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Arizona Wildlife News

Issue 2: Wildlife Connectivity

Centennial Year Edition

ARIZONA WILDLIFE FEDERATION

1923 Celebrating 100 Years 2023

Official Publication of the Arizona Wildlife Federation

What is AWF?

Our Mission Statement

Arizona Wildlife Federation is a non-profit organization dedicated to educating, inspiring, and assisting individuals and organizations to value, conserve, enhance, manage, and protect wildlife and wildlife habitat.

AWF is a statewide association of people interested in the present and future well-being of Arizona's wildlife, wildlife habitat and natural systems.We believe our wildlife heritage should not be jeopardized by any activity that fails to ensure its long-term health and sustainability. From the outset of the organization, AWF's primary goal has been the establishment and maintenance of a Commission/Department form of wildlife administration, free of political influence. We continue to work with the Arizona Game and Fish Department and Commissioners to assure that science-based best practices are used in the management of wildlife and habitat in Arizona.

Our Newsletter

The official publication of the Arizona Wildlife Federation, the State affiliate of the National Wildlife Federation, Arizona Wildlife News (ISSN) is published quarterly as a service to affiliate members and Federation members. The editorials and commentaries in this publication do not necessarily reflect the mission of the Arizona Wildlife Federation. AWF is an equal oppertunity provider.

The Arizona Wildlife Federation welcomes stories, art, and photographic contributions! We will consider, but assume no responsibility for unsolicited proposals, manuscripts, art, photographs, and transparencies. Contact the AWF office at (480) 702-1365 for details.

The Arizona Wildlife Federation is celebrating our Centennial in 2023. We are the oldest conservation organization in Arizona and were instrumental in forming the state's first commission and department to manage wildlife. This year, we are reflecting on our history in Arizona and looking toward our future with hope. We welcome you — our supporters — to tell us stories of past leaders and changemakers who made the AWF what it is today.

Published by the Arizona Wildlife Federation

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In This Issue

A Message from the Executive Director	3
Using Wildlife Crossings to Connect Arizona Wildlife Populations for Future Generations	4
Conservation Corner	6
Don't Fence Me In: Removing Barbed Wire Fence to Help Wildlife	8
Wildlife Crossings Save Wildlife and People	10
Regional Roundup	11
Regional and Affiliate Events	18
Project Wildlife: Bisbee	20
Native Gardens: A Collaborative Theater Event	21
100 Years of AWF: Centennial Spotlight	22
Support the Arizona Wildlife Federation	23

JOURNAL CONTRIBUTORS

Front Cover Photo Courtesy of Judi Kohler
Back Cover courtesy of the National Wildlife Federation
Articles by: Jeff Gagnon, Lew Carpenter, Trica Oshant Hawkins, Jeremy Romero, Elise Lange, and Valerie Morrill

JOIN THE CONVERSATION

A Message from the Executive Director

By Scott Garlid, AWF Executive Director

As we celebrate the Arizona Wildlife Federation's Centennial in the pages of our Arizona Wildlife News (AWN) magazine this year, we're focusing on some of the most important challenges that will define the next hundred years for wildlife in Arizona. None of those challenges are perhaps more important than wildlife connectivity--our theme for this issue of AWN.

It's an exercise in visualization to imagine the Arizona landscape of 100 years ago. Certainly, old pictures of the "boom" towns of Yuma, Prescott or even Phoenix give some perspective, as do historical photos of mining operations or remote Native American trading posts. There are even old photos of Arizona's ponderosa pine forests and desert grasslands that give an indication of how much the natural landscape has changed in the last century. But what's harder to visualize is what you would see if you took a series of photos as you traveled in a straight line in any direction across our state. A hundred years ago, you would have seen mile after mile of vast, unimpeded landscapes. Today, very few of those miles are uninterrupted by some kind of human development.

In 1923, the entire population of Arizona was 371,000 people, roughly 30% smaller than the city of Mesa is today. There was no urban sprawl, interstate highways didn't exist, and roads like the "National Old Trails Road," which eventually became Route 66, weren't paved. There were no massive power lines cutting across public lands, no solar or wind power developments, and even the mines had relatively small footprints as the first open pit copper mine had just opened near Ajo a few years prior. The closest thing to human-caused habitat fragmentation would have been a scattering of cattle fences and a few lightly traveled railroads crossing the state through Yuma, Tucson, Flagstaff and Phoenix.

Today, put your finger anywhere on an Arizona map and you'll be pointing to a landscape that is heavily fragmented by development, roads, transmission lines, power generation, fencing, massive mining operations, or several of those threats together.

It's that aspect of change that poses perhaps the greatest challenge to wildlife in the next hundred years. How can we live in a world where we depend on the things causing the fragmentation, and still provide animals the important corridors they need to access water, escape the effects of climate change, and reproduce with healthy genetic diversity?

This issue of AWN shares perspectives on this challenge from the experts like Jeremy Romero with the National Wildlife Federation, Jeff Gagnon at the Arizona Game and Fish Department, and Trica Oshant Hawkins with the Arizona Wildlife Federation. As you might expect, there are no easy answers, but our work, as always, will be to bring people together for meaningful dialog and to get things done based on the best available science and practical solutions.

Also in this issue, like every issue, you'll see what's happening in all corners of Arizona in our Regional Director's reports. And don't forget, as a tribute to our Centennial Year, we've hidden images of one of our founders, Aldo Leopold, in these pages, so look for Aldo and send page numbers and brief descriptions to elise@azwildlife.org to win some AWF swag!I hope your spring is full of optimism and hope for the season, the year, and for the next hundred years, and you're finding time to get out and enjoy Arizona's great outdoors!

Yours in conservation,

Scott Garlid

Using Wildlife Crossings to Connect Arizona Wildlife Populations for Future Generations

By Jeff Gagnon, statewide connectivity biologist for the Arizona Game and Fish Department

As Arizona's population continues to grow, so do the challenges of effectively coexisting with our state's diverse wildlife populations. The effects of roads on wildlife top the list of these challenges, as animals are killed by vehicles each year and habitats are fragmented. The Arizona Game and Fish Department (AZGFD) works to reduce the effects of roads on wildlife. This is a daunting task, but thanks to partnerships and the potential for new funding opportunities, AZGFD looks for innovative solutions to reduce the effects of roads and connect habitats for the future of Arizona's wildlife.

The Negative Effects Of Roads On Wildlife

A 2021 Arizona Department of Transportation (ADOT) report conservatively estimates that wildlife-vehicle collisions have increased by more than 70% in the last decade.[1] These collisions are not only dangerous to wildlife but also to motorists that travel Arizona's roads. In 2022, a collision in which 10 elk were killed at once along I-40 west of Flagstaff provided a devastating scene. Collisions with larger animals, such as elk and deer, are regularly reported by Public Safety Officers because they tend to cause vehicular crashes. However, smaller roadkill animals generally go undocumented. A 2010 study in Saguaro National Park estimated that nearly 30,000 animals were killed by vehicles in one year, ranging from reptiles and amphibians to larger mammals like deer.[2] With Saguaro National Park making up less than 0.01% of Arizona's size, the number of wildlife likely killed by vehicles is overwhelming.

Habitat fragmentation is another major concern for the long-term persistence of wildlife populations and healthy ecosystems. When roads or fences fragment habitats, wildlife find it difficult to access resources necessary for survival such as food, water, and seasonal ranges through migration corridors. As climatic extremes, such as drought, become more prevalent, it is imperative for Arizona wildlife populations to maintain access to these resources and migration corridors.

In 2018, the Department of Interior released Secretarial Order 3362 (SO 3362) "Improving Habitat Quality in Western Big Game Winter Range and Migration Corridors." This Order includes provisions for research opportunities to identify wildlife migration corridors, and it requires western states to identify priority corridors in their State Action Plan.[3] This information helps AZGFD apply for funding to improve migration corridors.

Minimizing The Effects Of Roads On Wildlife

For over 20 years, AZGFD has worked with ADOT, Regional Transportation Authority (RTA), and other partners to effectively address these issues. Wildlife crossing structures and exclusionary fencing are a proven method to reduce the

1. **WILDLIFE-VEHICLE COLLISIONS HAVE INCREASED BY MORE THAN 70% IN THE LAST DECACDE**

https://azdot.gov/planning/transportation-studies/completed-transportation-studies/wildlife-vehicle-conflict-study

2. **NEARLY 30,000 ANIMALS WERE KILLED BY VEHICLES IN ONE YEAR IN SAGUARO NATIONAL PARK**

https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1240&context=hwi

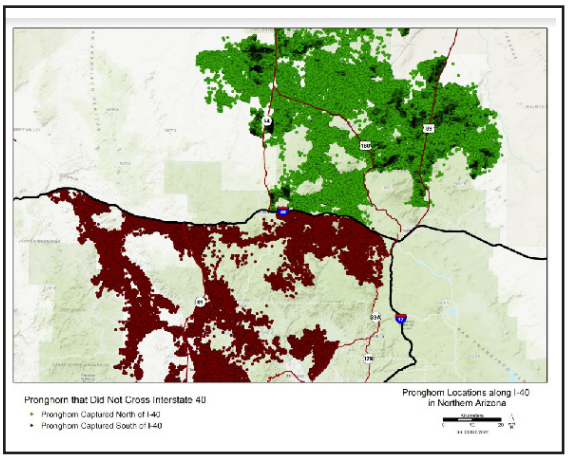
3. **"IMPROVING HABITAT QUALITY IN WESTERN BIG GAME WINTER RANGE AND MIGRATION CORRIDORS"**

https://wafwa.org/wp-content/uploads/2022/10/Arizona2022SAP.pdf

4. **ARCGIS MAP SHOWING EXISTING AND FUTURE WILDLIFE CROSSING PROJECTS**

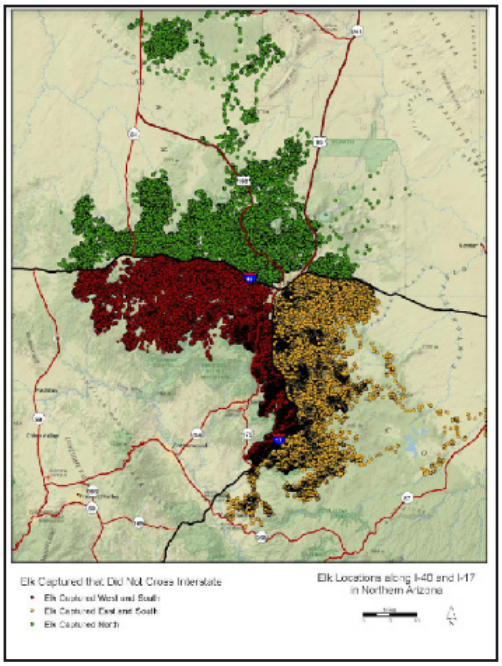
https://storymaps.arcgis.com/stories/fff7446bf2254305ae16ef0b585bf891

effects of roads on both vehicle caused mortality and habitat fragmentation. Projects in Arizona include State Route 260, US Highway 93, State Route 77, among others that include four wildlife overpasses, numerous underpasses, and culverts connected with fencing to keep wildlife off of the road while safely guiding them to the crossing structures. These efforts reduced collisions with some wildlife species by 85-100% and AZGFD staff have documented tens of thousands of animals using the wildlife crossing structures.[4]



More Work To Be Done

Highly-traveled interstate highways are substantial barriers to wildlife given their high traffic volumes. AZGFD GPS movement studies indicate that I-17 and I-40 near Flagstaff, AZ are nearly complete barriers for most wildlife species, including elk, and pronghorn (See the images to the right). Although elk and deer may occasionally cross I-17 and I-40, pronghorn do not cross the highway at all. Pronghorn are particularly susceptible to habitat fragmentation by roads as traffic volumes increase to more than 5000 vehicles per day. I-17 and I-40 regularly exceed 20,000 vehicles per day and pronghorn herds living near interstates are completely separated from one another.



While these highways are a barrier to most wildlife, there are a few brave animals that elect to cross the road anyway. For animals like elk and deer, it usually doesn't end well. AZGFD and ADOT collaborated on studies from 2007-2012 that documented more than 200 elk and deer collisions per year along select stretches of I-17 and I-40. As part of these studies, AZGFD worked with ADOT to identify locations of wildlife crossings and fencing. These projects had been shelved due to a lack of funding, but portions of them are being dusted off as funding opportunities arise.

Funds To Get The Job Done

Recently introduced funding opportunities may provide additional support for the construction of wildlife crossings and fencing. As funding opportunities arise, AZGFD has selected priority projects to focus on from among the innumerable statewide needs for this type of mitigation. In 2022, AZGFD began working with ADOT to design three wildlife overpasses previously identified during the I-17 and I-40 studies.

As part of the prioritization process, AZGFD recognized that the support of ADOT was crucial for wildlife crossings. Having a human safety nexus was the key link to that support. Additionally, the support of landowners on either side of the road will ensure long-term success of the crossings. In the case of I-17 and I-40, the United States Forest Service (USFS) owns land on both sides of the road and their Forest Plans support habitat connectivity. Combining the desired components of AZGFD wildlife, ADOT safety, and USFS landscape needs was the recipe for support needed to get these projects on the right track. One potential funding source is the Wildlife Crossing Pilot Program which is part of the Infrastructure Investment and Jobs Act (IIJA). AZGFD is working with partners to be in a position to apply for these funds with I-17 and I-40 overpasses at the top of their priority list. If funded and implemented, these three wildlife overpasses will not only provide safer roads for those traveling through northern Arizona, but will also provide a crucial link for the long-term sustainability of Arizona wildlife populations and their conservation for future generations.

Conservation Corner
Connectivity is Important Throughout the West

By Lew Carpenter, Director of Conservation Partnerships, National Wildlife Federation Rocky Mountain Region

This wildlife crossing is one of the most celebrated in the U.S., as it spans the U.S. 191 to help a pronghorn herd who migrates from Grand Teton National Park hundreds of miles south to the Red Desert of Wyoming

Wildlife move both daily and seasonally to survive. However, the habitats animals rely on continue to be fragmented by housing, roads, fences, energy facilities, and other man-made barriers. As a result, animals are struggling more and more to reach food, water, shelter, and breeding sites.

At the same time, the need for wildlife to be able to move may be greater than ever. The expanding U.S. population is bringing more people and development into conflict with wildlife and their historic habitats. And climate change is fundamentally altering landscapes, forcing many animals to relocate.

Habitat connectivity is defined as the degree to which the landscape facilitates or impedes animal movement and other ecological processes, such as seed dispersal.

The National Wildlife Federation and many of its state and territory affiliates are confronting this challenge by improving habitat connectivity and providing safe movement pathways for wildlife on the ground, and developing policies to ensure wildlife nationwide will always be able to get where they need to go.

Improving Wildlife Movement in the United States

As habitat continues to be fragmented, degraded, and lost to development, the need for a coordinated connectivity network is growing. Better habitat connectivity will allow wildlife to migrate and disperse throughout the country with the changing seasons, boost biodiversity and resilience in degraded ecosystems, safeguard genetic flow between populations, and ensure species are better able to adapt to our changing climate. This work is an important and long overdue investment in the long-term health of wildlife populations and ecological processes.

What is Connectivity?

Connectivity is a landscape-level ecological characteristic that leads to a proper functioning and more resilient ecosystem. Wildlife depend on connectivity to thrive: to track seasonal conditions, for food, to reproduce, to respond to natural events (e.g. fire, drought, snow, flooding), as well as to adapt to human development. Movement routes are essential to landscape connectivity, and wildlife use them on a daily basis to survive. However, landscape connectivity is threatened when habitat along routes or within seasonal ranges is lost due to conversion or other human development. In addition, features such as roads, fences, and railroads fragment the landscape and incrementally reduce the ability of wildlife to move. However, there are common sense solutions.

Smart investment in habitat connectivity projects will help connect protected landscapes, such as the National Park System and National Wildlife Refuge System as well as supporting connectivity on Tribal lands (i.e. supporting a Tribal Wildlife Corridors Act will make important contributions to achieving long-term conservation goals and objectives on and off Tribal land, for both game and non-game species alike).

Identifying prioritized corridors and key pinch points will improve connectivity that will benefit all species. Wildlife rely on secure habitat and the ability to move — sometimes over great distances — to maintain robust populations through increased reproduction and survival rates.

Pronghorn antelope are the fastest land mammal in North America. Even so, their survival is severly impacted by roads, fences, and other forms of human development. Habitat fragmentation in Arizona has led to genetically distinct populations of this species

Movements occur on both a daily and seasonal basis. Understanding movements and their impediments are essential in maintaining landscape connectivity.

How do we increase connectivity?
Wildlife are unconcerned with human-made borders. The best way to increase connectivity is collaboration. We work with all stakeholders and use scientific approaches, including remote cameras, GPS tracking devices, modeling approaches, and monitoring to identify migration and other movement routes—and barriers—for solutions to ensure wildlife can navigate across a landscape. Fostering long-term relationships is essential, and we partner with state and federal agencies, landowners, universities, and other conservation organizations to find on-the-ground solutions that support wildlife and people.

The Arizona Wildlife Federation is proud of our amazing volunteer for wildlife projects that we host or help with across Arizona. Therefore, we are so excited to start working on wildlife corridor projects in Arizona, following suit with other Western states.

Education and outreach are also critical for sustaining and restoring connectivity for populations of native wildlife to the region. From citizen scientists to volunteers who modify fences or restore critical wet areas on the dry prairie, our success depends on building networks of community awareness and support for protecting habitats and removing movement barriers.

Read the next article to learn what the Arizona Wildlife Federation is doing to address habitat fragmentation and improve wildlife connectivity

Don’t Fence Me In:
Removing Barbed Wire Fence to Help Wildlife

By Trica Oshant Hawkins, Conservation Programs Director

Fences are so ubiquitous in our world's landscapes that we barely notice them. Fences are so common that almost anywhere in the U.S. outside of city limits, you are likely to be only about 2 miles away from the nearest fence (unless you’re in a neighborhood, then it’s way closer). Fortunately, as wildlife conservationists, we are more and more noticing fences and their effects on wildlife and public lands.

The sad fate of a pronghorn that attempted to cross a barbed wire fence. Photo courtesy of Randy Newberg

Fences serve many purposes, with both positive and negative effects on wildlife and people. On the positive side, fences may be used to protect natural areas or sensitive habitat. They can serve to reduce human-wildlife conflicts, reduce crop depredation, or protect sensitive wildlife from predation or disease.

However on the negative side, fencing can directly kill wildlife and indirectly affect the well-being of individual animals and entire wildlife populations. Directly, wildlife simply get entangled in fence wire, which frequently results in death. In one study conducted in Colorado and Utah, researchers found one dead animal (either pronghorn, mule deer, or elk) for every 2.5 miles of fence surveyed. In total, they documented 133 mortalities along their study route during the year-long study. Most of the moralities were in August during weaning of fawns, and most of the animals were juveniles.

Besides killing animals outright, fences disrupt the natural movement of wildlife and cause individual stress and population declines. Animals become stressed when trying to negotiate a fence crossing or when they are separated from others in their herd. Often a mother animal is able to cross a fence but the young cannot. This usually results in the death of the young animal and (obviously) stress on the mother. In general, fencing can fragment ecosystems and reduce connectivity, isolate wildlife populations, and reduce genetic diversity.

There are many different kinds of fences on the landscape and fortunately, we now know what kind of fencing is more lethal to wildlife and what kind of fencing is more wildlife friendly. Research has shown that the most lethal kind of fencing is woven wire with one or two strands of barbed wire on top. Wildlife are more prone to getting entangled in this kind of fence given that their only option is to try and jump the fence and it is difficult to negotiate the loose barbed wire strands on top. Besides woven wire fences, 4 or 5 strand barbed wire fences, especially abandoned and forgotten fencing that has not been maintained for years, is also very lethal to wildlife as they become entangled in the wire trying to go over or under. Fencing that allows wildlife to either jump over or crawl under without becoming entangled is considered wildlife friendly. The optimum wildlife friendly fence has a bottom strand of wire that is smooth (no barbs) and is at least 16 inches off the ground. Its top strand should also be smooth and be no higher than 42 inches.

The good news is that there is a movement across the west to remove and/or to modify fencing to help wildlife and increase their connectivity across landscapes. The challenging news is the sheer amount of work that needs to be done. While fences are largely unmapped, undocumented, and unregulated, it is estimated that there are 620,000 miles of fence on private, city, county, state, and federal lands across the west. Of that fencing, no one really knows how much of it is barbed wire fence that is no longer in use. It is also likely that many miles of abandoned barbed wire were not

Don't Fence Me In: Removing Barbed Wire Fence to Help Wildlife, Cont'd.

included in that estimate. This is important to organizations such as AWF because of all the many different kinds and uses of fence, abandoned barbed wire fencing serves no useful purpose and poses nothing but hazards for animals on the landscape. It is this abandoned barbed wire fencing (aka ghost fence) that we focus on in our fence removal projects.

AWF Volunteers for Wildlife annually remove about a mile of barbed wire from the Table Top Wilderness area

Many of these fences were installed during the era of intense cattle ranching in the southwest, which coincided with the invention of barbed wire in the late 1870s. To hold on to their public land grazing allotments, ranchers had to show "improvement" on the land. Building fences was (and still is) one of the primary methods of "improving" ones grazing allotments. However, there weren't (and still aren't) any directives stating that those fences had to be removed once ranchers and their cattle moved on. As land ownership and grazing allotments changed, the relics of the cattle industry remained on the landscape. And they still do to this day.

Those of us who have been busy removing barbed wire from the landscape know there is a significant amount of "ghost fence" on our public lands. As an example, in the 776 square miles that make up the Sonoran Desert National Monument (an AWF fence removal project site), it is estimated that there are at least 40 more miles of abandoned fence that need removing… that we know of. And that's after many miles of barbed wire have already been removed! As one of our Bureau of Land Management (BLM) partners, Damon Haan, states, "Once you start getting out on the land, you find fence you didn't know existed."

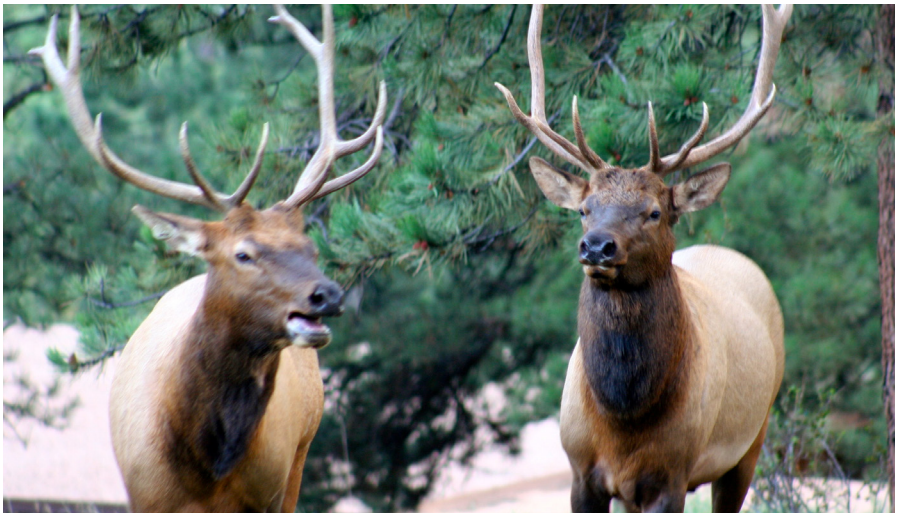
So, there's lots to be done! The beauty of AWF fence removal work is that we have many partnerships to help make it happen. We work with agencies like the BLM and the Arizona Game and Fish Department, and organizations like the Arizona Antelope Foundation and our partners in the Desert Fence Busters to get these jobs done. For projects in southern Arizona, our partnership with Desert Fence Busters allows us to pool resources, skills, and experiences as we work together to identify projects, reach out to volunteers, and remove and haul away old fence.

Removing fence has become a focal priority of our Volunteers for Wildlife program. We've primarily been working in central and southern Arizona but expect to expand our efforts over time. We even have a project in a wilderness area, which means that we must do all of the work without any mechanized help. Of all the volunteer work we do, here is nothing more gratifying than fence removal. Nothing says accomplishment like a wide open landscape you know is safer for wildlife and allows freedom of their movement. We have several project each year and invite you to join us! If you can't physically join us, we invite you to make a contribution to our Volunteers for Wildlife program.

The Desert Fence Busters includes the following partner organizations: Friend of Ironwood Forest, Arizona Wildlife Federation, Coalition for Sonoran Desert Protection, Arizona Game and Fish Department, BKW, Bureau of Reclamation, City of Tucson, Friend of Buenos Aires National Wildlife Refuge, Mule Deer Foundation, Pima County, Saguaro National Park, and Tucson Audubon Society.

Wildlife Crossings Save Wildlife and People

By Jeremy Romero, Regional Connectivity Coordinator, National Wildlife Federation



In late November I had the opportunity to tag along with a close friend of mine in some of the most exceptional elk habitat Arizona has to offer. Through responsible game and land management, this location has become a highly desirable destination for anyone fortunate enough to chase bull elk in Arizona.

As I sat there I could not help but think about all the hard work and time invested in conservation. As a profession and passion, I too invest a considerable amount of time advocating for these special places and iconic wildlife species. As the Regional Connectivity Coordinator for the National Wildlife Federation, I quite often remind myself about how blessed I am to work with like-minded individuals. I spend nearly all of my time working on wildlife corridors and habitat connectivity.

Wildlife need intact, undisturbed, and non-fragmented landscapes to thrive; whether that is traveling through migration corridors as they transition from summer range to winter range or shift ranges as a result of drought or wildfire as a result of climate change. We call this fragmentation, where disturbances such as roads, urban development, and non-wildlife-friendly fences — to name a few — drastically prevent wildlife's ability to move and utilize the landscapes for their various ecological needs.

Highways and roads are one of the largest contributors to habitat fragmentation and severely decrease wildlife's ability to move across landscapes. Tens of thousands of wildlife are injured and killed on our roadways every year. With these not-so-uncommon interactions, thousands of motorists are injured or even killed when wildlife-vehicle collisions occur, costing millions of dollars to society.

For decades, wildlife and transportation agencies such as the Arizona Game and Fish Department (AZGFD) and the Arizona Department of Transportation have been working to prevent wildlife/vehicle collisions and increase motorist safety on some of the most vulnerable and heavily traveled roadways. Through collaboration with these agencies, wildlife crossing structures have begun to make a significant impact in reducing wildlife-vehicle collisions, enhancing habitat connectivity, and reducing fragmentation in some of Arizona's most important landscapes.

You've probably seen some of these projects as you travel through Arizona. Most notable are projects like the Oracle Road Wildlife Crossing, completed in 2016. This project consists of an underpass and overpass and provides species like bighorn sheep and mule deer the chance to safely travel across the busy State Route 77.

Other projects like those on I-17 and US 93 have also proven beneficial in preventing wildlife-vehicle collisions. To date, the AZGFD has monitored these crossings producing data that shows many species like javelina, mule deer, elk, bighorn sheep, and bobcats using these structures. Highly effective in reducing wildlife-vehicle collisions, these projects are not cheap. The Oracle Road wildlife crossing project cost nearly $11,000,000 to complete.

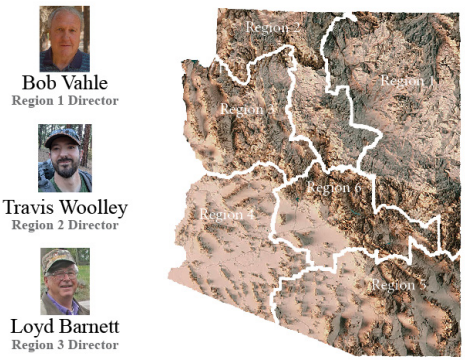
This is one wildlife overpass on US 93, about 3 miles from the Hoover Dam. This overpass provides safe passage to desert bighorn sheep and other wildlife

The Infrastructure Investment and Jobs Act (which passed last year in Congress) created funding opportunities that provide much-needed capacity for states to continue to develop and prioritize wildlife crossing projects. The Wildlife Crossings Pilot Program appropriates $350,000,000 over 5 years through competitive grants with a focus on reducing wildlife-vehicle collisions and improving habitat connectivity for terrestrial and aquatic species.

Other federal and state funding sources and efforts have helped states like Arizona leverage funding to identify where wildlife are moving and in turn recognize the best places for such crossing and habitat improvement projects. As the population continues to grow and the average amount of daily traffic increases, projects like the Oracle Road Crossing and others will become that much more important in providing safe travel for wildlife and motorists alike.

AWF Regional Roundup

Arizona Wildlife Federation divides the state into regions in the same manner as the Arizona Game and Fish Department. This map depicts each of those regions and the members of our Board of Directors who serve as directors for each area. Our Regional Directors are busy!



Region 1 Director's Report

By Bob Vahle, Regional Director

Heber Wild Horse Territory (HWHT) - Management Plan

The AWF continues to await the completion of a HWHT Management Plan which was scheduled to be completed by the Apache-Sitgreaves National Forest (ASNF) by March 2022. The AWF has been actively involved since 2017 to help the ASNF develop a management plan for the 19,000-acre HWHT near Heber-Overgaard, AZ. To date, the Final Environmental Impact Statement (FEIS) - HWHT Management Plan has not been completed, approved, and implemented. Hopefully, this process if completed and implemented would retain the key management provisions that were identified in the Draft Environment Assessment (DEA) - HWHT Plan.

Population Removal of Feral Horses Critically Needed on the Alpine and Springerville Ranger Districts

As previously reported, the AWF will continue to strongly support the ASNF in its proactive actions to contract for the humane capture and removal of feral horses. Currently, an estimated 400+ animals, considered 'trespass/unauthorized livestock" and are not protected as "wild horses" under the provisions of the 1971 Free Roaming Wild Horse and Burro Act, are on the Alpine and Springerville Ranger Districts. Unfortunately, the ASNF continues to receive significant opposition by some publics that do not accept the fact that feral horse populations must be controlled and removed from federal public lands, particularly when they are causing significant natural resource damage to vegetation, soils, water, and habitats for native wildlife. Detailed information on the ASNF actions to remove feral horses (unauthorized livestock) can be found on the ASNF website at (https://www.fs.usda.gov/detail/asnf/landmanagement).

Four Forests Restoration Initiative (4FRI)

As previously reported, the 4FRI project has changed emphasis over the next 5 years that started in Fiscal Year 2022 to focus forest restoration treatments of mechanically thinning dense forest stands, removing hazardous ground fuels, and using prescribed fire in areas of highest wildlife risk to local communities and watersheds. Within the ASNF in Region I, forest restoration treatments along the Mogollon Rim and in the White Mountains will be focused around Forest Lakes, Heber-Overgaard, Show Low, Pinetop-Lakeside, Greer, Springerville, and Alpine, AZ. The acreage that was targeted for treatment in 2022 included 14,388 acres of mechanical thinning, 11,500 acres of hazardous fuel reduction, and 43,881 acres of prescribed fire to reduce wildlife risk. The final total of acreages that have been treated in 2022 will be reported to the 4FRI Stakeholders at upcoming stakeholder meetings.

ASNF - Public Motorized Travel Management Plan

The Revised Draft Environmental Impact Statement (DEIS) for the ASNF "Public Motorized Travel Management Plan (PMTMP)" was issued for public comment in August 2019. The AWF reviewed and provided extensive comments on the DEIS and proposed management plan. As previously reported, completion and implementation of the ASNF- PMTMP is critically needed considering the significant increase each year of the sales and the use of Off Highway Vehicles (OHVs) on the ASNF. The ASNF reported the completion of the Final EIS to be issued to the public on March 1, 2023. To date, no public news release or other public notice has been issued by the ASNF that the Final EIS has been completed.

Mexican Wolf Program

Mexican wolf population information is gathered from November through February by the Interagency Field Team (IFT). During this time, the IFT conducts ground and aerial surveys using a variety of methods, including remote cameras, scat collection, and visual observation. For the first time since reintroduction into the wild in Arizona in 1998, the population of Mexican wolves in Arizona and New Mexico has surpassed 200, with a minimum of 242 wild wolves documented in 2022. The population estimate represents a 23% increase from the minimum of 196 wolves in 2021. This marks the seventh consecutive year of population growth and a more than doubling in size since 2017. The population is distributed with 105 wolves in Arizona and 136 in New Mexico.

For more information on the Mexican Wolf Recovery Program, visit the Mexican wolf website (www.fws.gov/mexican-wolf) or visit the Arizona Game and Fish Department website on wolves (www.azgfd.gov/wolf).

Read the full Region 1 Director's Report: https://azwildlife.org/Full-Regional-Reports-Spring-2023/

Region 2 Director's Report

By Travis Woolley, Regional Director

Local Partnerships getting work done for Four Forest Restoration Initiative (4FRI) and Wildfire Crisis Strategy

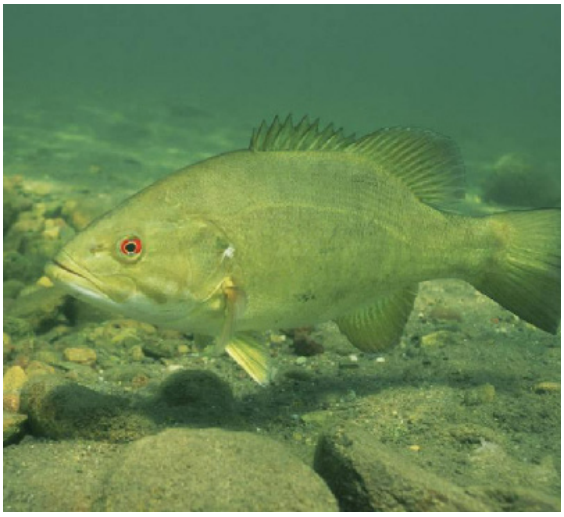
The USFS continues to build out its Wildfire Crisis Strategy by announcing additional high-risk landscapes and investing in what they are calling Keystone Projects. These projects include allocating tens of millions of dollars to key partners to focus on projects that reduce fuel loads on the ground. Partners include organizations like the National Forest Foundation and The National Wild Turkey Federation. To increase the pace and scale of work, projects will focus on areas of strength and current work for the respective partner organizations.

Fuel load reduction in Coconino County

While these National level agreements are being developed (and hopefully reaching the ground for local fuels reduction and restoration projects soon), key local partners in the 4FRI landscape are working to apply Infrastructure Investment and Jobs Act and other funds to work on projects that address key stakeholder issues. For example, Coconino County will invest $30 million over the next 5 years to complete restoration projects on USFS land. These dollars have and will continue to be focused in key areas that Coconino County has prioritized for steep slopes and other difficult and costly areas to treat for watershed health and protection. The County will have invested in treating around 1,500 acres in the Bill Williams Mountain project and will invest further in the Upper Rio de Flag watershed moving forward. Partnerships such as this are key to continuing to build momentum and restoring our forests for community and habitat health and protection.

Invasive smallmouth bass in the Colorado River

In addition to the vast societal issues surrounding lower water levels in the Colorado River and Lake Powell, these water levels are potentially creating a non-native fish issue in the form of smallmouth bass. Due to these lower water levels, warmer water and the smallmouth bass that live in them, are being pulled through the dam's hydropower intakes and dumped downstream. The warm water also allows for more reproductive success for the smallmouth, which in turn means more predation on trout fisheries and native fish such as the humpback chub.



Smallmouth Bass, USFWS Photo/Eric Engbretson

When a breeding population of smallmouth were discovered last summer, the National Park Service quickly began efforts to remove the invasive fish using rotenone (a pesticide derived from plant roots and approved by the Environmental Protection Agency) which has been effective for smallmouth removal efforts in the past. This is likely not the long-term solution, and it is unclear exactly how effective the effort has been. It also raises questions from a tribal perspective regarding the taking of life. Moving forward the Bureau of Reclamation is planning an Environmental Assessment with several alternatives around releasing colder water combined with flow spikes to disrupt the smallmouth bass that do make it downstream in hopes they will not reproduce. The National Park Service is encouraging anglers to report any catch or observations of smallmouth bass below the dam, and if caught remove them and contact the Glen Canyon National Recreation Area or Grand Canyon National Park.

Region 3 Director's Report

By Loyd Barnett, Regional Director

Burros

As previously reported, the Bureau of Land Management (BLM) continues to remove excess burros from the Black Mountain Herd Management Area in order to reach the appropriate management level of 478.

The number of burros had increased to at least 3,000 animals. Between September 2020 and June 2022, they removed 2100 animals. In October, 2022 they began another gather with the aim of removing an additional 700 over a six month period. To date, 552 of that planned number have been removed.

Verde River

As reported a year ago, the Prescott National Forest is conducting a wild and scenic river (WSR) suitability study in the Prescott and Coconino National Forests for 37 miles of the Upper Verde River already determined eligible for inclusion in the National Wild and Scenic Rivers System (NWSRS). This is the portion upstream from Cottonwood. A draft environmental assessment (DES) was issued in December 2022.

Image 1: Segment of the upper Verde River within the WSR evaluation section

The analysis illustrated the situation which sometimes occurs due to conflicts when implementing different laws/regulations pertaining to environmental protections. In this case the conflict is between the requirement for a free flowing condition to qualify for WSR designation and the proposed fish barriers to help reestablish and protect the native fish in the section of the river under the Threatened and Endangered Species Act.

Fish barriers are frequently used to prevent non-native fish from moving into a stream section managed for native species. Many of the non-natives prey on or compete with the natives. Smallmouth bass and catfish are two sport fish that are present in the Verde, as well as several non-sport species.

Sometimes fish barriers can be installed in a WSR where it does not change the character of the river. An example is Fossil Creek where a fish barrier has been installed. The difference is in the stream ias shown in Image 1 and 2.

The DES stated a preferred alternative of WSR designation for the entire 37-mile section, with portions designated as Wild, Scenic, and Recreational. Under this alternative the opportunity for construction of fish barriers would not be considered.

One of the alternatives evaluated omitted the two locations proposed for fish barriers and the stream reaches affected by them and recommended WSR for the remainder of the evaluation area. Designations of rivers or streams in the WSR system are made by congress. A decision on the analysis in the DES would result in a recommendation to congress to that effect.

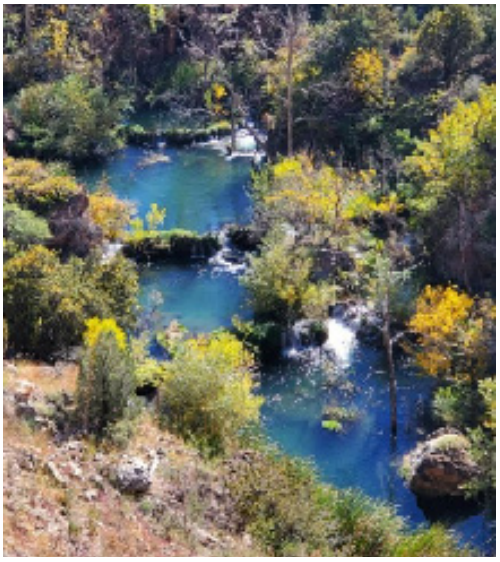


Image 2: Segment of Fossil Creek within the WSR system. Photo by Janie Agyagos, Coconino National Forest

Greater Prescott Landscape Fire Prevention

In the last few years the number and burned intensity of wildland fires across the West has increased exponentially. Warming temperatures, along with periodic droughts, occurring with climate change continue to accelerate this trend. The 2021 Infrastructure Act included multi-year funding for the Forest Service and other land management agencies to accelerate preventive actions.

The Forest Service initiated their program of landscape investments to protect communities and improve resilience in the nation's forests. Ten landscapes were initially chosen, the Greater Prescott Landscape is one of these first ten (the 4-Fri area in northern Arizona is also included in that initial group).

This program will provide funding to accelerate actions already in progress. Within the last 10 years, landscape scale environmental analyses for vegetation management have been completed, awaiting funding for implementation. Actions include mechanical thinning, broadcast burning, and mastication.

The project will improve overall ecosystem health and watershed function while reducing the wildfire hazard to communities, including but not limited to Prescott, Prescott Valley, Dewey, Humboldt, Mayer, Cottonwood, Crown King, Walker, Groom Creek, Ponderosa Park, Highland Pines, and Jerome. This project will meet the strategic treatment objective of restoring fire-adapted ecosystems to 40 percent of the landscape to reduce 80 percent of the exposure from wildlife.

Read the full Region 3 Director's Report: https://azwildlife.org/Full-Regional-Reports-Spring-2023/

Region 4 Director's Report

By Pat Headington, Regional Director

GMU 41 Drinker

This past January, the largest wildlife water catchment constructed in the desert southwest was completed in Game Management Unit (GMU) 41. Volunteers from Yuma Valley Rod & Gun Club (YVRGC), together with Yuma Proving Ground and Arizona Game and Fish Region 4 (R4) staff installed 44 lengths of 24" diameter PVC pipe, a drinker, and collection points during this 3-day project.

The work began with the excavation of the trench for all the PVC piping (a wheeled excavator was driven 30 miles to the project site). After completing the dig and leveling the trench, installation of the PVC piping began. All 44 sections of the 22' long PVC were installed in 3 ½ hours!

By the end of day 2, all the piping was installed, the manifold completed, and the drinker positioned and anchored. Crews wrapped up the project by completing the construction of the collection points and finalizing the installation of the drinker. The catchment is capable of storing 28,000 gallons of water.

Scott's Leadwell Tank Rehab

This project is a rehabilitation of an old cattle tank north of Quartzsite, Arizona. YVRGC, R4 staff, and volunteers from a local off-highway (OHV) group in Quartzsite came together to complete the project this past February. While the YVRGC and R4 staff excavated the trench and installed the 20 sections of 24" PVC piping, the OHV volunteers worked on construction of the collection points for the drinker.

The project wrapped up with the completion of the drinker and collection points. A large portion of this project was sponsored by the local OHV group and Yamaha Motorsports. This proved to be an excellent partnership of conservationists, industry, and enthusiasts working together for the betterment of wildlife.

Region 5 Director's Report

By Duane Aubuchon, Regional Director

Arizona Desert Bighorn Sheep Society & South Eastern Arizona Sportsman Club assist the Arizona Game and Fish Department to re-construct the Javelina Mountain catchment in the Whitlock Mountains

Habitat Partnership Committee

In 2022, the Arizona Game and Fish Department was able to utilize the Habitat Partnership Program to fund and complete 61 individual projects, including 40 water projects, 15 habitat improvement projects, and several wildlife management focused projects. Approximately $4.9 million dollars of Department funding was expended while leveraging roughly $2 million dollars of external funds. The total impact of just under $7,000,000 is a record for the Program, of which the Arizona Wildlife Federation is a proud supporter. At the end of 2023, we reviewed and provided input on over 60 grant applications for 2023 projects, many of which we will support with volunteer labor to assist in their completion.

Environmental Groups File Suit Regarding Grazing on the Coronado National Forest

On February 24, 2023, the Center for Biological Diversity and Maricopa Audubon Society issued a notice of intent to file suit against the U.S. Forest Service and the U.S. Fish and Wildlife Service for Endangered Species Act violations for failing to ensure that livestock grazing on the Coronado National Forest (CNF) does not destroy or adversely modify Western yellow-billed cuckoo, Chiricahua leopard frog, and Sonora chub or their designated riparian Critical Habitat. The claimants conducted grazing impact surveys in designated yellow-billed cuckoo Critical Habitat on the Sierra Vista and Nogales Ranger Districts in 2021 and 2022, documenting widespread impacts on habitats designated for endangered species survival and recovery.

Arizona Border Wall

Former governor, Doug Ducey, had 10 miles of border wall constructed through the CNF in Cochise County from double-stacked shipping containers. It is one of the few places along the Arizona border where endangered species like the jaguar, ocelot and other large animals can travel between Mexico and Arizona. Under threat of litigation from the Department of Justice, Ducey finally agreed in January to take down the walls installed near Yuma and Sierra Vista.

Several environmental groups are now warning that the damage already done to the area will require a huge recovery effort. Aside from that, the over 1,700 shipping containers will now be removed at a cost of $76.5 million. The original contract with the state was $123.5 million to install them. Though it violated federal law, the US Forest Service did nothing to deter the construction of the wall on public lands. This is an example of poor governance and wasted resources at every level. Only Santa Cruz County refused to allow the shipping container barrier, which is why Ducey turned to Cochise County instead.

Bureau of Land Management (BLM) Travel Management Plans

Last quarter, I reported that the BLM would be preparing a comprehensive access and transportation management plan

Region 5 Director's Report, Cont'd.

By Duane Aubuchon Regional Director

(TMP) for the Middle Gila South, Picacho, and Lower Galiuro Travel Management Areas out of their Tucson Field Office. This planning area includes approximately 212,000 acres of BLM lands in Pinal, Pima, Gila, and Cochise Counties, with approximately 700 miles of existing travel routes accessed from State and County roads and highways. Now, the BLM is inviting the public to participate in the scoping stage of the Middle Gila South Access and TMP and associated environmental assessment. This 30-day public scoping period is from March 2 to April 3, 2023.

Rosemont / Copper World Mines

After losing the appeal of a 9th Circuit Court decision, Hudbay Minerals moved its focus from the Rosemont Mine on the east side of the Santa Rita Mountains to its Copper World project on the west side. The mining company is currently building new roads and drill pads, and clearing ground for tailings piles on the property it owns. The activity is filling ephemeral stream beds and disturbing habitat in anticipation of final approvals to move forward with the first phase of a 44-year mining plan the company hopes to launch sometime within the next two years.

Phase I of the Copper World project would have four open pits and three tailing dumps on approximately 4,500 acres of private land. A decision by the AZ Dept. of Environmental Quality (ADEQ) on whether to issue a new air quality permit and amend Hudbay's Aquifer Protection Permit is expected soon, and mining is set to begin sometime in 2024. ADEQ has asserted jurisdiction over the Copper World Project over Pima County, given the county's resistance to mining in the Santa Ritas.

The State Mine Inspector's Office approved Hudbay's amended Mined Land Reclamation Plan (MLRP) without any public notice or a comment period. Local groups appealed this decision, with the suit claiming the Mine Inspector's Office determined there had not been a substantial change to the original MLRP despite the project nearly tripling in size and increasing from two open-pit mines to six.

Now, Hudbay must not only get an air quality permit and amend its Aquifer Protection Permit, but it must also wait for the courts to rule on the MLRP appeal. There are also concerns about the mine's impact on local water supplies, with use planned at 6,000 acre-feet of water per year, as permitted by the Arizona Department of Water Resources. For comparison, Tucson uses 13,150 acre-feet per year for about 102,570 individuals. Hudbay also wants to expand its private land ownership and has applied to the State Land Department to purchase two additional parcels of 40 and 160 acres to create contiguous lands on which to dump tailings.

Read the full Region 5 Director's Report: https://azwildlife.org/Full-Regional-Reports-Spring-2023/

Region 6 Director's Report

By Jon Hanna, Regional Director

AWF welcomes Jon Hanna as our new Region 6 Director. Jon is recently retired from the Arizona Game and Fish Department following a 19 year career. Jon has been following the Resolution Copper Mining project since he came on board as regional director and has attended a couple of their community meetings. According to Jon, "The Community Working Group focuses on potential environmental impact issues, science and policy, and economic development and growth. The group also discusses the pros and cons of the proposed development of the Resolution Copper Mine, which could become one of the world's largest copper mining ventures. Members include residents and stakeholders from the Town of Superior, Queen Valley, and nearby communities." Jon will continue to keep us apprised of this and other issues in Region 6.

Regional and Affiliate Events

Region 1

EARTH DAY Meteor Showcase and Night Sky Watching and Much More

April 22, 2023 @ 10 am - 10 pm

https://wmnature.org/event/meteor-showcase-and-night-sky-watching/

Region 5

Corridors, Connectivity, and Crossings Conference

May 9, 2023 – May 10, 2023

All day

https://www.nafws.org/product/wildlife-connectivity-corridors-and-crossings-conference/

Friends of the Verde River

Verde BioBlitz

April 20-30, 2023

Using iNaturalist, a free app, participants can upload observations to help us learn more about the flora and fauna in the Verde River Watershed.

https://verderiver.org/bioblitz/

Verde Valley Birding and Nature Fair

April 27-30, 2023

At Dead Horse Ranch State Park. Sign up for guided hikes and workshops throughout the Verde River Watershed!

https://na.eventscloud.com/website/50890/

Family Nature Fair
April 29, 2023
A free event at Dead Horse Ranch State Park. Activities include BioBlitz walks, seed ball making, and art activities. Kids completing all activities receive a prize!
https://na.eventscloud.com/website/50890/family-fun-day/

Arizona Trout Unlimited

14th Annual Native and Wild Trout Conference
April 6, 2023 @ 9am - 4pm

https://www.eventbrite.com/e/14th-annual-native-and-wild-trout-conference-registration-558374843187

Yuma Valley Rod and Gun Club

Water for Wildlife Golf Tournament!
April 22, 2023 @ 8 am to 5 pm
You can help support our water catchment and hauling operations and enjoy the course!

https://www.yvrgc.org/club_event/water-for-wildlife-golf-tournament-3

Arizona Elk Society

2023 WM Chapter 8th Annual Banquet
June 10, 2023 @ 4:30 pm
Fundraiser for elk habitat projects, riparian restoration, youth camps, mentored hunts, and hunts for AZ's disabled Veterans

https://www.arizonaelksociety.org/wm-chapter-banquet

Project Wildlife: Bisbee

By Elise Lange, Communications Manager

Project Wildlife: Bisbee is an amazing effort to certify the whole town of Bisbee as a Community Wildlife Habitat through the National Wildlife Federation, AWF's national affiliate.

This project started because residents of Bisbee, Arizona wanted to plant native plant species to support birds, bees, bats, and other pollinators whose continued survival is threatened by loss of habitat, suitable food resources, invasive plants, and increasing human development. However, they knew that one wildlife garden would not have the impact they wanted — so they decided to make the whole town of Bisbee a certified wildlife habitat!

The Arizona Wildlife Federation has partnered with Project Wildlife: Bisbee! We are incredibly excited about this project and all efforts in Arizona to develop wildlife habitats for species everywhere — especially in places where it's difficult for wildlife to find food, shelter, and secure areas for raising their young.

Project Wildlife: Bisbee's goal is that by September 2023, Bisbee will be designated as a Community Wildlife Habitat by the National Wildlife Federation. The Bisbee Bloomers, Bisbee's nonprofit gardening group that works to protect and enhance nature in Bisbee, plans to hold its Annual Garden Tour in September 2023 to celebrate the individual gardens that are certified as wildlife habitats.

This tour comes just a month before AWF's Centennial Anniversary!

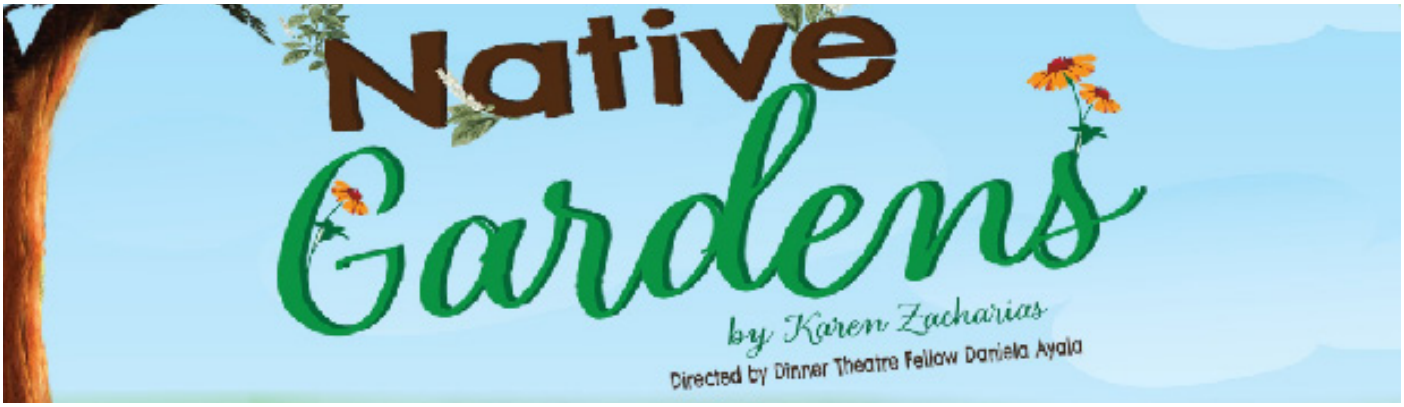
Project Wildlife: Bisbee needs your support. In order to meet their goal for the number of certified gardens to make Bisbee a Community Wildlife Habitat, they need 50 more individual property owners to garden mindfully and register their gardens with the National Wildlife Federation. The requirements:

You can certify your garden by visiting www.nwf.org/certify. If you have questions about Project Wildlife: Bisbee, you can contact them via plantnativeinbisbee@gmail.com.

Thanks to the many supporters of this project The Bisbee Observer, The City of Bisbee, Ace Hardware, The Bisbee Bloomers, The Bisbee Saturday Market, The Bisbee Science and Research Center, the National Wildlife Federation, and the Arizona Wildlife Federation.

Native Gardens: A Collaborative Theater Event

By Valerie (Val) Morrill, Board Member at Large



Earlier this year the City of Yuma kicked off a dinner theatre production, Native Gardens, in collaboration with AWF in honor of our Centennial.

The play centers on Pablo and Tania, who aim to realize the American dream when they purchase a fixer-upper next door to community stalwarts Virginia and Frank. A disagreement over a longstanding fence line soon spirals into an all-out war of taste, class, privilege, and entitlement. The hilarious results guarantee that no one comes out smelling like a rose.

As many of you may know, AWF is the affiliate sponsor of the National Wildlife Federation's Garden for Wildlife program (https://azwildlife.org/garden-for-wildlife) in Arizona. The program encourages people to support wildlife in our yards and public spaces while promoting awareness about habitat loss and the need for action.

Through our collaboration on the play, Native Gardens, we were able to promote the Garden for Wildlife program. We consulted on set design and landscape recommendations, arranged a tour of Master Gardeners' Native Plant Greenhouse for the City of Yuma staff, selected native plants for the greenhouse to grow for the stage and table décor, and consulted on the dinner menu, specialty drinks, and ingredient sourcing. We also provided an information display on Garden for Wildlife and even performed as extras in the showings!


Dinner Theatre:
Native Gardens

Menu

Bread
Smoked Mesquite Bread

Salad
House Salad with Orange
Chiltepin Vinaigrette.

Buttery Acorn Squash (Vegan)
Buttery acorn squash stuffed with charred vegetables marinated in a chiltepin and prickly pear wine bath, all over a bed of wild rice decorated with Zucchini Blossoms.

Lavender Lemon Shortbread
Buttery shortbread crust with a luscious lemon curd filling, topped with local lavender honey, blackberries and fresh mint.

Chef Juan Velasquez

Juan found inspiration for this meal from exploring the hills of Colonia with his mother as a child. That early education helped him discover the wonderful ingredients derived from native plants.

Native Gardens

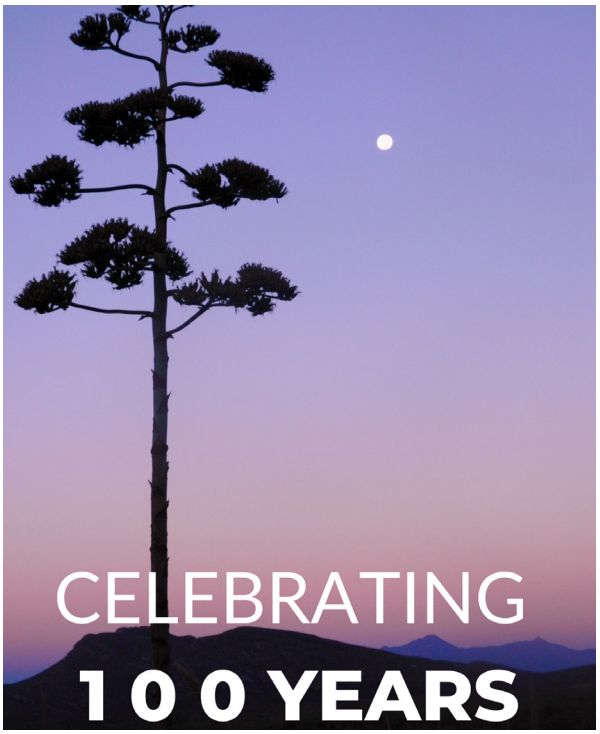
Spring 2023

Conserving Wildlife and Habitat

www.azwildlife.org

100 Years of AWF: Centennial Spotlight

By Trica Oshant Hawkins, Conservation Programs Director



Centennial Spotlights

With this spring magazine edition, we are continuing our year of celebrating our 100 year anniversary: Our Centennial! Along with a series of special events and activities, we will be sharing our amazing history with you in the form of "Centennial Spotlights" – articles on the people and events that made the Arizona Wildlife Federation what it is today. We stand on the shoulders of giants and we want to share their stories and contributions with you. These are stories worth telling and people worth remembering for what they have done not only for AWF but for Arizona wildlife. As we look ahead to our next 100 years, we honor those who laid the foundation for AWF and science-based wildlife stewardship in Arizona.

We are also continuing our "Where's Aldo?" activity, honoring Aldo Leopold, a famous conservationist who was present at AWF's first meeting in Flagstaff, Arizona in 1923. Make sure you look through our magazine again to find where he's hidden! If you find him, send an email with all the page numbers he's on to our Communications Manager at elise@azwildlife.org.

Centennial Spotlight: Charles T. Vorhies, a man who has been called "the Arizona Wildlife Federation in person."

Charles Taylor Vorhies arrived in Arizona in 1915 to serve for over 30 years in a variety of zoology-related capacities at the University of Arizona. Shortly after his arrival, Vorhies became very active in many natural history-related organizations, including a local chapter of the Game Protective Association.

In 1923, as a Tucson delegate, he attended the very first meeting of the Arizona Game Protective Association (AGPA) in Flagstaff. This seminal meeting served to officially incorporate AGPA, the organization which eventually became the Arizona Wildlife Federation. Vorhies was very active in the early work of AGPA and was one of the authors of the revised Arizona Game Code of 1928, which ultimately led to the creation of the Arizona Game and Fish Commission. He was also editor of AWF's first newsletter, the Arizona Wild Life and Sportsman.

A well-rounded scientist and naturalist, Vorhies loved Arizona wildlife and studied insects, reptiles, birds, and mammals. He understood the role of predators and prey in the ecosystem and noted numerous subtle interactions between species.

This led him to advocate for the protection and better management of many important, but often overlooked species including small mammals such as rodents, squirrels, and rabbits; birds such as masked bobwhite quail, white-winged doves, roadrunners, and hawks; and reptiles such as Gila monsters, desert tortoises, and chuckwallas. His work modeled the application of science in wildlife management!

In his later years, Vorhies became very active in the Executive Committee of the National Wildlife Federation. For all that Charles Vorhies did for the wildlife of Arizona and the AWF, we cannot let the memory of him and his work become extinct.

He is truly one of the giants upon whose shoulders we stand.

You can support the Arizona Wildlife Federation!

Order a Ranger Rick Magazine

https://azwildlife.org/ranger-rick-magazine

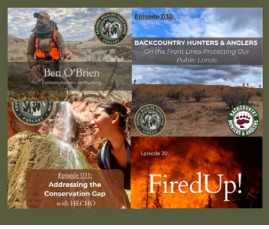
Join Becoming an Outdoors-Woman

Arizona BOW

https://azwildlife.org/BOW

Arizona Wildlife Federation Podcast

https://podcastq5.podbean.com/



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