


THE ARIZONA WILDLIFER

2024 Issue 4

 [Follow us on X \(Twitter\)!](#)

 [Like us on Facebook!](#)

Fall Edition

Inside this issue:

Black-footed Ferret Update	5
Surviving Plague	7
Biobanking Leopard Frogs	9
Rabbit Hemorrhagic Disease	11
Milkweed and Monarchs	13
Safety Awareness	16
AZTWS News & Resources	18

EXECUTIVE BOARD

President: Chris Carrillo
480-292-1830 chris.d.carrillo@usda.gov

President-Elect: Holly Hicks
480-603-8603 hhicks@azgfd.gov

Treasurer: Haley Nelson
480-204-9312 haleynelson92@gmail.com

Recording Secretary: Tiffany Sprague
623-670-0750 tasprague@gmail.com

Corresponding Secretary: Tom Correll
520-635-3427 thomas.s.correll@usda.gov

Board Member: Lias Hastings
928-225-0316 lias.hastings@usda.gov

Board Member: Vicki Olmstead
480-743-2479 victoria.olmstead@srpmic-nsn.gov

Newsletter Editor: Tiffany Sprague
aztwseditor@gmail.com

Contact us:
<https://aztws.com/about/contact-us>
PO Box 87015, Phoenix, AZ 85080



The President's Message



AZTWS Chapter President Chris Carrillo

The Arizona Chapter of The Wildlife Society (AZTWS) has great members who possess a variety of skills, knowledge, and experience. In fact, each of you brings something unique to AZTWS. Whether you have knowledge of plants or animals, individual species or whole communities, the information you provide is of interest to others. We all benefit from the sharing of information; doing so not only benefits other Chapter members but also Arizona's wildlife. Our Chapter is a blend of professionals, educators, stu-

dents, and laypersons who value wildlife conservation. As a result of all our efforts, the Arizona Chapter was awarded the "2024 Chapter of the Year" following its success in building and nurturing relationships with state, national, and Tribal partners. I would like to thank Past President Sarah Rinkevich for her contributions and leadership to the AZTWS and her nomination that led to this award. I would encourage our membership to continue to support the AZTWS as we continue to share knowledge and support wildlife conservation throughout the state. Each of you are the driving force behind AZTWS; without your involvement and dedication, we wouldn't be able to accomplish our goals. So thank you for being supportive and for your commitment to wildlife conservation!!!

The 2025 Joint Annual Meeting (JAM) of the Arizona and New Mexico chapters of The Wildlife Society and American Fisheries

(Continued on page 2)

Presidents Message cont...

Society will be held in Albuquerque, NM, at The Clyde Hotel from February 6–8, 2025. Please be on the lookout for notifications on registration and the call for abstracts.

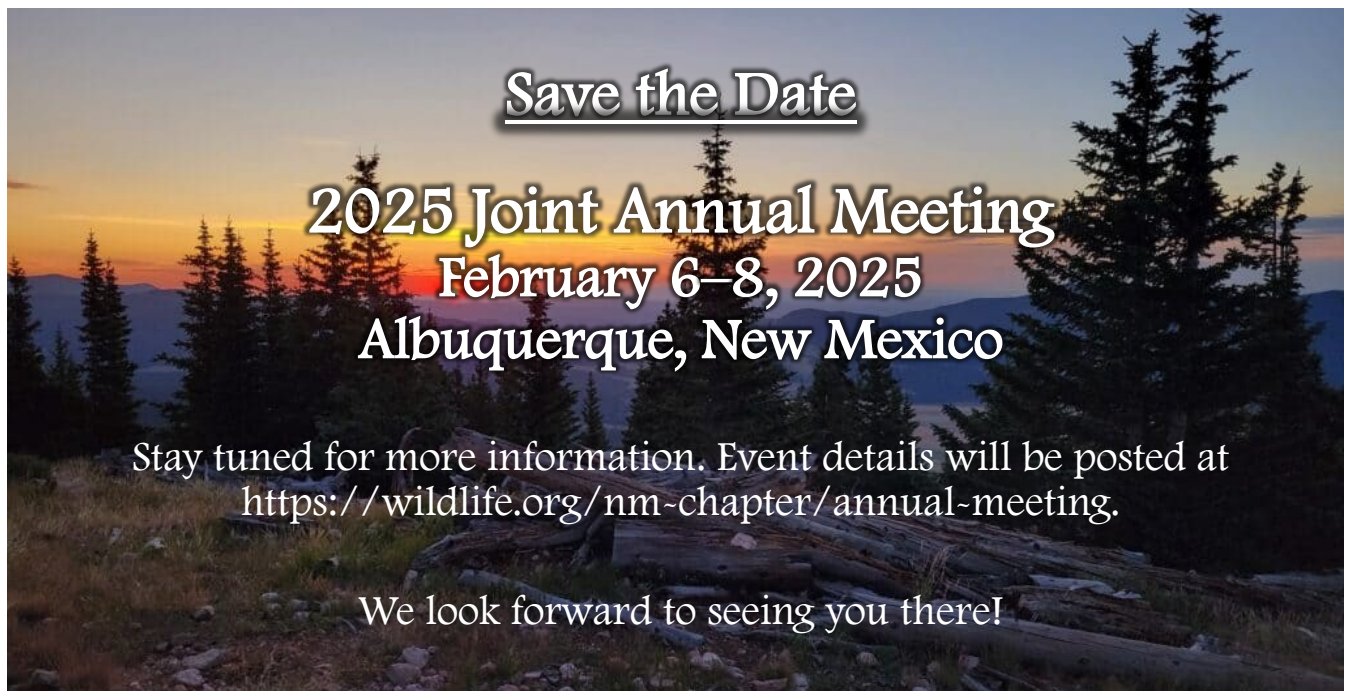
The Wildlife Society's annual conference will be held October 19–23, 2024, in Baltimore, MD. I want to thank Past President Sarah Rinkevich for planning to attend the conference to receive the "2024 Chapter of the Year" award on behalf of AZTWS. This conference is one of the largest meetings of wildlife professionals and supporters in North America. For more than 30 years, this conference has provided information on wildlife management and research while providing opportunities for networking and career advancement.

I want to remind everyone again that, as we approach the JAM, we request nominations for the 2025 AZTWS awards. There are lots of deserving individuals who do great work for Arizona wildlife. Please look at the AZTWS website to view the award descriptions and past winners. Nominations can be sent to Holly Hicks at hhicks@azgfd.gov.

The AZTWS is still looking for several committee chair volunteers. Current vacancies include Continuing Education, Diversity, Memorial Garden, Conservation Affairs, and Historian. Please consider nominating yourself or a colleague for a position. Feel free to ask any board member or reach out to me if you have questions about positions and duties. I look forward to hearing from you.

I hope you enjoy the articles in this issue of the newsletter. We have included new sections covering safety and disease awareness. If you have an interesting article or exciting project to write about, please submit those to our aztwseeditor@gmail.com. Suggestions for improvement on any aspect of AZTWS, or ideas for engaging our members, are always welcome; feel free to send me your comments at Chris.D.Carrillo@usda.gov.

Sincerely,
Chris Carrillo



Get Involved!

Submit an award nomination! We encourage you to nominate deserving individuals for future awards. You can learn 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](#).

Join the AZTWS Executive Board!

The Arizona Chapter of The Wildlife Society (AZTWS) is seeking new Executive Board Members who want to take an active role in wildlife conservation and management. Join us to inspire and empower the next generation of wildlife professionals!

The following positions are up for election this year. Visit <https://aztws.com/about/executive-board-positions> to learn more about the roles and responsibilities. All officers are expected to participate in monthly conference calls to help with planning and current business.

President-Elect: Serves a two-year term—one year as President-Elect and one as President—and assists and fills in for the President on a variety of assigned tasks and serves as the Chairperson of the Awards and Nomination committees.

Treasurer: Serves a two-year term and is responsible for maintaining financial records and files for the Chapter.

Corresponding Secretary: Serves a one-year term and is responsible for the Chapter files and correspondence with members and supporters.

Recording Secretary: Serves a one-year term and is responsible for recording and distributing minutes of the Executive Board and Chapter Membership meetings.

Board Member: Serves a two-year term and shares all responsibilities of conducting Chapter business and assisting other Board Members with assigned tasks.

If you are interested in serving, please email Holly Hicks (hhicks@azgfd.gov) by November 30, 2024, and indicate the position that you are applying for and provide a short bio (about 300 words). Voting will commence in mid-December, and the results will be announced at the Annual Business Meeting at the 2025 JAM.

Regional News

Southwest Section Tracks

By **Kathy Granillo**,
TWS Southwest Section Representative



Southwest Section Representative
Kathy Granillo with a wolf pup.

The TWS Annual Conference is upon us! I hope that many of you can join us October 19–23, 2024, for the 31st Annual Conference in Baltimore, Maryland. Please feel free to find me at the conference for one-on-one discussions about The Wildlife Society, wildlife conservation, or whatever else you'd like to talk about. You can message me via the meeting app or by email to arrange to meet. Council will be having the Fall Council meeting October 17–18, and anyone can stop by and watch us in action. We will also have a Council meeting the afternoon of October 23 to thank Council members leaving our team, to welcome new members to the team, and to transition leadership of Council. This meeting is also open to anyone to attend.

For those attending the conference, please take care of yourself—physically, socially, and mentally. There will be approximately 2,000 attendees with events and talks from sunup to well after sundown for the duration of the conference. Prepare for the conference as you would for a multiple-day field work project. Plan your schedule ahead of time but be prepared for change. Think about how to stay hydrated and nourished and well-rested. Prioritize how to expend your energy. Have a safety plan. This safety plan should include traveling to and from the conference, as well as your time at the conference. Remember Baltimore is a huge city and, while the waterfront area is well-patrolled by the police, other parts of town can be risky places for the unprepared. TWS is urging all participants to stay in groups while out and about and to make sure someone knows your plans and whereabouts.

I recently participated in a TWS webinar aimed at those attending the conference for the first time and realized that the advice and recommendations we gave are relevant to all attendees. The webinar is posted on the [TWS website](#).

These are the four main topics we covered and key take-aways from the webinar:

- Appropriate attire—Be you!
- Picking sessions/events to attend—Make priorities and don't try to attend everything; take breaks and get outside.
- How to meet attendees, potential employers, or potential graduate advisors—Be bold; be adventurous; team up
- Staying safe physically and socially—Be smart; be aware; know that there are many allies available to help.

The conference will have an Ombudsperson, Jen Sims, available for the full event. TWS staff are there to help you, as are all Council members. If you have an issue or concern, please reach out to these folks. We want everyone to have the best experience possible at the Annual Conference.

Whether or not you are attending the conference, I hope you have a great fall! Please feel free to contact me at KGBirder55@gmail.com.

Our Neck of the Woods...

Black-footed Ferret Recovery in Arizona

By Holly Hicks, Small Mammal Project Coordinator, Arizona Game and Fish Department

Black-footed ferret recovery in Arizona has been a roller-coaster ride since it began in 1996 in Aubrey Valley east of Seligman along historic Route 66. Several times a year, you can drive along this highway at night and notice a sea of lights bouncing down dirt tracks in what seems like the middle of nowhere. These lights are a mix of headlights and spotlights all searching for the emerald-green eyeshine of the elusive black-footed ferret.

In the early days of recovery, Arizona tested various ways to establish ferrets including building on-site breeding and preconditioning pens, releasing pregnant females, and initiating spring releases. These efforts led the ferret population on an upward trajectory until it reached a peak of 123 ferrets in 2012. The U.S. Fish and Wildlife Service considered the Aubrey Valley population a success and that onsite breeding and preconditioning pens were no longer needed, so they were dismantled.

After 2012, the ferret population began to dwindle at an alarming rate, which couldn't be explained. Other manage-



Black-footed ferrets spend more than 90% of their time underground. Seeing one in the wild is a rare treat! Credit: George Andrejko

ment sites that experience this type of loss usually attribute it to disease, most likely sylvatic plague. But Aubrey Valley was not experiencing the typical symptoms of plague (prairie dog colonies quickly disappearing and dead prairie dogs found above ground). Thus, biologists tried a new strategy to figure out why this decline had occurred—telemetry focusing on the fate of ferrets after release.

Ferret telemetry is not easy work! Chasing a fossorial nocturnal animal that moves as far as 11 kilometers in a night is no easy feat. We tracked both captive and wild ferrets for three years, conducting releases at various times in the fall in Aubrey Valley and the adjacent Double O Ranch. The results showed the ferrets were traveling farther in areas where densities of prairie dogs were lower, putting themselves in greater danger when



Jennifer Cordova using telemetry to locate a ferret. Credit: Robert Coonrod

(Continued on page 6)

(Continued from page 5)

traveling long distances. So we shifted our focus to the prairie dogs and what might be impacting their populations because they are the main prey for ferrets.

In 2020, we began a disease treatment study comparing various insecticides that have been used to kill fleas, which carry and transmit plague. We were concerned that disease may be occurring at a low rate that would not cause colonies to disappear but would impact densities and their survivorship. Working with partners from the U.S. Geological Survey, U.S. Fish and Wildlife Service, and USDA APHIS Wildlife Services, we began treating plots with deltamethrin (DeltaDust), fipronil grain, and fipronil in bait form (“fipbits”) and compared them to control plots. Fipronil grain and fipbits were the most effective at reducing flea loads and for longer periods of time. The survivorship of prairie dogs was also much higher on plots treated with fipronil products compared to both the dusted and control plots.

The other interesting result was the presence of plague at most of our plots. We monitor for disease through collection of blood and/or fleas from prairie dogs, other small mammals, and predators such as coyotes and badgers. Coyotes, badgers, and prairie dogs were testing positive for plague. Plague is known to kill 90–100% of a prairie dog colony, but captured prairie dogs in Aubrey Valley that tested positive for plague were surviving consecutive years. The Aubrey Valley prairie dog population has been monitored for decades and has never experienced a population crash from plague, but it was apparent that plague was causing declines in prairie dog densities and was likely the culprit impacting our ferret populations.



Holly Hicks welcomes a ferret to its new home. Credit: George Andrejko



Long bodies help ferrets sneak into burrows when they aren't slinking across the prairie. Credit: George Andrejko

Although we are confident we have found the cause of the ferret decline within Aubrey Valley, the path forward is not clear. Are disease treatments at the prairie dog colonies and vaccination of ferrets enough to combat plague at these low levels? Can the Aubrey Valley population reach its potential once again now that we have found effective tools that can reduce flea loads? These are questions we don't have answers for yet but will guide our next steps.

If you have never witnessed a black-footed ferret slink across the prairie or dance on a burrow, I strongly encourage you to volunteer with Arizona Game and Fish Department. We have spotlighting opportunities annually in the spring and fall, which are announced on the [Department's volunteer webpage](#). Please join us

and see what else you can find strolling in the grasslands in the dark of night.

Plague, Prairie Dogs, and PPE

By Tom Correll, Wildlife Biologist, USDA Wildlife Services

In the summer of 2014, I got plague.

I was in the midst of my second summer as an intern with the Arizona Game and Fish Department's black-footed ferret project on Espee Ranch. The Espee is a large working ranch owned by Babbitt Ranches on high desert plains situated between Big Boquillas Ranch, north of Seligman, and Cataract Canyon, which descends from Grand Canyon like a long taproot. The Babbitts, a family of historic significance to the state of Arizona, have long been advocates of wildlife conservation and had given the Department approval to begin the process of reintroducing black-footed ferrets to the ranch in hopes of establishing what would be, at the time, the second self-sustaining population of ferrets in Arizona.

Now, black-footed ferrets hold a special level of reverence in the conservation community. They are a Lazarus species, an animal once thought extinct that was rediscovered in the wild. Having disappeared from the American West during the 20th Century, ferrets were an indirect casualty of the Animal Damage Control Act of 1931. Early agricultural practices in our country's history involved large-scale poisoning and trapping operations to remove as many perceived nuisance wildlife as possible from the landscape to make way for westward expansion. Prairie dogs were some of the most heavily persecuted creatures on the plains, so much so that, today, they occupy less than 5% of their historic range. Prairie dogs are also highly susceptible toylvatic plague infection, and, if a colony gets infected, it can kill more than 90% of the individuals.

Black-footed ferrets are obligate predators of prairie dogs, and the Espee certainly had no shortage of this prey species. We spent most of our days walking vast north-south transects through the ranch, surveying prairie dog colonies. However, that summer we noticed that previously occupied burrows had begun caving in and started to be occupied by snakes, spiders, and rabbits, and prairie dogs just weren't in places they had been the year before. At the same time we were preparing for a ferret reintroduction, the U.S. Geological Survey Wildlife Disease division were conducting oral plague vaccine (OPV) trials at prairie dog colonies across the West, and Espee was selected as a study site. Our prairie dog densities were crashing before our very eyes, so we quickly got to work, establishing an OPV site and a placebo site and laying out baits at every burrow opening we found. We trapped every single prairie dog, rabbit, and ground squirrel we could and collected as much data as possible—sex, size, weight, ear-tags for mark-recapture values, nobuto strips to collect blood, and most importantly, we combed for fleas.



Arizona has the only black-footed ferret reintroduction sites in Gunnison's prairie dog habitat. Credit: Scott Sprague

(Continued on page 8)

(Continued from page 7)

You see, prairie dogs are merely a carrier of sylvatic plague, not the host. That esteemed title belongs to the simple flea and, boy, did these prairie dogs have fleas. A single swipe of a comb through some of their coats would turn up hundreds of fleas, and you had to quickly scrape them into vials of alcohol to avoid having them jump onto you. We stressed the importance of wearing appropriate protective garments, such as long-sleeves, gloves, and hair covering and using pest repellents like permethrin and DEET. Hundreds of prairie dogs and rabbits were processed; it was a chaotic work site and, naturally, corners were cut, oversights were made, and I unknowingly got bit.



Prairie dogs are combed vigorously to remove fleas for testing. Credit: Scott Sprague

I lived in Flagstaff at the time, and I went home after a hard week of trapping and flopped down into my stereotypical college-kid inflatable mattress and slept hard. Saturday went without a hitch. I went out with my friends and had a great day. I went to bed with a slight ache in my hips. The next morning, I woke up feeling horrible; my whole body hurt, and I was alternating between jackhammer chills and intense waves of heat. Vomiting began, and I noticed I had an extremely tender lump in my groin. I called my boss Jennifer Cordova to tell her that I wasn't feeling well, and she did not miss a beat. Jennifer immediately asked me what was going on, and when I told her about my symptoms and she said, in no uncertain terms, that I need to get to the hospital ASAP and not to let them let me go until they treat me for plague.

Well, I did as I was told. I went to the Flagstaff Medical Center and informed them that I believed I may have plague. At first, they doubted me, insisting it was not a common disease. I explained to them that I had been working hands-on with prairie dogs, specifically on a plague accine study, and then I pulled out my trump card—the little yellow medical alert card that all field biologists should have. It says something to the effect of “this person might have rare diseases you wouldn't normally consider in differential diagnosis.” The doctor kindly said, “Okay, let's get you taken care of.” They gave me an intramuscular injection of antibiotics and 20 days' worth of oral

-route antibiotics. The doctor also took a fine needle aspiration of my inflamed lymph node in my groin, which they apparently sent to the Centers for Disease Control; I never heard from them. Within a few days, I was right as rain, and I was back on Espee trapping prairie dogs and combing fleas, this time with a new-found appreciation for my PPE.

Plague is a very serious disease and, for folks who are handling wildlife regularly, needs to be taken as a serious hazard. I think about the late Eric York, a National Park Service biologist who worked on trapping mountain lions in Grand Canyon who succumbed to the rarer, even more deadly, pneumonic variation of sylvatic plague he acquired while performing a mountain lion necropsy. His story should live in the back of our minds always as a reminder that every time we go into the field, we accept risks that we sometimes cannot even see.

Implementing Technological Advances for Chiricahua Leopard Frog Genetic Management

By Audrey Owens, Ranid Frogs Project Coordinator, Arizona Game and Fish Department



Chiricahua leopard frog. Credit: Scott Sprague

Chiricahua leopard frogs (CLF) are native to Arizona, New Mexico, and parts of northern Mexico. They are a highly aquatic frog that has declined across its range due to chytridiomycosis (caused by the fungal pathogen chytrid), nonnative invasive species, and habitat loss, resulting in the need for federal protection under the Endangered Species Act. Although populations have been increasing due to active management by a number of partnering agencies and landowners, many populations were started with few founders, resulting in genetic bottlenecks. These small, isolated populations are susceptible to extirpation and, as each generation goes by, are subject to loss of genetic diversity caused by genetic drift.

The Arizona Game and Fish Department's Ranid Frogs Project, along with the U.S. Fish and Wildlife Service, Turner Endangered Species Fund, and the New Mexico Department of Game and Fish, have been partnering with a conservation geneticist (Dr. Rob Denton of Marian University) to help increase genetic diversity in the wild. We are using long read sequencing to build a reference genome, and we are using RADseq short read sequencing to find genetic variation at thousands of locations across the CLF genome. These two approaches have allowed us to analyze CLF genetic diversity rangewide and will help us implement a data-driven genetic management plan. Through informed population mixing, we hope to increase genetic diversity and give Chiricahua leopard frogs the best possible chance for survival in the face of a changing climate.

Another safeguard we recently implemented is "biobanking" (cryopreservation of sperm for future use). Collaborators from the Fort Worth Zoo, who are part of the Amphibian Conservation and Biobanking Network, visited Arizona in June to collect sperm from four different CLF populations. This "Amphibian Ark" is a biobank for some of the world's most imperiled amphibians.

Ranid Frogs Project staff (Ian Latella, Ryn Davison, Rae Anderson, and me) and the Department's Borderlands Program intern Daniella Bojorquez captured male frogs from four different populations in eastern Arizona in June 2024 and brought them to Eastern Ar-



Chiricahua leopard frogs await their turn to contribute to the biobanking effort. Credit: Audrey Owens

(Continued on page 10)

(Continued from page 9)

izona College’s Discovery Park campus for processing, where Fort Worth Zoo had set up a makeshift lab. The sperm collection process involves injecting a hormone that triggers the male to release sperm. With this genetic material banked at a state-of-the-art cryopreservation facility at the Fort Worth Zoo, we can use it in the future to contribute to CLF genetic diversity, even if we lose that population in the wild. The Zoo can thaw it and use it to fertilize eggs from other, closely related CLF populations.

This biobanking technology may not be new for banking human or cow sperm, but it’s new to the amphibian world, and we are grateful to be able to use it as one more tool to help conserve CLF populations in the wild.



Collecting and storing sperm from species such as Chiricahua leopard frogs aids conservation efforts. Credit: Audrey Owens

Continuing Education Grants

AZTWS offers \$1,500 annually in [Continuing Education Grants](#) to its members (including professionals, graduate and undergraduate students) to support education and career development opportunities (conferences, workshops, trainings, etc.). Grant requests should not exceed \$500 per application and only one grant is awarded per person, per year. Grants are limited to current Chapter members only; membership dues are \$6/year. Join or renew [here](#).

Applications can be submitted at any time and will be reviewed quarterly by the Continuing Education Committee. Applicants will be notified within 30 days of the Committee’s review. The Committee evaluates applications based on your explanation of how the activity will enhance your career development, your financial need, your efforts to obtain supplemental funding, and your involvement in Chapter activities. AZTWS encourages applicants from under-represented individuals and groups.

APPLY NOW

Where Have All the Cottontails Gone?

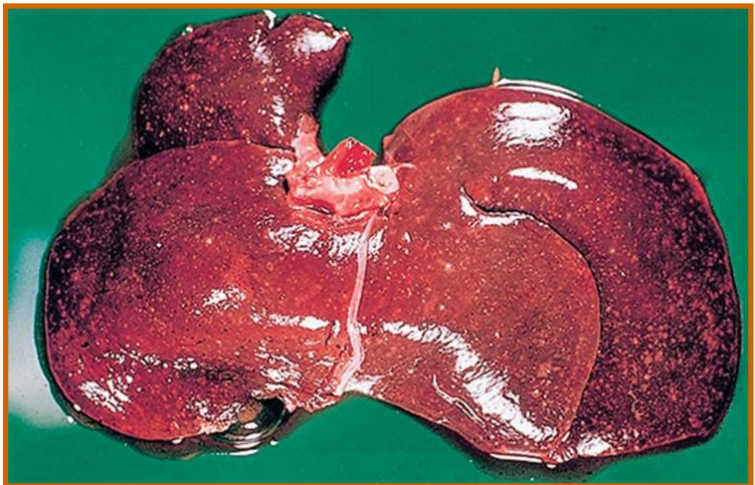
By Anne Justice-Allen, DVM, MS, Arizona State Wildlife Veterinarian, Arizona Game and Fish Department

In spring of 2020, the Arizona Game and Fish Department received several reports across southeastern Arizona of dying cottontails and jackrabbits. The Wildlife Health program acquired several specimens for testing and confirmed that the lagomorphs were dying as a result of infection with rabbit hemorrhagic disease virus type 2 (RHDV2). It was the first time that this devastating disease had been detected in wild rabbits in North America. This disease originated in Europe, where it has been present for a number of years. It was sporadically identified in domestic rabbits in several areas across the United States and Canada before being identified in association with a mortality event in domestic and wild rabbits in New Mexico just prior to being found in Arizona. The outbreak spread to rabbits throughout the western United States. We still receive reports of rabbits dying in groups of four to seven animals and consider several areas of the state endemic (consistently present in the population) for the disease. However, there are some areas, such as Maricopa and Yuma counties, where we have not detected the disease. In most locations, lagomorph populations have recovered and appear stable.



Hemorrhaging from the nose is a symptom of RHDV2. Credit: Anne Justice-Allen

We continue to investigate all reports of rabbit death because of the presence of another disease in Arizona, tularemia. Tularemia is a bacterial zoonotic (transmissible to people from wildlife) disease of rabbits and rodents caused by *Yersinia pestis*. People can become infected by handling an infected rabbit or through the bite of an infected tick or fly. Another route of exposure is by weed whacking or mowing over a carcass. In people, fever, headache, muscle ache, and swollen lymph nodes are common symptoms, which generally begin three to five days but as long as 14 days after infection.



RHDV2 causes necrosis of the liver (left; credit: Anne Justice-Allen), whereas tularemia results in small white spots on the liver (right; credit James Runnigen).

(Continued on page 12)

(Continued from page 11)

Both of these diseases can cause sudden death in rabbits. However, these diseases look very different on necropsy. One of the hallmarks of RHDV2 is hemorrhage from the nose; sometimes it can be quite remarkable. Inside the animal, RHDV2 tends to cause liver necrosis, enlarged spleens without any spots, and hemorrhage in the lungs. Liver necrosis can be seen grossly as a soft friable organ sometimes with a net-like pattern (reticular) over the surface. In contrast, tularemia often causes small white spots in the liver or spleen. Ultimately, though, the only way to definitively diagnose either disease is with diagnostic testing. In the case of RHDV2, the best test is PCR. This virus is quite hardy and can be detected in degraded carcasses. Tularemia can be detected via culture, immunofluorescent antibody testing, immunohistochemistry, and PCR.

Get Involved with AZTWS!

AZTWS has open vacancies for Chair Committee 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.

Milkweed and Monarchs: What Activity Did We See in 2023 and 2024?

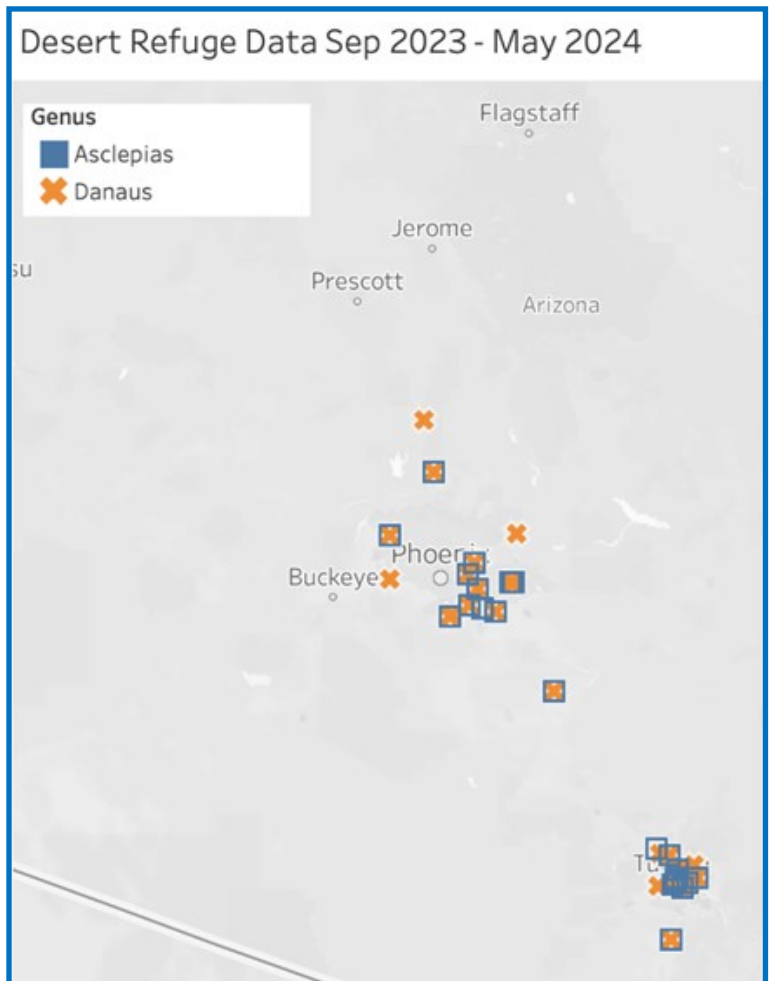
By McKinsey Tighe, Student Outreach Assistant, USA National Phenology Network

Have you ever wondered why Arizona sees monarch butterflies and caterpillars in the winter? The USA National Phenology Network (USA-NPN) and Desert Botanical Garden (DBG) created the Desert Refuge campaign in 2022 to better understand the overwintering monarch population in Arizona and their relationship with the 30 species of native milkweeds found here. The campaign seeks to answer the following questions:

1. Where and when are adult monarch butterflies observed across Arizona during the winter?
2. When are monarchs breeding (as evidenced by the presence of caterpillars)?
3. What life stages do milkweeds experience during the winter and how might this affect monarchs?

The 2023–2024 Desert Refuge results show that the phenology of milkweeds plays an important role in the ability of monarchs to survive in Arizona throughout the winter. The map to the right shows the locations and overlap of milkweed plants (*Asclepias*, blue squares) and monarch butterflies (*Danaus*, orange “x”) in Arizona.

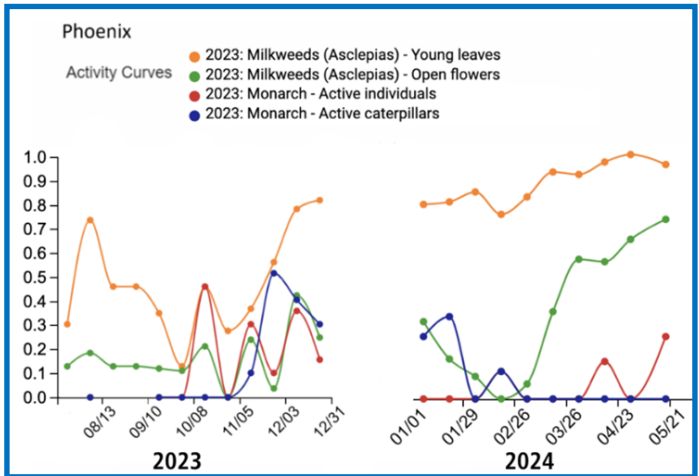
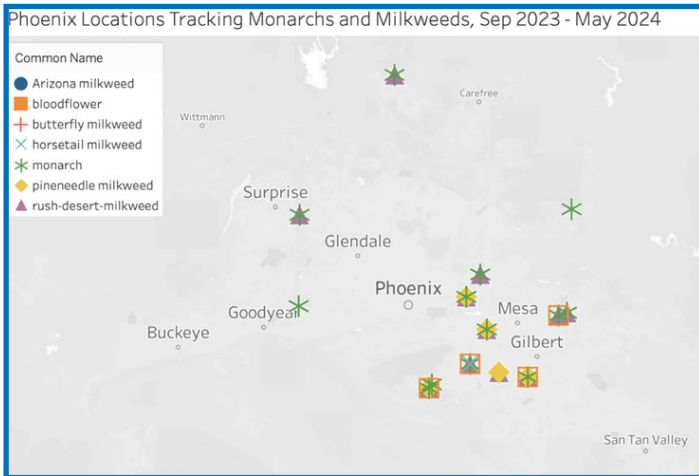
A majority of reports came from the Phoenix and Tucson areas, with 43 observers contributing to the Desert Refuge campaign during this span. Comparing results between the two cities yields some interesting trends. In Phoenix, the peak of open flowers in winter was in early December, when about 40% of observers saw open flowers. Leaves were reported throughout the season, which are important to the growth of caterpillars. Adult monarchs were reported until January, and caterpillars were reported until the end of February. Tucson saw similar reports for leaves throughout the season but saw a higher proportion of “yes” reports for open flowers throughout the year than Phoenix. Adults and caterpillars were seen throughout most of the season in Tucson, although there was a decrease in reports in January and February for both.



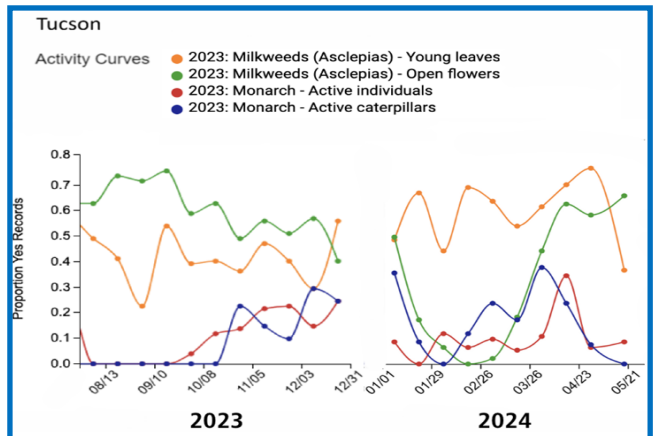
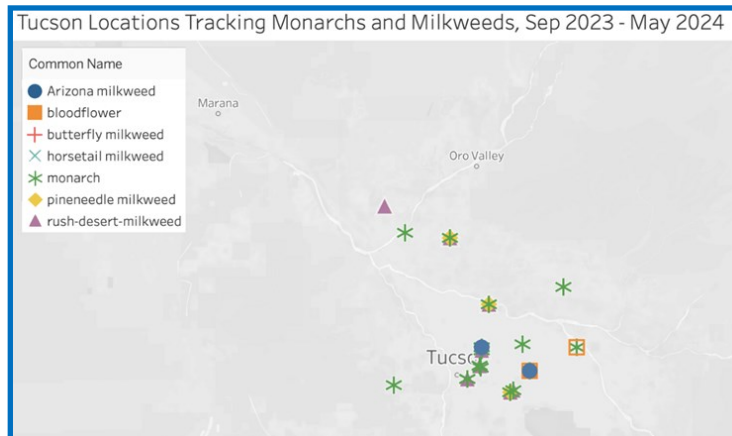
Desert Refuge data from September 2023 to May 2024.
Credit: USA-NPN

(Continued on page 14)

(Continued from page 13)



Phoenix area results, including what species of milkweed were reported and milkweed and monarch activity throughout the year. Credit: USA-NPN

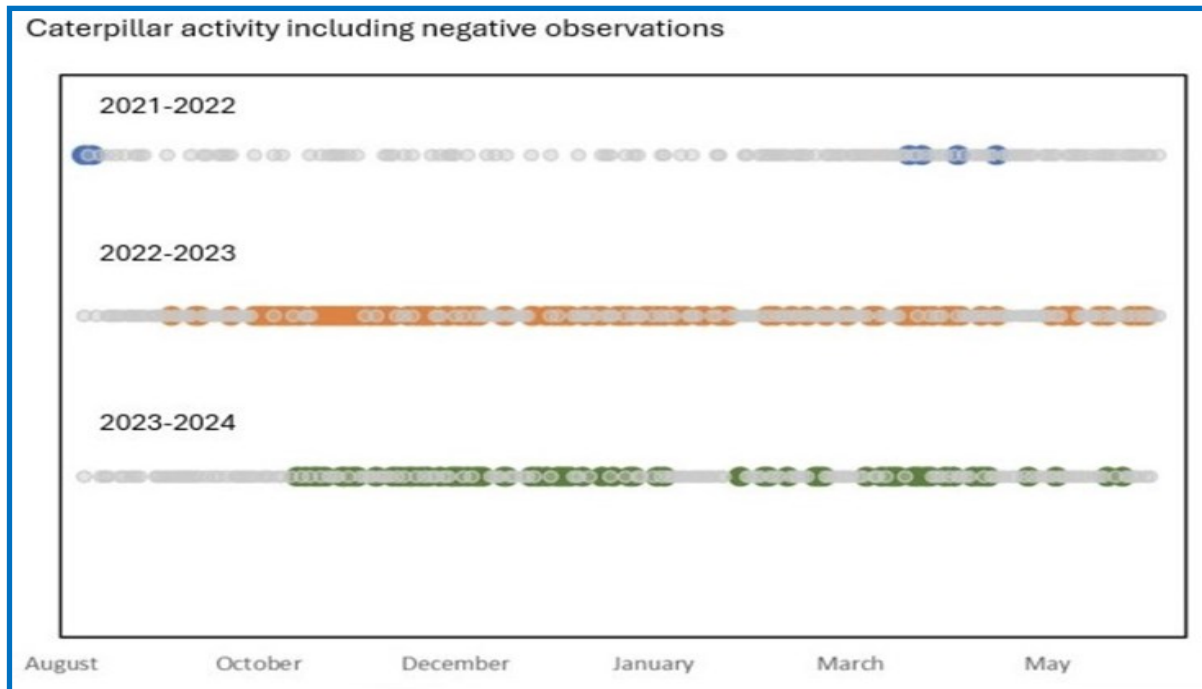


Tucson area results, including what species of milkweed were reported and milkweed and monarch activity throughout the year. Credit: USA-NPN

The Desert Refuge campaign has come a long way since 2022, and we wouldn't be here without the hard work and dedication of Nature's Notebook observers! These reports are directly contributing to monarch butterfly research and our understanding of the relationship between monarchs and milkweeds in Arizona. If you would like to participate in the 2024–2025 Desert Refuge campaign and receive updates on the campaign throughout the year, you can visit the [campaign page](#) on our website.

(Continued on page 15)

(Continued from page 14)



At USA-NPN, negative observations (reporting “no” for a phenophase when you do not see it) are of great importance to our understanding of the species we observe and their phenology. This graphic shows the “yes” reports (blue, orange, or green) and “no” reports (gray) of caterpillar activity over the past three years. These negative observations let us know that we are not missing observations throughout the year. Figure created by Kim Pegram, Desert Botanical Garden

Local Phenology Programs play a major role in encouraging communities and citizen scientists to use an app called Nature’s Notebook and observe the phenology of their environments, including milkweeds and monarchs! Below are the top contributors to the campaign this year. If you’re interested in joining a Local Phenology Program, you can see which groups are in your area on our [website](#).

Local Phenology Group	Number of Records
Desert Botanical Garden	2135
Reid Park Zoo Pollinator Garden	1933
Master Gardeners Phenology Group	1583
Tohono Chul	1463
Tohono Chul Self-Guided Phenology Trail	1394
CAGRNationalMonument	708
U of A Campus Arboretum	648
Tucson Botanical Garden	150
Tucson Audubon	8

Safety Awareness

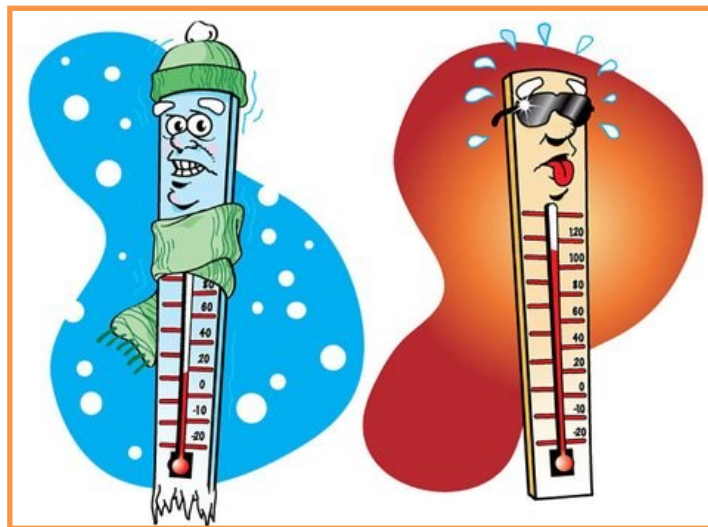
By Chris Carrillo, AZTWS Chapter President

With summer coming to an end and winter approaching, I'd like to raise awareness about heat and cold stress. Heat and cold stress can cause adverse health effects, from mild discomfort to death, when the body isn't able to properly regulate its temperature. It's important to be aware of the signs and symptoms of heat and cold related illnesses.

In hot conditions, sweating may not be enough to enable the human body to maintain a normal temperature, and heat-related illnesses may occur. The most common issues caused by hot environments include heat stroke, heat exhaustion, heat cramps, heat rash, and dehydration. Some signs of extreme heat include high body temperature; hot, red, dry, or damp skin; fast pulse; headache; dizziness; nausea; confusion; and passing out. Although these heat-related illnesses are dangerous and potentially life threatening, they can be prevented. For those working outdoors or indoors without air conditioning/ventilation, you should acclimate to the environment, take breaks in a cool place, ensure you have plenty of water, and take water breaks as necessary. Another thing to consider is to schedule work during the cooler parts of the day while avoiding the hottest time of the day. You should also wear lightweight, loose-fitting, breathable clothing. You can also wear a wide-brimmed hat to protect yourself from the sun.

During cold weather, our body uses energy to maintain a normal internal body temperature. This results in a shift of blood flow from our hands, feet, legs, and skin to our chest and abdomen. If this happens, cold-related illnesses and injuries can occur if you are exposed to cold conditions for an extended time. The most common health problems caused by cold work environments include hypothermia, frostbite, trench foot, and dehydration. Signs of frostbite include skin that looks waxy and feels numb. Frostbite typically affects extremities such as the face, ears, fingers, and toes. Just like heat-related illnesses, cold-related illnesses and injuries are dangerous and potentially life threatening. However, they can be prevented. Prevention methods include acclimation, engineering controls, and the use of personal protective equipment. For those spending time outdoors or indoors without heat, you should wear several layers of loose clothing, including a sweater or jacket, warm hat, and/or rain gear. Protect your ears, face, hands, and feet with waterproof and insulated boots, gloves, and extra socks. If you're working, try to schedule heavy work during warmer parts of the day, take breaks out of the cold, and move into warm locations during breaks. You can also carry cold-weather gear, such as blankets and a change of clothes.

The Centers for Disease Control and Prevention (CDC) have Emergency Preparedness Guides on heat and cold stress [on their webpage](#), providing information that can help you protect yourself and avoid heat and cold illnesses. Please review the guides for useful information on symptoms, definitions, prevention, and safety tips for working in hot and cold environments.



Credit: <https://pixy.org> CC BY-NC-ND 4.0

SHARE YOUR AZ WILDLIFE STORIES

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

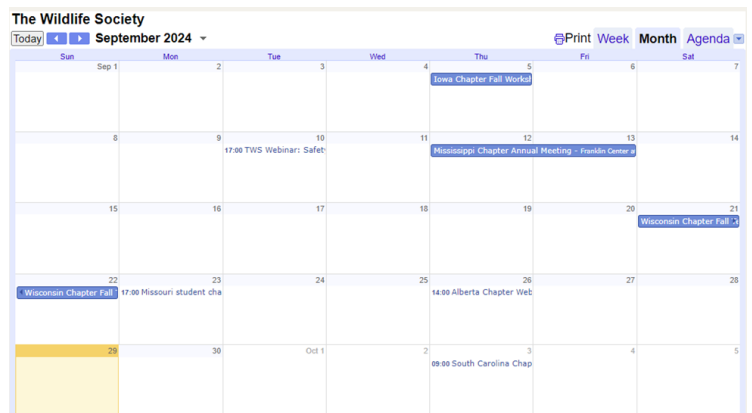
Issue	Deadline
Winter 2025	Dec 20, 2024
Spring 2025	Mar 21, 2025

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

* * * * *

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.



AZTWS News & Resources

The [Arizona Chapter of The Wildlife Society](#) is dedicated to promoting sound management and conservation of Arizona's wildlife resources and strives to be the preeminent resource for Arizona's community of scientists, managers, educators, students, technicians, planners, and others working to manage and conserve wildlife and habitats in the state. To help you keep up with AZTWS's resources, opportunities, and happenings, we hope that you find the following hotlinks useful:

- **Members** gain access to numerous opportunities; if you are not yet a member, sign up [here](#). Annual dues are only \$6!
- **AZTWS's Web Store** is live! Show your support by gifting cool AZTWS swag to others (or splurging for yourself). Proceeds support AZTWS resources, including conference events and our Continuing Education Grant. [Shop now!](#) [You can also support AZTWS's mission by [donating](#) discretely or in monthly recurrences.]
- Support others and help increase representation in Arizona's natural resource fields by **gifting a AZTWS membership** (1-year) – [details here](#).
- Looking for that older issue of *The Arizona Wildlifer*? **All issues** are freely accessible [here!](#)
- 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 12](#) for details.
- Have questions for us? Contact us [here](#).



Arizona is home to a diversity of sensitive and rare species. We hope you enjoy ferreting out info about these species in our newsletters! Credit: George Andrejko