and water use resources based on species occurrence data, species demography, habitat connectivity, hydrology, and climate resilience and discuss case studies in which acquired lands have supported conservation efforts for the Mojave desert tortoise (*Gopherus agassizii*), Mojave fringe-toed lizard (*Uma scoparia*), Western and Arroyo toads (*Anaxyrus boreas*; *A. californicus*), and others. We address challenges inherent to this work, including funding limitations, need for long-term stewardship and monitoring, competing land and water-use pressures, and surrounding habitat issues required to support this work. We underscore that strategic, science-informed habitat acquisition and management represents an effective and lasting tool for conserving amphibian and reptile fauna in the face of accelerating habitat loss.
Oral presentation

Calling Phenology, Environmental Conditions, and Pathogen Prevalence Among Anurans Along the Lower San Pedro River (AZ)

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Understanding environmental site-selection in lowland leopard frogs (*Lithobates yavapaiensis*) in streams where intermittency levels vary is important for conservation of this sensitive taxon in Arizona, and further complicated by sympatry with invasive American bullfrogs (*L. catesbeianus*). The extent to which L. catesbeianus may serve as a vector for *Batrachochytrium dendrobatidis* (Bd) and ranavirus to other anurans, and particularly the susceptibility of *L. yavapaiensis* to these pathogens in the region, is also of special concern. Our study is located at the Lower San Pedro River Preserve (Pinal County) operated by the Salt River Project, and intends to examine 1) the extent to which hydrological, habitat, and seasonal variables impact calling phenology of *L. yavapaiensis* and analyze 2) pathogen prevalence in the site's anuran populations and 3) the extent of species co-occurrence across different sites. Data is collected via recordings from Wildlife Acoustics audio recording units (ARUs) located at different points along the San Pedro, anuran swabbing for pathogens, and environmental data from ARU-centered transects and plots for substrate composition, floodplain incline and incision, vegetation cover, densities of riparian plant species, canopy cover, stream depth, and more. In addition, covariates such as temperature and relative humidity are recorded via HOBO loggers.

The research is currently in progress since mid-May 2026 with 11 ARUs deployed and 17 *Lithobates*, of co-occurring species, sampled for pathogens. This study will grant a better understanding of *L. yavapaiensis* along a zone of ecological importance, high regional biodiversity, and increasing anthropogenic threat among central Arizona's riparian systems.
Lightning Talk, Student Presentation Awards Consideration

Assessing environmental DNA as a detection method for the Dunes Sagebrush Lizard (*Sceloporus arenicolus*)

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Arid lands account for over 40% of the terrestrial habitat on Earth yet rank among the least studied ecosystems on the planet, limiting conservation and management options. Sensitive and accurate biodiversity surveillance tools are needed to increase the efficiency of biodiversity surveys and enable effective, fit-for-purpose conservation measures. Therefore, we developed species-specific environmental DNA (eDNA) assays targeting the endangered dunes sagebrush lizard (*Sceloporus arenicolus*) and the closely related, but non-endangered, southern prairie lizard (*S. consobrinus*). Development began with laboratory experiments to observe eDNA shedding and persistence, followed by a small-scale pilot of eDNA detection in natural habitat. In both laboratory and field trials, eDNA detection was rare, and eDNA concentrations were low. Detection was not statistically associated with incubation time or among individuals, although detections tended to increase slightly over the first 12 hours before declining at 24 hours. Detection rate did significantly relate to DNA extraction method, with double the number of positives occurring in CTAB-extracted samples (54.5%; n = 24) compared to Qiagen PowerMax Soil (27.3%; n = 12) and Macherey-Nagel NucleoSpin Soil kits (27.3%; n = 12). Model selection provided limited evidence that time and extraction method may influence eDNA concentration, though neither factor was statistically significant on its own. In field applications, although we did not visually confirm lizards utilizing coverboards, we detected *S. consobrinus* eDNA. Overall, our results inspire cautious optimism about the potential benefit of eDNA analysis for biodiversity study and management in arid lands and lay the foundation for continued work in this space.
Oral presentation, Student Presentation Awards Consideration

Utilizing Community Science Records to Evaluate Herpetological Species of Conservation Concern

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Observations from community scientists provide important occurrence data to supplement data collected by researchers and wildlife agencies. The incorporation of community science data allows researchers to access information about emergence, abundance, and activity outside of scheduled surveys. Not only does community science data aid biologists in capturing species occurrence data over large areas and broad time scales, but it allows us to understand the intersection of human recreation and wildlife encounters. Utah's wealth of state and national parks, along with its expansive public lands, makes it an ideal location for community exploration. Records from the community science platforms HerpMapper and iNaturalist effectively augment existing data and have proven especially useful for informing state conservation ranking calculations for herpetological species with historically limited occurrence data. Despite the limitations inherent to opportunistic data collection, with proper data screening and thoughtful integration, community-generated observations have the potential to play a significant role in tracking species presence, identifying areas for future study, and guiding conservation planning on the landscape.
Oral presentation

Training an Automated Classifier for Anuran Vocalizations in National Park Service Sites

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Autonomous recording units (ARUs) allow researchers to collect data across large spatial and temporal scales that would be difficult to obtain through on-site fieldwork. However, the manual processing time required to identify anuran vocalizations in resulting audio files is extensive, creating delays in applying results. To increase processing efficiency, we are comparing (1) a general-use species classifier (BirdNET V2.4), (2) a custom convolutional neural network (CNN) trained on data collected in Gila Cliff Dwellings National Monument (GICL), and (3) a custom CNN trained on data collected in four different Sonoran Desert Network (SODN) park units on their respective ability to detect American bullfrogs (*Rana catesbeianus*) at untrained ARU sites. Both custom models will also be assessed on their ability to detect other anuran vocalizations and detection accuracy in park units not included in the training sample. We primed each CNN with transfer learning from the ResNet-18 architecture and trained with data collected by SODN ARUs using OpenSoundscape (0.11.0). Our CNN models are currently undergoing testing and improvements. We expect that pre-processing ARU data with the custom classifier will decrease manual processing load by filtering out audio files with no anurans, thus resulting in a faster turnaround between data collection and use by park managers.
Lightning Talk

Development of YY American bullfrogs (*Lithobates catesbeiana*) and models of their release for invasive population management

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American bullfrogs (*Lithobates catesbeianus*) are highly invasive in the Western United States and have been identified as the primary cause for declines of federally threatened ranid frogs and gartersnakes. Bullfrogs prey on and outcompete native species for resources, occupy habitats, and are disease vectors for chytrid fungus and ranaviruses. Current management methods to control invasive bullfrogs are largely ineffective as bullfrogs are particularly difficult to manage because of their long dispersal capabilities (i.e., up to 12 km) and high fecundity (i.e., up to 40,000 eggs per clutch). The goals of this study will be to develop YY individual bullfrogs and model their release as a possible management tool for invasive bullfrog eradication. To develop this solution we must assess the effectiveness of sex reversal through feminization in bullfrogs as well as test genetic sex identification markers for genotyping feminized males and YY males. We intend to use 17-β estradiol (E2) and 17-α ethynylestradiol (EE2) for genetic (XY) male feminization, and will investigate feminization success and health effects on developing bullfrogs. We will then model the release of YY bullfrogs across a variety of western landscapes to determine effective YY stocking scenarios. The implementation of releasing YY bullfrogs and skewing the sex ratios of harmful populations to extirpation could be an effective tool in the support of native species in the Western United States.

Review of Three Years of Herpetofauna Survey Efforts in Southwest New Mexico

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The Amphibian and Reptile Conservancy aims to conserve and protect herpetofauna and their habitats, primarily in designated Priority Amphibian and Reptile Conservation Areas (PARCAs). In New Mexico, a significant portion of our efforts are dedicated to species surveys and monitoring in the Gila PARCA and the Bootheel PARCA. We use several survey techniques, including species focused methods such as call surveys or playback for anurans, to more general catch-all methods such as Visual Encounter Surveys (VES) and roadcruising. Much of our survey efforts are aimed at finding where focal species are distributed across the landscape, including both species of conservation need and more common species with unclear distributions (Painter et al., 2017). We also use surveys to document the distribution of invasive species and target areas for invasive removal. After three years of ARC's field work in southwest New Mexico, a review of survey efforts and efficacy is in order to better direct future endeavors. In this review we aim to define the goals and priorities for the Gila and Bootheel PARCAs as they pertain to past and ongoing survey work. With goals defined, we will assess whether our survey efforts have been successful in helping us meet these goals in each PARCA, and identify gaps in our efforts and additional avenues that should be explored.

Population Declines and Drought-Driven Mortality of the Mojave Desert Tortoise in Southwest Utah

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The 2025 spring monitoring season documented substantial declines in Mojave Desert Tortoise populations within the Red Cliffs National Conservation Area (NCA) and Red Cliffs Desert Reserve, with adult abundance in Management Zone 3 declining from approximately 3,406 individuals in 2001 to 891 in 2025. Across the Reserve, an estimated 1,982 adults remain. Record-low winter and spring precipitation, including the driest winter on record, severely reduced forage availability and resulted in the lowest tortoise surface activity and encounter rates observed since monitoring began in 1998. Annual mortality was estimated at 31%, the second-highest recorded, with evidence indicating prolonged drought as the primary driver of mortality, particularly among older adults and in Management Zone 3, where repeated wildfires have further degraded habitat. Although few tortoises exhibited visible signs of upper respiratory tract disease, this may reflect elevated mortality among already compromised individuals. Long-term monitoring indicates that repeated droughts, wildfires, invasive plants, habitat fragmentation, recreation, and urban development continue to drive population declines. Despite these challenges, portions of the NCA and Reserve still support some of the highest tortoise densities within the species' range. Continued habitat protection, restoration, wildfire management, fencing maintenance, translocation, law enforcement, public outreach, and long-term monitoring remain essential to sustain viable desert tortoise populations in southwest Utah.

Oral presentation

Using Artificially Modified Microclimates to Increase Herpetofaunal Use of Cover Objects in Southwestern New Mexico Deserts: Preliminary Results

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Southwestern New Mexico has very high herpetofauna diversity due to the convergence of different habitats, including Chihuahuan Desert Scrub and Semidesert Grasslands. Methods for detecting herpetofauna in this type of arid environment are variable in their success and come with their own challenges. Camera traps need specific placements and settings to adequately record herpetofauna, Visual Encounter Surveys (VES) depend on active searchers being able to find and identify target species, and use of natural or artificial cover objects as refugia has not been found to be effective in desert environments. Though herpetofauna frequently utilize similar cover objects in other regions (Hampton, 2007; Lind et al., 2017), that is because they typically retain higher levels of moisture (and less extreme temperatures) that the desert lacks outside of monsoon seasons. As such, we designed an experiment to increase humidity and

lower temperatures with excavated chambers and/or artificial water sources under coverboards during the arid season. By pairing the experiment with both VES and camera trapping, we can additionally investigate the efficacy of each monitoring technique during this process. Preliminary 2025 data (Mar-Nov) shows 34 herps captured on camera, and 17 herps observed in-person incidentally or during VES at the sites, and early 2026 data is currently being processed. Though the water-baited coverboards across all 5 sites on average did have lower temperatures and higher humidity than the excavation-only or control boards, the highest number of total detections overall (both target herps and non-herp species) were found at the excavation-only boards.

The Influence of Anthropogenic and Livestock Disturbance on Detection of Deceased *Eurycea* Salamanders in Central Texas.

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Urbanization is rapidly expanding in Central Texas, driving the conversion of the historical cattle ranching pasture common in the area into suburban developments. Springs and salamanders are protected in Central Texas, meaning that during development the land immediately surrounding a spring is typically retained as green space. This green space is often recreationally used by humans living nearby. As part of regular monitoring for Central Texas *Eurycea*, we conducted visual encounter surveys at occupied springs across various land-use types including ranch land, access-restricted preserves, and human-frequented green space. Deceased salamanders are occasionally discovered during these surveys providing the unique opportunity to assess the impacts that the presence of both cattle and humans may have on salamander mortality. We used generalized linear mixed models to analyze how human recreation and cattle presence influence encounter rates of deceased *Eurycea*. Our initial findings show that livestock presence significantly increases detection of deceased salamanders. However, human recreation did not have a significant effect. This supports livestock exclusion as a simple conservation management tool for protection of Central Texas *Eurycea*.

Oral presentation

Interannual Climate Variability and Survival of Western Toads in Northwestern Utah

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Amphibian populations are declining worldwide, and climate change is increasingly recognized as a driver of these declines. While prior studies have examined relationships between climate variables and survival rates of Western toads (*Anaxyrus boreas*), the relative importance of climate variables varies among populations. Additionally, these relationships remain largely unstudied in arid montane environments, where variability in precipitation, temperature, and

season length can affect site conditions and seasonal activity patterns, potentially influencing annual survival. To address this knowledge gap, we are analyzing a 26-year capture-recapture dataset from breeding ponds in the Grouse Creek Mountains in northwestern Utah. We are estimating annual survival probabilities using Cormack-Jolly-Seber models in Program MARK and relating these estimates to remotely sensed climate covariates derived from daily precipitation, temperature, and snow water equivalent data. Preliminary analyses suggest that winter climate conditions, particularly snowpack timing and duration, may explain temporal variation in annual survival. This study will advance understanding of climate sensitivity in amphibians living in arid montane systems and improve conservation strategies under increasing climatic variability.
Oral presentation, Student Presentation Awards Consideration

Tortoise Conservation Efforts in Southern Utah &
Video Compilation of Rarely Witnessed Reptile Behaviors

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The Washington County Habitat Conservation Plan (HCP) performs a variety of conservation activities to protect the federally threatened Mojave desert tortoise and other sensitive species in Southern Utah. Cameron will provide a brief overview of some of these efforts such as habitat management, translocation, predator management and community outreach. As a side hobby, Cameron has been observing Utah's herpetofauna for over 20 years. He will share a variety of photos and videos of tortoises, Gila monsters, rattlesnakes and kingsnakes engaged in rarely witnessed behaviors such as combat, courtship, live birth and inter-species competition. While the media is intended to inspire and generate appreciation for our scaly friends, behavioral observations can also provide additional insight to improve management strategies for these secretive species.

Keynote Speaker

Short-term translocation success of Arizona Tiger Salamanders (*Ambystoma mavortium nebulosum*) in Glen Canyon National Recreation Area (USA)

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Prolonged drought has reduced water levels in Lake Powell to historically low levels. Low reservoir levels allowed invasive fishes like Smallmouth Bass (*Micropterus dolomieu*) and Green Sunfish (*Lepomis cyanellus*) to pass through Glen Canyon Dam, where they now threaten native fishes in the Colorado River, including the federally listed Humpback Chub (*Gila cypha*) and Razorback Sucker (*Xyrauchen texanus*). Bass and Green Sunfish began reproducing in the river in 2022 and 2015 respectively, first detected in a rare spring-fed slough (river mile -12 slough) that provided unique warm backwater conditions and habitat for native amphibians, including Arizona Tiger Salamanders (*Ambystoma mavortium nebulosum*). Environmental DNA surveys for amphibians at 34 sites along ~464 km of the Colorado River in 2020 and 2024–2025 produced no other detections of salamanders, confirming the importance of this slough to salamanders in the Colorado River corridor. However, this slough was channelized in 2025 to eliminate warm water breeding habitat for fishes. Prior to this channelization, National Park Service staff captured and translocated 12 adult salamanders to a smaller, nearby slough in Glen Canyon National Recreation Area. Surveys in 2026 did not detect salamanders at the now-channelized 12-mile slough, but salamander larvae were found at the recipient site, indicating initial success of the conservation translocation. This near-term success is promising, but because conservation translocations of amphibians have a poor long-term track record, continued monitoring will be important to determine if translocated salamanders produce a self-sustaining population.
Oral presentation

Developing American Bullfrog (Rana catesbeianus) Early Detection and Rapid Response Protocol for Sonoran Desert National Parks

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Introduced and non-native American bullfrogs (*Rana catesbeianus* [RACA]) are a significant threat to native species. RACA are highly fecund, are voracious predators, and have high capacity for dispersal between and among isolated aquatic habitats. RACA thrive in anthropogenically altered wetlands and have been frequently detected in large populations adjacent to protected areas with native aquatic herpetofauna populations. To protect these native populations, we are developing a RACA early detection and rapid response (EDRR) protocol for National Park Service units with the Sonoran Desert Inventory & Monitoring Network (SODN) with plans to expand to adjacent public lands. We tested three methods of RACA detection: environmental DNA (eDNA), autonomous recording units (ARU), and visual encounter surveys for efficacy and efficiency. We found that all methods successfully detected RACA in both lotic and lentic systems, with eDNA being the most effective. However, eDNA was the costliest method and did not provide immediate feedback. Thus, we suggest parks primarily use ARUs and VES during the RACA breeding season (April-August), especially after rain

events, to detect dispersing individuals. RACA removal efforts are being instated, and require park-specific protocols and highly trained crews.
Lightning Talk

Demystifying the Cryptic Wood Frog: Evaluating Status and Distribution in Colorado's Relict Range

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A disjunct, glacial relict population of Wood Frogs (*Lithobates sylvaticus*) exists in northern Colorado, where relatively little is known about their distribution and ecology. This lack of understanding is reflected in the previous listing of Wood Frog as a Tier 2 Species of Greatest Conservation Need in the 2015 Colorado State Wildlife Action Plan (SWAP), and more recently as a Species of Greatest Information Need (SGIN) in the 2025 SWAP. A pilot study conducted in 2025 to evaluate current Wood Frog distribution in Colorado focused on areas where Wood Frogs have been documented in the last 5-30 years. These surveys included characterizing habitat metrics and collecting skin swabs to determine the presence and prevalence of chytrid fungus (*Batrachochytrium dendrobatidis*) in Wood Frogs and other amphibian species inhabiting the study sites. Future plans include expanding upon this study to improve understanding of the status of Wood Frogs in Colorado, to address informational needs identified in the 2025 SWAP, and to identify factors contributing to the persistence of *L. sylvaticus* across the landscape. Information gathered through these initiatives will help Colorado Parks and Wildlife and its partners engage in effective conservation actions to maintain this unique component of Colorado's amphibian species assemblage and heritage.
Oral presentation

Habitat Quality in a Changing Desert: Non-Native Plants and Microhabitat Selection by Sonoran Desert Tortoises

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Sonoran Desert Tortoises (*Gopherus morafkai*, tortoise) are a cryptic and long-lived species present throughout Arizona. Tortoises use available microhabitats to thermoregulate, however, proliferation of non-native plants can cause rapid environmental changes. Non-native vegetation introduces novel forage to the tortoise's diet, but may not provide adequate nutrition or thermal refugia. Non-native grasses are major contributors to wildfire risk and altered vegetation communities in arid regions, potentially decreasing habitat quality for the tortoises. The objective

of this research is to examine tortoise microhabitat selection to understand how non-native vegetation relates to habitat quality. Our study area is located in the McDowell Sonoran Preserve, an urban desert park used for recreation and influenced by habitat fragmentation. An analysis of 2,211 tortoise shelter use observations showed that during spring and fall, tortoises spend more time in the open and under shrubs compared to using burrows or rock shelters. This activity pattern may require complex vegetation structure for shelter and foraging. Using iNaturalist data, we determined that non-native plants are in areas known to be utilized by tortoises. Future research aims to assess how non-native vegetation influences tortoise microhabitat selection by comparing known tortoise locations and random locations. We predict that tortoises will avoid areas with high abundances of non-native plants. Furthermore, we predict that tortoises that do use these areas will exhibit poor body condition. Understanding how tortoises experience invasive species and how their distribution changes supports conservation and management of this cryptic desert species, particularly in landscapes affected by recreation and habitat fragmentation.
Lightning Talk, Student Presentation Awards Consideration

How Current Efforts Can Benefit Adaptive Management Strategies and Future Conservation of the Dunes Sagebrush Lizard (*Sceloporus arenicolus*)

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The dunes sagebrush lizard (*Sceloporus arenicolus,* DSL) is a small, federally endangered, psammophilic lizard found in the Mescelero and Monahans sand formations in west Texas and eastern New Mexico. As a strict habitat specialist, anthropogenic activities that result in habitat loss and fragmentation can have substantial impacts on population persistence. The fragile dune systems *S. arenicolus* rely on occur only within a small portion of the Permian Basin; however, this basin is now the largest petroleum-producing basin in the United States. Like other arid regions of the southwest, southeastern New Mexico has also been historically exploited by overgrazing from domestic livestock, and more recently, has become an epicenter for production of renewable energy (i.e., wind and solar). Furthermore, current climate forecasts for the region are concerning considering how climatic shifts could influence known impacts. Since 2008, CEHMM has implemented U.S. Fish and Wildlife Service programs (i.e., CCA/As) to provide a balance between conservation of *S. arenicolus* and land-use activities (i.e., oil and gas and ranching) in New Mexico. Despite the longevity of these conservation programs, adapting to a rapidly changing land-use environment is a necessary endeavor. These circumstances provide an opportunity to improve upon current programs and develop modernized plans to address contemporary conservation problems. Here, we discuss how ongoing monitoring programs and conservation initiatives can inform long-term decision making for *S. arenicolus*, and how this species could serve as a model for the conservation of other species with a high degree of overlap with global economic interests.
Oral presentation

Using NAIP Imagery to Evaluate Changes in Surface Hydrology at a Boreal Toad Reintroduction Site

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Boreal toads (*Anaxyrus boreas boreas*) are listed as endangered in New Mexico. After being extirpated from the state in the 1980s, New Mexico Department of Wildlife reintroduced Boreal toads to Trout Lakes in northern New Mexico in 2008. Periods of drought are associated with reproductive failure in pond breeding amphibians, such as Boreal toads. Despite survey efforts, toads have not been detected at Trout Lakes since Fall 2023. We hypothesize that changes in surface water composition due to drought may have contributed to these declines. Remote sensing can provide longitudinal datasets of water surface area, allowing us to identify changes in perennial water bodies used for amphibian breeding habitat. The objective of this study is to evaluate trends in water surface area at Trout Lakes following the 2008 reintroduction to Boreal toads to present. We used National Agriculture Imagery Program (NAIP) imagery at 0.6 meters resolution to determine water bodies throughout the Trout Lakes system. Using the estimates of surface area, we evaluated temporal trends in surface water dynamics between 2018 and 2022. The results of mapping Normalized Difference Water Index (NDWI) in Arc GIS Pro show visible differences between water surface area with an overall decrease in surface moisture. Surface area dynamics evaluated in conjunction with historical Boreal toad count data could give wildlife managers a more comprehensive understanding of Boreal toad habitat suitability and threats to their survival in northern New Mexico.

Oral presentation, Student Presentation Awards Consideration