

Mountain Lines

MAGAZINE OF THE MCDOWELL SONORAN CONSERVANCY

Fall 2017



How to Hike with Kids

The child's age matters

Bat Trapping at Dixie Mine

Studying bats to preserve them

One of the Preserve's Great Hikes

Popular Gateway Loop



FROM THE BOARD OF DIRECTORS



Paul Staker,
Interim Executive Director

While the McDowell Sonoran Conservancy Board of Directors searches for a new executive director, a position previously held by Mike Nolan, I have stepped in as the interim executive director. Since taking on this role, I've reflected upon

my involvement as a Conservancy steward over the last seven years.

My wife, Mary, and I became acquainted with the organization and Scottsdale's McDowell Sonoran Preserve during a vacation here shortly after we retired. We joined some stewards leading a public hike for the Conservancy from what would become the Gateway Trailhead. I was looking for

something to do with my new free time and becoming a volunteer steward seemed the perfect opportunity to give back while getting involved in the outdoor experiences I most enjoyed. This decision eventually led to a move to Scottsdale and, ultimately, greater involvement with all nine steward programs.

Since that time, I've been amazed by how the organization has expanded to support the significant growth in the Preserve's size, in our adult and youth education programs, and in our scientific research. As recruitment and development of new stewards are critical to our continued vitality, I became more involved in steward training at the monthly New Steward Orientation classes. Although I have assumed additional responsibilities, such as, serving on the board and acting as the interim executive director, I still consider myself as one of the more than 650 volunteer stewards who contribute time, treasure and talent to this great organization.

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On the cover: The Gateway Loop Trail in Scottsdale's McDowell Sonoran Preserve is popular for its vistas, and as a trail for a good workout. Photo by Dennis Eckel.

About Us

The McDowell Sonoran Conservancy champions the sustainability of the McDowell Sonoran Preserve for the benefit of this and future generations. As stewards, we connect the community to the Preserve through education, research, advocacy, partnerships and safe, respectful access.

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Educational Series



The McDowell Sonoran Conservancy offers free presentations starring Scottsdale's McDowell Sonoran Preserve throughout the year. See page 5 of this issue for a schedule of the 2017-2018 talks and plan to be there. Photos by Dennis Eckel.

Presenting the Sonoran Desert

By Janice Holden,
McDowell Sonoran Conservancy steward

After graduating from college, many of us begin to work full time. Shortly thereafter, or even decades later, we look for something more to do. We don't want more formal schooling, but we want to learn because something piques our interest. What is this passion that drives people—sometimes years after graduation day—to study, conduct research, become subject-matter-experts and volunteers, or to teach after working in unrelated fields? Who are these people? One answer is the stewards in the McDowell Sonoran Conservancy. They are people from all walks of life who are eager to learn and want others to share in their passion. They make it possible for the Conservancy to offer a rich and diverse education program about Scottsdale's McDowell Sonoran Preserve.

The Preserve occupies over 30,500 acres, nearly one quarter of the City of Scottsdale, and is one of the largest



The Conservancy hosts popular presentations about the Sonoran Desert's geology, flora, fauna, ecosystems, soil crust, local history, and more. Photo by Dennis Eckel.

urban preserves in the nation. It's difficult to live in the midst of such a unique desert environment and not be curious about the amazing world that surrounds us. At the very least, we need answers for our guests who arrive each winter and ask us why some saguaro have arms that grow down, or query us about the cause of a fan shaped saguaro crest.

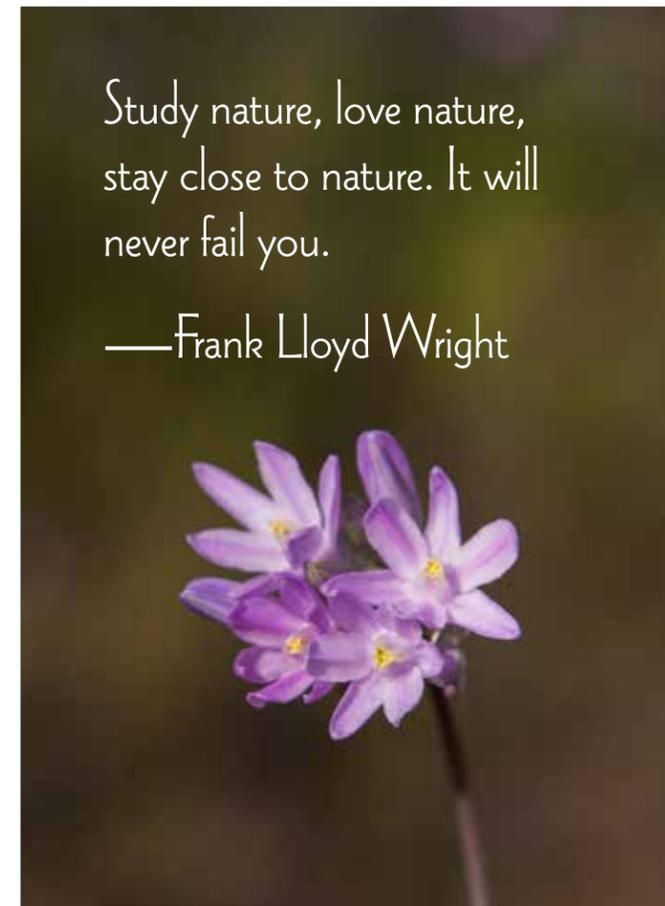
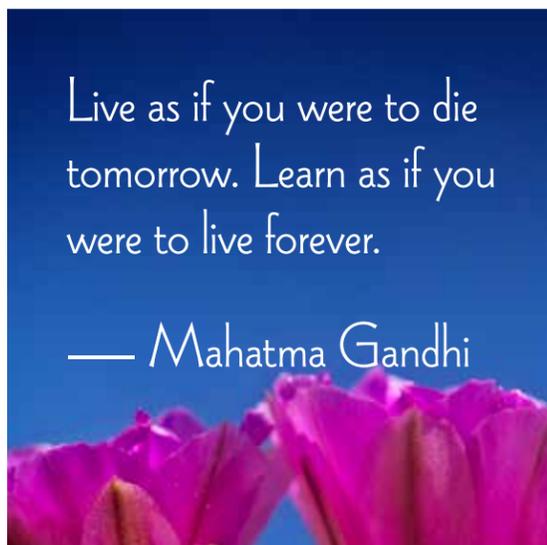
The Conservancy offers a rich series of lectures, events, Family Sonoran Sundays, the Junior Citizen Science Festival, and a multitude of hikes covering a variety of subjects designed to educate adults, children, stewards, and the public about the Preserve. Classes and events are open to the public, held on evenings and weekends, and are free of charge. Amphitheaters at Preserve trailheads and interpretative trails are the site for many of these events. Scottsdale Mustang Public Library auditorium is the

site for many of the classes. Three Natural History classes given at the library explain the geology, ecology, and desert surfaces of the Sonoran Desert in ways that are fun and easy to understand. An ethnobotany class explores ways in which earlier inhabitants used plants to thrive in the desert. For those who attend the lectures, there are corresponding field

study hikes in the Preserve that bring the lectures alive through an on-site experience in learning and observing what was described in class.

You don't have to be a scientist to enjoy learning about rocks and lichen. Two inspiring lectures, "Secrets of the Landscape" and "Rust, Dust and Crust", reveal the history about the ground beneath our feet, while "Birds, Bees, Flowers and Trees" introduces us to the prolific life of the desert flora and fauna. Ethnobotany's "Surviving and Thriving in the Sonoran Desert" teaches us how desert people, who lived here before us used plants to sustain themselves.

The second, bi-annual Science Symposium hosted by the McDowell Sonoran Conservancy Field Institute will be held in early 2018. Launched two years ago, it received accolades for its content and excellent presentations.



The semi-annual two-day Junior Citizen Science Fair in Nov 2017 and Mar 2018 are wonderful opportunities to introduce and engage young learners to the wonders of the Preserve.

Some of the most popular classes focus on the rich human history of the McDowell Mountains. You do not need to be a history buff to appreciate them. A two-part class, "Bizarre Human History of the McDowells", reveals military blunders of the past, miner and rancher misdeeds, and the unique contributions of some famous women. The Conservancy's Pastfinder Program presents a monthly series of lectures about local history. The talks bring the glories of the past to life in entertaining and meaningful ways.

For those who want more education outdoors, there are over 45 guided discovery hikes that will uncover rich stories concerning the trails, and nearly 30 wellness hikes—from easy to difficult—that take hiking to new heights! To learn about our current calendar of classes and events, visit our website at www.mcdowellsonoran.org.

Successful lectures depend not only on great material but on presenters to make it engaging. An entertaining speaker can make the driest desert topic fun! Who are they and why do they teach? Four of the Conservancy's lecturers offered up their experiences.

McDowell Sonoran Conservancy Education Series 2017-2018

Secrets of the Landscape

Oct. 7, 2017 10:30 a.m.—12:00 p.m.
Jan. 21, 2018 1:30 p.m.—3:00 p.m.

Sonoran Desert rocks reveal an amazing story about the world in which they were formed. Learn about the forces that created the Preserve and how the landscape changed over geologic time.

The Birds, Bees, Flowers and Trees

Oct. 21, 2017 and Feb. 3, 2018 8:00 a.m.—12:00 p.m.

A hands-on session to help you distinguish identifying features of the desert's plants. Then visit Toad Hall at Scottsdale Community College Center for Native and Urban Wildlife, to meet some of our native Sonoran Desert animals.

Junior Citizen Science Festival

Nov. 3 and Nov. 4, 2017 9:00 a.m.—2:00 p.m.
Mar. 2 and Mar. 3, 2018 9:00 a.m.—2:00 p.m.

Designed for elementary grade students, this science-made-fun event introduces the Sonoran Desert. From live raptors to native flora, students learn about plants, animals, the Preserve's geology and human history. Inspired by the beauty of nature, they learn to preserve and protect our fragile desert ecosystem.

Rust, Dust and Crust

Nov. 4, 2017 and Mar. 3, 2018 1:00 p.m.—3:30 p.m.

The desert's surface beneath your feet is full of life in the form of soil crust, lichen and desert varnish. We'll explore these life forms and how they enrich and protect the desert surface.

✂ Cut here for future reference. Continued on next page

Education Series 2017-2018

CONTINUED

The Bizarre Human History of The McDowells

Part I Nov. 18, 2017 1:00 p.m.—3:00 p.m.

Part II Feb. 24, 2018 1:00 p.m.—3:00 p.m

Part I: The Early Americans, Miners, Ranchers and the Wild Women of the West, The McDowells!

Part II: The Military, Murders, Wild Fires, Plane Crashes and More, The McDowells!

The McDowell Mountains feature a peculiar past of plane crashes, ghosts, murders and wildfires. Learn about the unusual and sometimes tragic history that befell these mysterious McDowell Mountains.

Ethnobotany

Dec. 2, 2017 1:00 p.m.—3:00 p.m.

Mar. 31, 2018 1:00 p.m.—3:00 p.m.

Surviving and Thriving in the Sonoran Desert

People of the Sonoran Desert thrived in the harsh environment. Learn how they used plants to sustain themselves, and about the gathering and processing procedures of many essential desert plants.

All lectures are free to the public. Registration is not required. Corresponding field hikes in the Preserve are offered to all who attend class.

Dates and times are subject to change. For locations and updates please log onto www.mcdowellsonoran.org and scroll down to Events.

“I am a passionate speaker about ecology and conservation because I love learning and helping others learn. For me, there is that moment of connection when a person grasps a concept for the first time. I feel honored if I have inspired that,” offered Melanie Tluczek, former Field Institute manager.

“It was easy for me to move from a long career as a management consultant to educator,” explained Dan Gruber, legacy steward. “Virtually all consulting is a form of education—persuading clients about what needs to be done, why, and how best to do it. In my view, I’ve been an educator for decades. Now I’m teaching science-related topics—as I expected to do when I was young. It just it took a bit longer for me to get there.”

Jacques Giard, design professor at Arizona State University and master steward, says it this way. “Teaching is all about discovery and sharing what is discovered with others. This is why I’ve always considered teaching to be a journey, one that I share with my fellow explorers. At ASU, they are my students; in the Conservancy, they are my fellow stewards, and anyone with a desire to learn.”

“It has been my experience that our best presenters speak about subjects related either to their vocational or avocational interests,” says Len Marcisz, legacy steward and Arizona Historical Society former president. “As I observe these exceptional individuals, it strikes me that they have three qualities in common—a lifelong desire to acquire knowledge, a love of people, and a desire to build things through the sharing of knowledge.”



Family Sonoran Sundays occur throughout the cooler months at various trailheads. Check our website at mcdowellsonoranconservancy.org for dates and locations. Photo by Lynne Russell.



Educational hikes led by experts in various subjects occur from October through April. Consult our web page at www.mcdowellsonoran.org for details and dates. Photo by Dennis Eckel.

Take Your Kid Hiking-Really!

By Laurie B. Jones,
McDowell Sonoran Conservancy lead steward

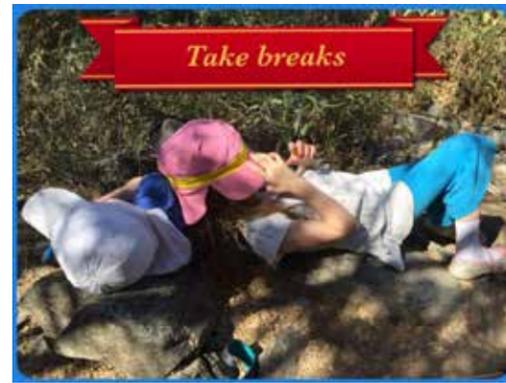
An adult walking with two children is the graphic on the McDowell Sonoran Conservancy logo, and a growing offering of Conservancy activities is attracting children and families. A new Family Hikes Program paired with interpretive trailside stations was developed last season by the McDowell Sonoran Conservancy Women's Program to promote love of our desert animals, birds, plant adaptations, and medicinal plants. Capacity crowds turned out at the events for children aged six years and older with an accompanying adult.

Child centered activities in Scottsdale's McDowell Sonoran Preserve yield many benefits to the adults, the children, and the community. Children who spend time outdoors in unstructured play and exploration develop creative thinking skills, and are more likely to maintain a healthy body. Adults enjoy passing on their hobbies and interests to the next generation. The Preserve benefits by connecting with more people. The children will grow up to be future voters and

conservationists to protect our great local treasure.

Children are curious scientists by their nature and you just have to slow down to their pace to see the world around you in a new light. Many adult caregivers are afraid to take small children hiking because of the risk of sun exposure, possible tantrums, cactus collisions, and the children's lack of trail etiquette. Some believe they should wait until a child is older. However, the opposite is true if you know your child well, and choose your hike or bike trail carefully. Early, frequent exposure to trails teaches respect for rules, and a few simple packing practices can help avoid over-heating, fatigue, or a bad case of the grumps.

There are three fundamental kid-friendly hiking principles: (1) Preparation: Use sun protective attire and sunscreen, and bring accessories, food, and water. (2) Age-appropriate goals: Consider the length and difficulty of the hike. Take rest stops, and consider carrying vs. walking. Finally (3) Reward:



When you see signs of fatigue, find a shady place to rest, take a drink and eat a snack. Photo by Laurie B. Jones.

Use enticement and anticipation prior to the hike, and invite one of the child's friends.

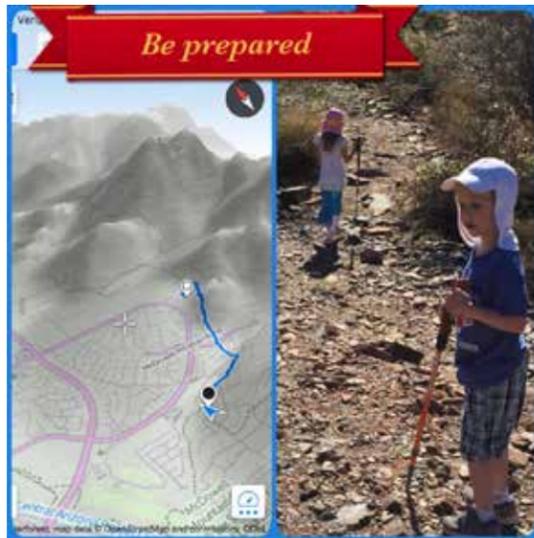
A few more simple tips for enjoying the Preserve with children include:

- Go at the pace of the child—never push them.
- Be in tune with their napping and feeding routines.
- Turn around if the child's behavior deteriorates.
- Give small rewards along the way.
- One bad hiking experience can sour a child, so choose trail length carefully.
- Print pictures from the hike afterwards for show and tell.

Learn more at our free talk about hiking with kids presented at the Mustang Library on both October 5, 2017 and January 11, 2018 from 6:30 p.m. to 7:30 p.m.



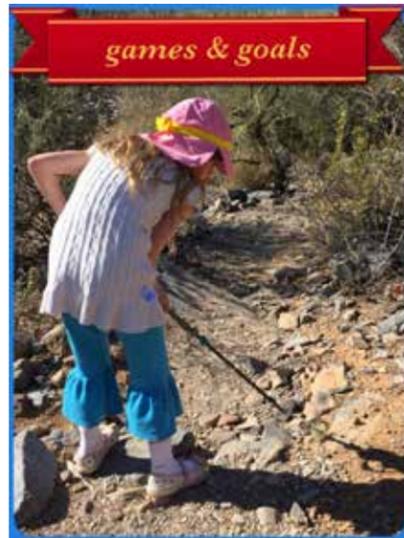
The Preserve contains three interpretive trails—Bajada Nature Trail, the Jane Rau Nature Trail, and the Kovach Family Nature Trail. Interpretive signs and smooth trail surfaces that accommodate strollers might be just right for introducing younger children to the Preserve. Benches are scattered along the trails too. Photo by Laurie B. Jones



Plan an age appropriate hike before you get to the Preserve. Be sure to protect the kids from the sun, and give them proper hiking gear. You should carry plenty of water and snacks. Photo by Laurie B. Jones.



Proper hiking gear can be fun and functional at the same time. Make sure the kids have good footwear that protects them as well as keeps them comfortable. Photo by Laurie B. Jones.



Playing games and completing reasonable goals is fun and keeps the kids engaged. Let the kids set their own pace and explore along the way. Photo by Laurie B. Jones

Junior Citizen Science Festival Rises to the Challenge

By McDowell Sonoran Conservancy staff

The next generation requires the knowledge and skills to achieve career success, and to meet the pressing environmental challenges of our day. Studies show that children gain huge academic and developmental benefits from spending time and learning in an outdoor, natural environment. However, urban children are increasingly disconnected from nature and spend more time indoors. Re-engaging them with nature and igniting the flame of scientific curiosity is a chal-

lenge for the twenty-first century.

The McDowell Sonoran Conservancy is meeting this challenge head-on. For the past two years, the Conservancy has hosted a Junior Citizen Science Festival in conjunction with the Arizona SciTech Festival. The purpose is to get young people outdoors and into Scottsdale's McDowell Sonoran Preserve, to learn about the Sonoran Desert in a fun, festival like atmosphere that also utilizes STEM (Science, Technology,



A volunteer talks to young visitors interested in rocks at one of the displays at the Junior Citizen Science Festival in spring 2017. This table was only one of many tables that displayed items from the Sonoran Desert. Such displays are always part of the festivals. Photo by Lynne Russell.



What is it, and what's that stuff inside? These questions and many others get answered at the Junior Citizen Science Festival. Photo by Dennis Eckel.

Engineering and Mathematics) lesson plans. In the coming twelve months, two Junior Citizen Science Festivals are planned, each spanning two days, making it possible for four times the number of children to participate. The events, which feature interactive booths and displays, are geared toward providing elementary school aged children with a hands-on STEM education experience specific to the Sonoran Desert biology, ecology and history. The expansion of the festival is made possible by generous gifts from Cox Communications, the Charro Foundation, and strong support from the City of Scottsdale.

The two-day festivals are scheduled for November 3 and 4, 2017 and March 2 and 3, 2018. Both will be held at Lost Dog Trailhead in the Preserve. Booths and displays will include live birds and other animals, as well as flora, fauna, geology and desert ecology displays.

"We've had an amazing response from the children, teachers, parents, the City of Scottsdale, our sponsors, and our steward volunteers," explained



A great horned owl, brought by Liberty Wildlife, was one of many animals on view at the spring 2017 Junior Citizen Science Festival. Visitors can expect to see a variety of wildlife at future festivals. Photo by Dennis Eckel.

Dr. Helen Rowe, director of the McDowell Sonoran Conservancy Field Institute. One fourth grade child wrote afterward, "I am so joyful that I got to go on a hike with you and my friends. I think I speak for everyone when I say we had a blast! I cannot wait to tell everybody all of the cool stuff I learned."

The events were originally conceived to provide a desert experience for children in Title 1 schools—those schools with a high proportion of low income students. In partnership with the City of Scottsdale, the Scottsdale Unified School District, and Playworks Arizona, children from those schools were bused to the Preserve for the event.

"We also welcomed walk-up participants and children from any

school," explained Don Brockway, a lead steward who helped plan and implement a large part of the festival. "What we found however, was that with a finite amount of space available at the trailhead, and with the large number of teachers, students, and parents who wanted to enjoy the festival, we were simply running out of room!" As a result, the Festival was expanded to two days, with the Friday date devoted to school groups, and the Saturday date for families, Boy and Girl Scouts, the Boys and Girls Clubs, and other self-guided groups.

"We are proud that we will be able to reach so many more children," Rowe explained. "And we want them to be able to see everything they want to see without being rushed or crowded."

"The festivals are a huge under-

taking in terms of both preparation and execution," Rowe continued. "In addition to the experience the children get from the events, our volunteers, city staff, and sponsors tell us it is a highly rewarding experience for them as well, giving them a chance to share their knowledge, and learn some new things along the way." 🦉

If you are a teacher, troop leader, club leader, or parent who would like to participate, please look for "Junior Citizen Science Festival" on Eventbrite, or contact Conservancy staff at jcsfinfo@mcdowellsonoran.org or 480-998-7971 x 105.

Scottsdale's Preserve Trailheads - from Vision to Reality

By Scott Hamilton,
City of Scottsdale Preserve planner

The City of Scottsdale, in partnership with the McDowell Sonoran Conservancy, manages Scottsdale's McDowell Sonoran Preserve according to a set of management objectives that are detailed in Chapter 21 of the Scottsdale Revised Code. These objectives can be divided into two primary categories: protecting the natural and cultural resources of the Preserve, and providing public recreational access to the Preserve. At first read, these goals might seem to be contradictory, but through long-range visioning, thoughtful planning, and steadfast community involvement, we have been able to achieve a healthy balance.

Following creation of the Preserve in the late 1990's, efforts began to plan public access to the Preserve. The focus was on providing appropriate recreational access for the people who approved taxing themselves to create it, while also ensuring the natural and cultural elements were protected. Specifically, the goal was to achieve the management objective from Chapter 21 which reads "provide enough access areas of sufficient size and with

adequate amenities for appropriate public access."

The McDowell Sonoran Preserve Commission and its planning subcommittee worked tirelessly with city staff to identify areas around the Preserve perimeter where trailheads would be needed and appropriate. A major guiding principle was to strategically locate trailheads to disperse public

usage, so no single trailhead is overburdened.

The group's efforts resulted in the document, "Scottsdale McDowell Sonoran Preserve Access Areas Report," which was approved by the Preserve Commission in 1999. An additional document was prepared establishing design standards for the trailheads. This document, "Access Area Design and



The sunset highlights the trailhead building nestled in the desert at Gateway Trailhead. Photo by Chris Brown.

Site Standards," has the stated mission of "developing environmentally responsible public access areas that borrow from and blend into the natural desert landforms and landscape of each specific Preserve access location."

Since the beginning, these documents have served as the foundation for the detailed planning and design of all the trailheads constructed to date, including Sunrise, Lost Dog Wash, Gateway, Tom's Thumb, and Brown's Ranch. They will continue to serve as the foundation for trailhead planning as we move forward with the conceptual design of the permanent improvements at the Fraesfield and Granite Mountain Trailheads, and for the Pima and Dynamite Trailhead.

For a trailhead to evolve from a vision to an on-the-ground reality, there are several additional steps that must take place, beginning with the authorization of funding. City staff prepares an estimate for the total cost of design and construction, and presents a request to the City Council as part of the annual Capital Improvement Project budget. The design and construction of Preserve trailheads is funded primarily by the 2004 Preserve sales tax, which is dedicated to land acquisition and capital improvements such as trailheads.

The next step is to hire the project design team which includes architects, landscape architects, and engineers. A Request for Proposals is issued which includes a description of the project and a series of questions on how the team would approach the project design. A diverse group of city staff reviews and ranks the proposals that are submitted. Once a firm has been selected, contract negotiations occur, which culminates in the City Council



Members of the public attend an open house hosted by the City of Scottsdale. The meeting presents the plans for a proposed trailhead, and city staff record comments given at the meetings. The staff carefully considers the comments with the goal of improving the trailhead plan. Photo courtesy of the City of Scottsdale.

considering approval of a design contract.

Upon contract approval by the City Council, the design team begins creating a concept design that meets the goals identified in the "Access Areas Report," and the "Access Area Design and Site Standards." The team works closely with city staff, the executive director of the Conservancy, and lead stewards to identify the needs of the project, and to review previous projects to identify what worked well, and what could be improved in the new design. Significant effort also goes into assuring the design is sensitive to the site on which it will be constructed, and to the nearby neighborhoods. The team studies the physical characteristics of the site, such as the drainage, vegetation, sensitive animal habitats, and views to and from the site.

The conceptual plan is then presented to the public for review and feedback. This is a critical step in the process. The public's input into the design of the trailheads is of utmost importance because these facilities

give them access to the Preserve they taxed themselves to create. Input is gathered through various means, including open houses where the community can review the plans, ask questions, and provide feedback. Digital technology is also used, where citizens can review the plans online and provide input via email or web-based comment forms. Plans are also presented to the McDowell Sonoran Preserve Commission for review and comment. This group is comprised of seven Scottsdale residents appointed by the City Council to provide recommendations on items related to the Preserve.

The design then goes through the Municipal Use Master Site Plan process. This formal process entails review and approval of the plans by the Planning Commission, Development Review Board, and City Council. These are all public meetings where the public can attend and provide comments. Once the site plan is approved, detailed construction drawings are completed, and a construction

contractor is chosen through a competitive process. The City Council is then asked to consider approval of the construction contract. Now, construction can begin.

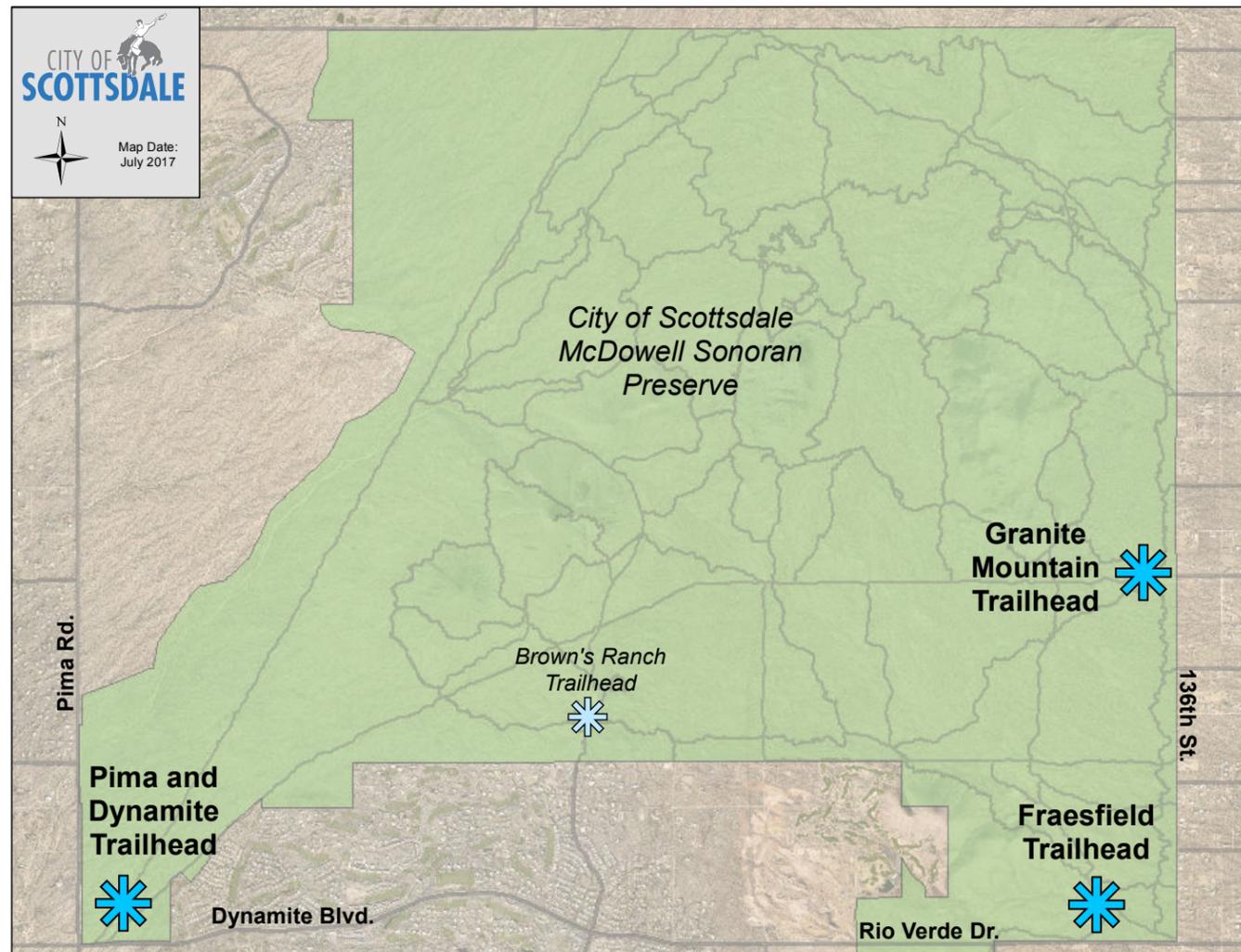
There are three trailheads currently in various stages of the design process—the Fraesfield, Granite Mountain, and Pima and Dynamite Trailheads. The Fraesfield and Granite Mountain Trailheads are synchronized as one project that includes two sites, and the Pima and Dynamite project is separate.

The Fraesfield and Granite Mountain Trailheads are located along

the eastern edge of the northern region of the Preserve. Fraesfield is accessed from Rio Verde Drive at the 134 Street alignment, and Granite Mountain is on 136 Street, two miles north of Rio Verde Drive. They will be similar in size and amenities to the Lost Dog Wash and Tom's Thumb Trailheads, with improvements to include restrooms, passenger vehicle parking, equestrian trailer parking and staging areas, regulatory and interpretive signage, shaded seating areas, drinking fountains (Fraesfield only), and storage areas for maintenance supplies. The needs of the Conservancy are also being considered,

including display and presentation areas designed to maximize visitor exposure, and room for storage of supplies. Conceptual planning occurred for these trailheads in 2016 and early 2017, with the Municipal Use Master Site Plan process occurring in the late summer and early fall of 2017.

The Pima and Dynamite Trailhead will be located on the northeast corner of Pima Road and Dynamite Boulevard with access from both roads. Its proposed size and amenities are on par with the Brown's Ranch Trailhead, but due to the expected popularity, the parking will be a bit larger. The site will



This map shows the existing Brown's Ranch Trailhead, and the location of future trailheads in the northern Preserve. Map courtesy of the City of Scottsdale.



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Cox is proud to partner with the McDowell Sonoran Conservancy as a Presenting Sponsor for the Junior Citizen Science Festival

include restrooms, parking for passenger vehicles and horse trailers, equestrian staging, shaded seating areas, regulatory and informational signage, water for humans, dogs, and horses, an office for city staff, and a small shaded educational amphitheater. The needs of the Conservancy are also being considered here. Conceptual design began in the summer of 2017, with the Municipal Use Master Site Plan process to occur in the fall of 2017.

Construction of all three of these trailheads—Granite Mountain, Fraesfield, and Pima and Dynamite, is expected to begin in 2018, with completion in 2019. For up to date information, please visit the City of Scottsdale website at www.scottsdaleaz.gov and search for "Preserve." You can also contact me directly at 480-312-7722, or email me at Shamilton@scottsdaleAZ.gov. I look forward to your input on the trailhead designs, and hope to see you on the trail! 🦋



The rendering shows what the Fraesfield Trailhead (on the left) and Granite Mountain Trailhead (on the right) will look like after construction is complete. It includes the trailhead building, paths and parking. Graphics courtesy of the City of Scottsdale.



There are many great vistas along Gateway Loop Trail. Look carefully at this photograph to see Tom's Thumb visible in the distance. Photo by Dennis Eckel.

Great Hikes in the Preserve: Gateway Loop Trail

By Doug Jabour,
McDowell Sonoran Conservancy lead steward

If you are looking for a hike that offers a great workout with expansive views of the McDowell Mountains along with some intriguing history, then the Gateway Loop Trail in Scottsdale's McDowell Sonoran Preserve is the hike for you. Some north Scottsdale residents enjoy the hike so much that they do it several times a week!

The McDowells are a very rich geological area which consists of 1.65 billion-year old metamorphic rock. It is very hard, fine grained rock which breaks down slowly to become fine dirt.

There is quite a variety of vegetation along the trail. Arizona spikemoss grows in this area on the north facing side where it is much shadier and cooler. This plant changes from a dead looking mass of brown twigs to a healthy green plant shortly after a rainfall. On the much hotter south facing side, there is an abundance of bursage and brittlebush. Cacti such as saguaro, teddy bear cholla, and buckhorn cholla are found along the entire trail.



Look for Arizona spikemoss (*Selaginella arizonica*) growing in rock crevices along the shady slopes of Gateway Loop Trail. During dry times, the plant is brown with tightly curled leaves. After rainfall, the leaves uncurl and turn green. Photos by Marianne S. Jensen.

Let's Go Hiking!

The Gateway Trailhead which opened in May 2009 is the starting point for this hike. If you are visiting the trailhead during the morning from October to May, you may be greeted by trailhead hosts who can provide you with information on the trails and answer your questions.

The hike is a 4.5-mile round trip with an elevation gain of over 800 feet. After leaving the trailhead, take Saguaro Trail over the bridge to arrive at the junction of the Bajada Nature Trail. Continue on Saguaro Trail for a short distance until you reach Gateway Loop Trail. This trail can be hiked in either direction, although a clockwise hike provides more expansive views. Proceeding clockwise, you quickly reach the Horseshoe Trail.

Gateway Loop Trail now becomes steeper and rockier as you climb to the junction of Windgate Pass Trail. Tom's Thumb will be visible to the north. Turn right at the junction and continue on Gateway Loop Trail until you reach Gateway Saddle, the high point on the hike at 2,375 feet. The saddle is a good spot to rest and have a drink or snack while enjoying the views. From this spot, you can see Thompson Peak to the east and Camelback Mountain to the southwest.

Leaving the saddle, you descend quickly to the junction of Bell Pass Trail. Look toward the southeast; you will see the remnants of an old mine. An article in the May 27, 1914 issue of the Arizona Gazette indicated that a rich ledge of gold bearing ore had been found there, and a subsequent article stated that the mine promised to be the richest ever discovered in Arizona. However, according to historians, while



Gateway Trailhead is the start of many destinations. It contains this scenic bridge which spans a wide wash. Photo by Dennis Eckel.

the Paradise Gold Mining Company was allowed to sell shares in the mine, no records exist of any gold having been produced. There was, however, no evidence of fraud found in the public records either. In March 1997, there was a rescue from the mine when a man who rappelled into it realized he was too tired to climb out. The rescue

made the national news.

After the junction of the Bell Pass Trail, there is a long, gradual descent to the Saguaro Trail which takes you back to the trailhead. If you have time, consider walking the Bajada Nature Trail, the Preserve's first, fully accessible interpretative trail. 🦋

Gateway Loop Trail is smooth in some parts and rugged in others. But the continuous great views are a constant. Photo by Dennis Eckel.



The lush plant life along the Gateway Loop Trail combines with lovely vistas to make this one of the most popular trails in Scottsdale's McDowell Sonoran Preserve. Photo by Dennis Eckel.



The Gateway Loop Trail brings a pair of hikers to a beautiful location in the Preserve interior. Photo by Dennis Eckel.



Bats Mean a Healthy Ecosystem

By Ronald Mixan and Joel Diamond,
Arizona Game and Fish Department

Arizona provides habitat for 28 bat species. This diversity is second only to Texas, and represents the highest endemism of any state. Endemism means that a species is unique to a place. Bats possess an amazing array of roosting, foraging and behavioral habits that play important roles in maintaining a functioning ecosystem in the desert southwest. Bats utilize caves, crevices, abandoned mines, buildings, bridges, and trees as roosting sites. Arizona bats contribute significantly to insect control, seed dispersal, and pollination across the landscape. However, many bat species appear to be declining due to habitat loss, exotic disease, disturbance, and mortalities at wind energy facilities. There are also myths about disease that surround bats that can contribute to negative public sentiments that need to be corrected. In order to manage bat populations for persistence, the Arizona Game and Fish Department creates and protects habitat, monitors disease, and limits disturbance to bats. An example of this bat management can be seen in collaboration among the Game and Fish Department, the McDowell Sonoran Conservancy Field Institute and the city of Scottsdale. Together we are monitoring bat populations, and

installing wildlife friendly gates on several abandoned mines located in Scottsdale's McDowell Sonoran Preserve to ensure bat habitat is conserved for future generations.

Bats eat a variety of insects including agricultural pests, mosquitoes, and even scorpions. Researchers have estimated that certain species of bats can consume between 70 to over 100 percent of their body weight in insects at peak times of energy expenditures, such as when females are nursing young. Millions of Mexican free-tailed bats migrate in extremely large numbers from Mexico to the southwestern United States in spring-time, and roost in abandoned mines, caves, and bridges in Arizona. It is not unheard of for this species to roost in numbers of over 20 million bats in a single roost, such as Bracken Cave near San Antonio, Texas. This cave is home to the largest concentration of mammals on earth. They emerge from their day roosts in large enough



Bats in a Mexican free-tailed bat colony crowd together. Photo by George Andrejko, Arizona Game and Fish Department.

numbers that they can be detected by Doppler weather radar. Estimates for the nightly insect consumption for a colony of one million Mexican free-tailed bats is 8.4 metric tons, providing an essential service to the ecosystem. This nightly insect consumption reduces agricultural pests, insects carrying potential human health risks, and has the potential to reduce the use of pesticides in agricultural areas benefitting farmers and the general public. The majority of insects consumed by Mexican free-tailed bats are moths that are known to be destructive agricultural pests for cotton, corn and alfalfa crops. Some of these agricultural pests migrate through the southwest to the southern and central United States. Therefore,



Bats in a Mexican free-tailed bat colony rest together during the day hours. Photo by George Andrejko, Arizona Game and Fish Department.

Mexican free-tailed bats are limiting pests, and benefitting farmers in other parts of the country. Other studies have noted that a modest colony of 150 big brown bats, which inhabit Arizona and can be found in urban areas, can consume hundreds of thousands of stinkbugs annually, which is just good for everybody. Bats occasionally serve as a source of food for owls, snakes, and ring-tailed cats.

Bats also help pollinate and disperse seeds for cacti and agave plants in the southwest and Mexico. Lesser long-nosed bats migrate to southern Arizona in spring following the bloom of columnar cacti north from Mexico, and feed on flowers and fruit of organ pipe and saguaro cacti. In late summer and early fall, they feed on and pollinate agaves before migrating south again. Bats in Mexico are also important pollinators for the agave species that produce tequila and mescal, thus they are extremely important. Other species in Arizona that pollinate cacti and agave are Mexican long-tongued bats and pallid bats.

Lesser long-nosed bats can be attracted to your home if you live in southern Arizona. They readily feed at

hummingbird feeders and can drain a full feeder in a single night. Bat houses are also a simple way to attract these insect annihilators to your yard. Houses or plans to build bat houses can be found at <http://batmanagement.com/> or elsewhere on the Internet, and building them is relatively inexpensive. If you're going to install a bat house in your yard, there are some things to consider: place the box at least 12 feet high on the north or east side of your house so it only gets morning sun; paint the house a light color; and make sure there is no clutter or tree branches around it so the bats have an obstacle free approach. Bats will need to find their new home, so be patient, and hopefully you'll have some helpful new neighbors moving in.

If attracting bats to your home does not appeal to you, and you would rather view bats at a distance from your residence, there are several opportunities in Phoenix. One bat roost that is easy to observe is a colony of Mexican free-tailed bats located in Phoenix in a Maricopa county flood control tunnel that runs from 40 Street and Camelback Road to 24 Street north of Camelback Road.

In summer months, the colony reaches 10,000 bats, and it's estimated they consume 2,000 pounds of insects per night. Best times for viewing them are June through August, but bats can also be seen as early as March and as late as October. For directions to watch the emergence, you can visit bat watching opportunities on the Arizona Game and Fish website. The Arizona Game and Fish Department also conducts watchable wildlife workshops where the public can join biologists in capturing and identifying local bat species.

There are myths about bats and disease (particularly rabies) that have been perpetuated through misinformation that need to be corrected. While bats can carry rabies, only 0.5 percent



Scientists record observational data from this captured, then released, pallid bat during a bat survey. Photo by George Andrejko, Arizona Game and Fish Department.

may contract the virus in their lifetime, and only one to two cases of transmission to humans in the United States are reported annually. This means if you're living in the United States, you are more likely to contract leprosy or

the black plague than rabies from a bat in a given year. With this said, precaution should always be taken if you do encounter a bat on the ground or in your house. Call a wildlife professional, such as the Arizona Game and Fish Department, to remove the bat. If you absolutely must, handle the bat with gloves, as rabies is almost always transmitted through being bitten, and grounded bats are obviously not well. Bats in the eastern and midwestern United States are also facing added pressure from white-nosed syndrome (WNS), a fungal infection of the

skin that causes bats to arouse from hibernation in midwinter, and burn through key energy reserves, leading to large mortality events. WNS has spread as far west as Washington state with a recent detection in Texas, but has not yet been detected in Arizona. Migratory species such as Mexican long-tongued, hoary, and silver-haired bats face threats from collisions at wind energy facilities. It has been estimated that these facilities have led to the mortality of hundreds of thousands of bats.

Bats face a multitude of pressures

on their survival from diseases such as White-nosed syndrome, human disturbance to important roosting sites, collisions at wind energy facilities, chemical pollution, and urbanization. But organizations, such as the McDowell Sonoran Conservancy Field Institute, Arizona Game and Fish Department, and Bat Conservation International, other non-governmental organizations, and state and federal agencies are working to change this, and to educate the public on the importance of bats to a healthy ecosystem. 🦇

Bat trapping allows scientists at Arizona Game and Fish Department to monitor the health of bats. This is a photo of a lesser long-nosed bat. Photo by Ronald Mixan, Arizona Game and Fish Department.



A rich mixture of desert plants grows along the Gateway Loop Trail. Photo by Dennis Eckel.



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Going Batty at Dixie Mine

By Debbie Langenfeld,
McDowell Sonoran Conservancy Field Institute certified citizen scientist

It's a hot summer night and the bats in the Dixie Mine wait for sunset to leave their cavern for their nightly excursion in search of an evening meal. But on this night their normal exit route will have a few new obstacles as they fly out. Just a quarter of a mile away, a group of researchers are preparing to disrupt the bats' normal existence.

Who are these researchers and why are they at the Dixie Mine? In 2016, the McDowell Sonoran Conservancy Field Institute, in partnership with Northern Arizona University (NAU), Arizona State University (ASU), and Arizona Game and Fish Department (AZGFD), initiated a study about bats in the mine adjacent to Scottsdale's McDowell Sonoran Preserve. The purpose of the ongoing study is to understand bat diversity and habitat requirements. The Dixie Mine area was selected for the study's initial focus because data exists from previous bat studies carried out there in the 1990s. "The importance of this roosting site cannot be understated," according to Marianne Moore, ASU Assistant Professor. "There are very few easily accessible sites in Arizona where numerous bats can be monitored."

The goal of the study is to survey bats and determine their habitat use within the Dixie Mine and its surrounding area. Several surveys were



This photograph of a Pale Townsend's big-eared bat, captured at a Dixie Mine survey in 2016, clearly shows where it gets its name. Photo by Dwight Keller.

conducted throughout the summer in 2016 and 2017 as summer is when species richness and abundance of individuals is greatest. Three methods were employed to collect data—exit counts, ultrasonic monitoring, and harp trapping.

Experienced researchers and Conservancy Field Institute citizen scientists trained in relevant techniques

initially performed the exit counts. Observers, using night vision equipment and infrared lights, sat quietly in front of the mine entrance and manually counted bats as they left the mine. In 2017, an infrared video camera replaced the human observers to minimize disruptions. Also, an ultrasonic monitoring detector, placed at a quiet location near the mine site, recorded



The harp trap, set up at the entrance to the Dixie Mine, allows researchers to trap bats without harm to the bats. Photo by Dwight Keller.

bat echolocation calls. Monitoring protocol dictated starting the count and acoustic recordings thirty minutes prior to sunset and continuing for two hours after sunset.

Moore, a qualified bat handler, oversaw the captures. A harp trap, the gentlest and safest known bat-trapping device, was set up at the mine entrance. Once captured, species, sex, relative age (juvenile, adult), and reproductive status were recorded. Bats were weighed to the nearest gram and the length of the forearm was measured. Wing damage and any other signs of injury or health status were noted. The bats were then safely released to proceed with their nightly hunt. During the last survey, samples were collected to test for presence of the white-nose syndrome fungus, *Pseudogymnoascus destructans*, on bats by gently wiping a swab across the wing and muzzle.

Overhead sightings and acoustic detection indicate that there is bat



Shining a light through the membrane of a bat's wing allows researchers to exam it. The condition of a bat's wing is one good indicator of a bat's health. Photo by Dwight Keller

activity around the Dixie Mine and throughout the wash leading to the mine. Results of multiple exit counts at the mine entrance suggest it is a



Dr. Marianne Moore, experienced bat handler and researcher, prepares to weigh a bat captured at the Dixie Mine in 2016. The recorded data will help researchers evaluate the health of the Dixie Mine bat population. Photo by Dwight Keller.

viable roosting site. Three species have been captured so far—Pale Townsend's big-eared bat (*Corynorhinus townsendii pallascens*), cave myotis (*Myotis velifer*) and canyon bat (*Parastrellus hesperus*), also known as western pipistrelle. With few known roosting sites for Pale Townsend's big-eared bats in Arizona, this site is an extremely important indicator for population stability.

There are still many questions to be answered. Which species use the mine, and for what purpose? Is it a maternity roost, interim roost, night roost, or hibernacula (a shelter for a hibernating bat)? What can we do to protect and enhance the habitat? Which direction should future research take? Ultimately, the research will result in a bat monitoring and management plan to guide bat research, management, and conservation efforts in the McDowell Mountains. So, stay tuned!



White-nose Syndrome: A Deadly Disease for Bats

By Marianne Moore, Ph.D.,
Arizona State University assistant professor



A bat, captured in the Preserve, is tested for the deadly white nose syndrome before being released. Photo by Dwight Keller.

Around Valentine's Day 2007, a phone call from the New York State Department of Environmental Conservation to my Ph.D. advisor at Boston University, Dr. Tom Kunz, alerted us to unusual bat mortality occurring in New York hibernacula (caves and mines where bats roost during winter). Soon after, I was donned in a Tyvec suit, double layers of nitrile gloves, a full face mask, and duct tape to secure all openings. After getting properly protected, I was sent to rappel along an ice sheet into a seemingly bottomless pit leading to darkness and dying bats.

The deaths we investigated underground were the result of a newly introduced bat fungal disease now called white-nose syndrome (WNS) that has, at most recent estimate, killed more than seven million North American bats. If you live in or visit the east, you may recognize the effects of WNS by observing how few bats are in the evening sky, a time of day when there would normally be a plenitude of silhouetted bats performing aerial acrobatics while voraciously foraging for insects.

The emergence of WNS redirected the focus of my research, drastically altered how agencies and researchers approach conserving North American bats, and most crucially, imperilled multiple species of bat with heightened risks of extinction.

What we now know about WNS is that the culprit is a newly described fungus, *Pseudogymnoascus destructans*, most likely transported to North America from Europe.



Initial visits into white-nose syndrome affected caves and mines prompted wildlife researchers and managers to wear protective clothing and breathing equipment. It is now understood that white-nose syndrome does not affect humans, and so protective equipment and decontamination protocols are currently used to prevent spread of the disease by human activity. Photo by Al Hicks.

We understand the WNS fungus grows optimally at cold and humid conditions used by bats during hibernation. Some, but not all, infected bats develop white fuzzy noses from characteristic and exuberant fungal growth at these conditions. Infection, which occurs through the skin, is established only during hibernation, a time when many physiological processes are naturally reduced in bats to conserve energy. (Bats generally do not eat during hibernation.) Infection can lead to disruptions in behaviour, rapid exhaustion of stored fat, and emaciation. We understand that WNS is associated with extensive damage to the wings of bats, necessary for locomotion and important for homeostasis (the state of maintaining stable conditions necessary for survival). We also know that not all bats are equally susceptible to WNS. Some species are reduced to roughly four percent of their pre-WNS population size. Other species are resistant and apparently thriving. But, geographic spread of the disease has been disturbingly rapid. As of this writing, WNS has been confirmed in 31 states and five Canadian provinces. At risk are more than half of the 47 bat species living in the



Characteristic powdery, white growth of the white-nose syndrome fungus shows on the muzzles and wings of little brown myotis hibernating in a natural cave in Pennsylvania in 2011. Photo by Marianne Moore.

United States and Canada. Humans are not affected.

Massive efforts aimed at understanding and managing WNS are underway, guided by a National Plan issued by the United States Fish and Wildlife Service in 2011. Many

caves and mines have been closed, and detailed decontamination protocols are being used to minimize spread of the disease by humans.

The good news is that there are survivors! Even in the most heavily impacted species, some bats appear to clear the infection and survive. Many research efforts are focused on what explains survival in these bats, and how this information may be used to protect other populations.

There is a credible threat to Arizona bats. Of the 28 species of bat in Arizona, roughly half are known hibernators. In spring 2017, the WNS fungus was found on two species sampled in Texas, but with ranges including Arizona. We do not know when WNS will arrive in Arizona or how it will impact western bat species. Since Dixie Mine may serve as an early indicator site for arrival of WNS in our state, the Conservancy's bat monitoring project is now more important than ever. 🦇



Little brown myotis are piled on the floor of Aeolus Cave, Vermont after dying from white-nose syndrome, and dropping from their roost. Aeolus Cave experienced a major population crash because of white-nose syndrome in winter 2008-2009. The little brown myotis is a highly susceptible species with population losses up to ninety-six percent. Photo by Marianne Moore

Autumn Is Yellow in the Preserve

By Steve Jones, botanist



The red area shows the large expanse of turpentine bush-foothill palo verde-mixed scrub plant community in which turpentine bush is the dominant low shrub. Map courtesy of the McDowell Sonoran Conservancy.



The yellow flowers of the turpentine bush are attractive to many insects. They are an important nectar source for local insects and fall migratory butterflies. Photo by Steve Jones.

Spring in Scottsdale's McDowell Sonoran Preserve provides a floral display of many different colors, from purple (lupine, phacelia), red (chuparosa, ocotillo), orange (globe-mallow, poppy), blue (chia, paper bag bush), white (saguaro, desert chicory) to yellow (brittlebush, goldeneye). But autumn is predominantly yellow.

In the autumn, Brown's Ranch Trail, north of the trailhead, is lined with yellow flowering shrubs two to three feet tall. These shrubs are the



Turpentine bush is found at higher elevations in the preserve and is dominant in much of the northern Preserve. Photo by Marianne S. Jensen.

native turpentine bush (*Ericameria laricifolia*). Intermixed with them along the trail is their smaller cousin, also yellow flowered, also native, the broom snakeweed (*Gutierrezia sarothrae*).

The name turpentine bush derives from the smell of its leaves when crushed. The aroma is not unlike turpentine, but in truth is not much like it either. Just as creosote bush is not a source of creosote; turpentine bush is not a source of turpentine. (Turpentine is a distillate of pine resin.) Creosote bush and turpentine bush get their common names from the aromatic compounds in their leaves. Those compounds protect the plants from browsing by herbivores, such as deer, rabbits, and caterpillars.

While turpentine bush leaves taste nasty and are avoided, the plant actually provides two important sources of food. Bees and butterflies relish its nectar. The nectar provides food and fuel for the local flying insects (including feral honeybees), and for butterflies migrating south in the

autumn. After the seeds mature, seed eating birds such as finches rely on this large and ready food supply over the winter. The individual seeds are tiny, but they are produced by the billion.

The turpentine bush flowers and fruits in the autumn, but produces new leaves in the spring. These new, small needlelike dark green leaves are soon covered with tiny glands that give the plant a yellow-green to gray-green appearance. These glands are the source of the compounds that discourage browsers. The glands also



Turpentine bush seeds are wind distributed as indicated by the dandelion like plume (pappus) on the seed. Photo by Steve Jones.

protect the leaves from desiccation (becoming extremely dry) through the hot, dry summer months.

At lower elevations, triangleleaf bursage is the dominant small shrub while turpentine bush covers large areas of the northern Preserve. Turpentine bush replaces triangleleaf bursage as the dominant small shrub in areas above 2,600 feet, which includes the eastern two thirds of the northern Preserve between Dynamite Boulevard and Rio Verde Road to the south, and the Tonto National Forest to the north.

The plant community in red on the map is named, in part, for the turpentine bush. It's called the turpentine bush-foothill palo verde-mixed scrub community. Turpentine bush is also found in other parts of the Preserve above 2,600 feet, although it is less

dominant in those plant communities.

Turpentine bush is sold in local nurseries as a native ground cover. The



Broom snakeweed also has yellow flowers in the fall. Note the ray petals which are absent on turpentine bush flowers. Photo by Steve Jones.

nursery plant is a cultivar from New Mexico which is smaller and denser than the wild plant here in central Arizona. Its flowers are also showier. These can be seen beside the wild version along the 118th Street Trail in the Preserve where the nursery variety was planted in a restoration project.

Broom snakeweed is, as mentioned, a cousin to the turpentine bush. Both are members of the very large and diverse daisy family (*Asteraceae*). Broom snakeweed also has compounds in its leaves that discourage browsing, and to a lesser extent—at least locally—it provides nectar and seed to the local fauna. However, it is found at lower elevations than turpentine bush and so occurs throughout the Preserve. 🦋

Preliminary Results of a Restoration Study

By Lisa Rivera,
McDowell Sonoran Conservancy certified citizen scientist

An experimental study is underway north of Cholla Mountain in the northern region of Scottsdale's McDowell Sonoran Preserve. Known as the Phase 2C Closed Trail Restoration Study, staff and volunteers from the McDowell Sonoran Conservancy Field Institute are testing various ecological restoration techniques on retired trails. A Preserve ordinance requires that efforts be made to restore degraded areas within the Preserve, such as closed trails, old roads, and other large degraded areas with compacted soil. This study will reveal the best methods to comply with the ordinance, combat habitat degradation and fragmentation, and increase plant diversity.

In order to determine the most successful and quickest method for restoring degraded lands, Dr. Helen Rowe, Field Institute director, designed this ecological restoration study. It consists of 10 study sites throughout the northern area of the Preserve, each containing eight study plots. Half of the 80 study plots are located in

ripped sections of the trails. (Ripping is the process where the soil is loosened mechanically by a mini excavator.) The ripping was done in spring 2016. Soil ripping has the potential benefits of improving water infiltration and plant growth, but it could possibly disturb the microbial and fungal health of the soil. The soil in the remaining study plots was not loosened, and those plots are referred to as non-ripped plots.



In spring 2016, a mini excavator lightly ripped (scraped) the soil surface of some of the trail restoration study plots. The other plots were left non-ripped. Later in the summer and the fall, Field Institute staff and volunteers applied a mixture of native seeds to specific plots of both kinds. Photo by Leona Weinstein.

Three methods of seeding were



Dr. Helen Rowe, Field Institute director, transports topsoil from multiple locations in the Preserve to a central location where the soil is mixed. The mixture is then divided and transported to the study sites where equal portions are applied to each of the seed bank study plots. Photo by Debbie Langenfeld.

applied to the study plots, and their results are being compared to control plots where no seeding treatment was applied.

- The **summer seed** treatment is a mixture of 10 native seeds purchased from suppliers, and the mixture was applied in July 2016 prior to the summer monsoon rains.
- The **winter seed** treatment is the same mixture of native seeds as the summer seed mixture, but the seeds were applied in November 2016 prior to the winter rains.
- The **seed bank** treatment required the collection and transportation of topsoil from beneath a number of plant species near the study sites. The collected soil was combined and thoroughly mixed, then transported and applied to study plots in November 2016. This local topsoil contained seeds that were naturally released



In March 2017, Field Institute staff and volunteers collected the first data on plant growth occurring in the study plots. Data collection will occur during the next several years for long-term results. The analysis of the data from various plots will reveal which planting method was most successful. Photo by Debbie Langenfeld.

from plants within the Preserve. Essentially, the seed bank treatment is testing a free method of obtaining native seeds.

The study is looking for answers to three questions:

- Does soil ripping improve establishment of the native plant community and establishment of from seed mixes?
- Does establishment of seeds differ when seed mixes are applied before summer monsoon rains versus winter rains?
- How does using purchased seeds compare with using local topsoil in establishing diverse native plant communities?

In March 2017, Field Institute staff and Field Institute citizen scientists

returned to the study sites to collect data from the study plots. Specifically, each plant species and the amount (percentage) of space it covered in each plot were recorded. In addition, participants counted the number of seedlings (individual plants) of the 10 planted seed varieties growing in each plot.

The preliminary results have revealed that the winter seed plots had the highest number of seedlings. Overall, the ripped plots had the highest amount of native plant cover, and appear to have better growth of perennials. However, richness of native plant species (the number of species in a plot) was greatest in the non-ripped plots. Also, the high native species richness of the non-ripped seed bank plots rivaled the richness of



A steward assists at one of the study plots where seeds were planted for the Restoration Project. The seeds were lightly mixed into the soil with a cultivator. Photo by Debbie Langenfeld

the non-ripped winter seed plots. This suggests that the novel and less costly seed bank method is a successful approach, although it is labor intensive.

Data collection will be repeated in spring 2018 and, likely, two or three years afterwards to collect longer-term results. The findings will allow the Field Institute to develop best practices and methods for restoring degraded lands, and to make recommendations to the City of Scottsdale and other local land managers for future ecological restoration efforts.



Gateway Loop Trail at sunset provides a rosy view of Drinkwater Peak and McDowell Peak. Tom's Thumb can be seen in the background on the left. Photo by Dennis Eckel.

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Share Your Conservancy Cheer!

By Blythe Sweeney
McDowell Sonoran Conservancy chief development officer

Ho Ho Ho—here come the holidays!

The holidays can be a magical time to celebrate the sights, sounds and spirit of the season with family and friends. Still, the holidays may not be "joy to the world" for everyone. As the hustle and bustle of the holiday season approaches, consider taking a few extra minutes to think about how your kindness can touch someone who could use a little cheer during this special time of the year.

- Do you know someone who is recovering from serious illness or in the battle now? Make time to stop by and spend a little time with that person. Bring a favorite treat, perhaps, or a hand-drawn picture or card from your kids or grand kids. Most of all, just seeing your smiling face will mean the world to your friend.
- Do you know someone battling serious illness that has a birthday coming up? Gather a few friends and host a small party for your sick friend, even while in the hospital if recovery permits. Celebrating more birthdays becomes even more precious to someone battling serious illness.
- Do you have a friend that has lost a loved one or beloved pet recently? Invite him or her to join your holiday festivities. If the friend isn't ready yet, stop by for a personal visit to offer a holiday hug.
- Do you have a friendship that has been neglected or could use a little TLC? Call to say that you're thinking of him or her, and see if your friend might have any needs over the holidays.



Photo by Dennis Eckel.

Wishing you and your family a warm and wonderful holiday season!



Photo by Dennis Eckel.

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A western canyon bat flies through the night sky looking for insects. These bats may eat as much as one-third their weight in insects every night. Specialized teeth, including large canines, help them to catch and chew insects. Photo by Randall D. Babb, Arizona Game and Fish Department.

