# Mountain Lines



#### McDowell Sonoran Field Institute Rich history in three years

#### Microflora and Microfauna How they sustain the desert

Being a Citizen Scientist Find out what it takes!





fall, the McDowell Sonoran Conservancy received a transformative gift from the Nina Mason Pulliam Trust: \$108,000 over three years, to conduct an inventory of the

Three years ago this

Mike Nolan, Executive Director

plants and animals of Scottsdale's McDowell Sonoran Preserve and establish the McDowell Sonoran Field Institute as a permanent research program going forward.

The purpose of the Preserve as defined by Scottsdale ordinance includes establishing in perpetuity a preserve of Sonoran desert and mountains as habitat for wildlife and plants, to be left in as pristine a state as possible to maintain for this and future generations a nearby natural desert refuge from the rigors of urban life. The McDowell Sonoran Conservancy's mission, in part, is to champion the sustainability of the Preserve for this and future generations.

There was a gap in our understanding of how best to accomplish these goals, because the McDowell Mountains and surrounding desert had never been systematically studied. We didn't have a full picture of precisely what could be found in the Preserve, so we couldn't know how best to manage it.

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Cover Photo: New Trails are open in the northern region of Scottsdale's Preserve. Photo by: B. White

This issue celebrates all that has happened for the Field Institute in three short years. A simple plan to inventory the plants and animals grew to include inventorying and mapping biotic communities, launching studies of how human uses impact the Preserve's ecology, studying the effects of the nearby urban communities on the Preserve, developing a baseline geologic map, collecting data on historic land uses, and much more.

At the same time we had to develop relationships with scientists who could help us design and complete the studies, create a model to get much of the work done using volunteers, train stewards as citizen scientists, secure research permits from the City, hire a staff person to coordinate and manage the work—and that was in just the first few months!

The Field Institute has come a long way in a short time. The work we've accomplished is highly regarded by our partners in the scientific community. Our methods have potential application for other park and preserve managers in the region. Our results have provided baseline data from which we can monitor future ecological changes and adapt our management techniques.

Read on to experience all we've accomplished, and where we're going next. It's an exciting time for the Field Institute, and for data-driven management of the Preserve.

### 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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# Big Things from Small Beginnings

By Peggy McNamara McDowell Sonoran Conservancy steward

s a child in suburban Minneapolis, Melanie Tluczek spent every free minute at the small creek running through her neighborhood. "I used to pretend that I couldn't see the houses around it," she says. "I think this is what triggered my love of nature and my desire to conserve it." Now, as Manager of the McDowell Sonoran Field Institute, Melanie works in the McDowell Sonoran Preserve where she combines her love of nature with conservation.

After arriving in Phoenix in 2002 to work with AmeriCorps VISTA, Melanie enrolled in undergraduate studies at Arizona State University. She registered for a wildlife management course in the School of Life Sciences. The course was centered on fieldwork and Melanie loved it. "By that time the desert had really captured my attention and I was fascinated with the incredible ways that life persists here," she explains. Melanie also liked the idea of working outdoors and contributing to the management of public lands.

After earning her bachelor's degree, Melanie enrolled in the school's graduate program. She worked on a project in Agua Fria National Monument following the American pronghorn antelope. She collected and examined their scat to determine what plants they ate and measured how much water they could get from these plants. She also followed the antelopes at night to observe their nighttime feeding behavior. Melanie funded her graduate education by working in the school's riparian ecology lab where she created maps and monitored plant communities. "I worked like crazy. But I received a well-rounded education and earned a Masters degree in wildlife ecology."

As graduation approached, Melanie interviewed for a job at the McDowell Sonoran Field Institute. She was impressed with the professionalism of the organization. "I could see a lot of opportunities for developing the Field Institute, and I liked the idea of being part of that," she states. Since becoming its manager in the summer of 2012, Melanie has been busy expanding ongoing research projects, developing new ones, writing proposals, recruiting scientists, organizing volunteers, publishing a newsletter, and developing educational material.

"This work is extremely important," she states. "I want the Conservancy's goal of science-based management of the Preserve to become a reality. Having our own research center positions us to do this. I also want to publish our findings in scientific journals and I look forward to the day when research papers cite our data."

Photo credit: B. McFarland, 2013 Focus on Conservation Photo Contest Best of Show





# Field Research With a Purpose

By Mike Nolan

McDowell Sonoran Conservancy Executive Director

he City of Scottsdale Ordinance establishing the McDowell Sonoran Preserve defines the Preserve's purpose as "... to establish in perpetuity a preserve of Sonoran desert and mountains to maintain scenic views, as habitat for wildlife and desert plants ... " and defines as management objective #1: to preserve the local plants, wildlife, and natural resources to maintain biological diversity. Yet as recently as three years ago, there had been no systematic study of the McDowell Mountains or the desert to the north of them to accurately identify exactly what lived there, and what their protection needs might be. This fundamental need for ecological information inspired the creation of the McDowell Sonoran Field Institute.

The Field Institute (MSFI) traces its birth to fall 2010, when the Nina Mason Pulliam Charitable Trust responded to a McDowell Sonoran Conservancy grant request for \$108,500 over three years to conduct a baseline inventory of the plants and animals in the Preserve. The Conservancy further promised the Pulliam Trust that the resulting inventory data would form the basis to establish the Field Institute, "an on-going monitoring center that examines the health and scope of the Preserve's living (plant, animal, and insect) and nonliving (rocks, water cycle) components."

The concept for the inventory program was to secure professional

Brown's Ranch Trailhead is nestled in the landscape. Photo by: B. White

scientists willing to volunteer their time and expertise to help design an inventory, direct the field team, and analyze and publicize the results. The scientists became the principle investigators. Actual field work would be largely conducted by volunteers who are trained stewards working under a scientist's direction.

The early organization of the inventories was led by Lesley Forst, an intern working for the Conservancy through ASU's Public Allies program. Lesley brought the principle investigators and their plans together, secured research permits from the City of Scottsdale, found stewards willing to help, scheduled trainings, and created the survey timeline. Subsequently hired full-time as the research program coordinator, Lesley went on to lead the expansion of the research work, including incorporating historical work done by the Conservancy's Pastfinder's, a group of stewards passionate about the human history of the Preserve. Current MSFI Manager Melanie Tluczek replaced Lesley in 2012, focusing on volunteer recruitment and training and more complex research and inventory projects.

The inventory project that launched in early 2011 focused on six groups of organisms: flowering plants, mammals, birds, reptiles and amphib-

Brown's Ranch Trailhead draws design elements from historic pole barns. Photo by: B. White





ians, and invertebrates. Mammals were further split into small and large, each with its own principle investigator and inventory protocol; and invertebrates were split into flying insects versus ground-dwelling arthropods.

The size and diversity of the Preserve landscape posed a problem for some researchers in deciding where to conduct their inventories. To solve the problem, they needed a map of the Preserve's biotic communities—interdependent groups of specific plants—to ensure all communities were sampled, and so a biotic community mapping project began. This has led to other mapping projects, including bedrock geology, fire history, and other resources.

Brown's Ranch Trailhead design honors those who ranched in the area. Photo by: B. White

Human impacts are also important to monitor and assess, so the Field Institute launched studies across trails to measure rate of erosion, and the impact of use on vegetation along either side of the trail. Other human impacts include changes along the Preserve's boundary adjacent to homes and businesses—the wildland-urban interface—which led to a study aimed at assessing those effects.

The rich human history in the Preserve is worthy of protection and attracts the attention of historians. Historical studies conducted in and around the Preserve include a search for evidence of the Stoneman Road, a military road that ran from Ft. McDowell to Ft. Whipple near Prescott, plus research on some of the early settlers in the area, and work on the ranching history.

These initial studies are now beginning to produce results. The inventories demonstrated a truly rich flora and fauna in the Preserve. Researchers found 377 varieties of plants, including some unusual hybrid cacti and three plant species previously not known to occur in Maricopa County; plus 25 mammal species, 34 types of reptiles and amphibians, 127 species of birds, and more than 250 invertebrate taxa. These numbers will continue to increase with more searching but they already indicate a diverse ecosystem.

Nine terrestrial biotic communities have been identified in the Preserve. A

biotic community is an association of specific plants occurring together, and is influenced by soils, aspect, altitude, prevailing microclimate, and other natural features. When mapped, the boundaries between communities create a mosaic pattern that reflects an interconnectedness of these communities across the landscape.

The human impact studies and research work along the wildland-urban interface are still a few years from producing enough data to begin analyzing trends. Field Institute historians, however, are uncovering and documenting many stories from the early settlement of the region, from the arrival of the army after the Civil War through the first homesteaders and even the story of the government surveyor who first systematically measured and marked the mountains and desert, and whose work is still the foundation of property lines today.

The work of the Field Institute over the past three years has provided critical baseline information about the ecology of the Preserve and what species currently live there. This data is now providing a foundation for development of an Ecological Resource Plan for the Preserve. Among other things, this plan will define future monitoring needs, land restoration priorities, and ongoing maintenance and mitigation of human impacts on trails and along the boundary. It will serve future managers of the Preserve who will track changes and seek to understand what actions they can undertake to preserve local plants and wildlife and maintain the native biological diversity.

This work is also informing educational efforts within and outside the Conservancy. Our Nature Guides, Hike leaders, Pathfinders (our trailhead hosts), and others are able to convey to the public accurate information about the Preserve and its native species. Steward education programs benefit, because we are able to provide better data specific to the Preserve to any steward who wants it. The information is also finding its way into the scientific community through herbarium specimens, location lists, and the teaching and ongoing work of the principle investigators at regional colleges and universities, Arizona Game and Fish, and the Arizona Geological Survey.

The future of the Field Institute is bright. Recently a Science Advisory Committee was established to continue the strong leadership it has enjoyed in its first three years. This group of scientists with diverse experience in desert natural areas will help set priorities for future work.

Ongoing monitoring will always be a core activity of the Field Institute

as we seek to understand how and why the natural communities undergo change. Restoration is likely to take on an expanded role in the Field Institute's work, as we seek to find effective ways to close and revegetate unwanted trails, repair damage caused by off-road vehicles, and bring native species back into areas where they once occurred. New research is needed to understand, for example, how the Preserve functions as a wildlife corridor, the population dynamics of key species, and direct and indirect human impacts.

In three short years the Field Institute has produced a huge amount of useful data for wildlife managers and Preserve visitors alike. Whether you are helping with ongoing research as a citizen scientist, or just keeping track of species you've seen on a bird list, the work of the Field Institute will continue to enrich how the community experiences Scottsdale's greatest outdoor treasure.

Brown's Ranch Trailhead design honors those who ranched in the area. Photo by: B. White



### Lions and Vultures and Skunks, Oh my!

by Barb Pringle McDowell Sonoran Conservancy master steward



hat famous line—Lions and Tigers and Bears, Oh My!—from The Wizard of Oz, springs to mind when viewing photos of the many distinctive animals captured by the City of Scottsdale's and McDowell Sonoran Field Institute's hidden trail cameras. Situated in five remote locations throughout the McDowell Sonoran Preserve, the images have been an invaluable resource for the Field Institute's mammal survey, which commenced in February 2012 and wrapped up in April 2013. Led by the Field Institute's manager, Melanie Tluczek, the mammal survey is part of the overall fauna survey project. Its primary objective is to determine what species live or travel through the Preserve. Collecting baseline data for current species and populations in the Preserve will help to guide land management policies, especially if future studies show significant changes in wildlife populations or diversity.

The hidden trail cameras are motion activated, operating 24 hours a day, 7 days a week. They can be programmed to automatically take a photo at various time intervals; for the mammal survey an interval of five seconds was used. Daytime photos are in full color, while nocturnal prowlers are captured as monochromatic images using a nondetectible infrared flash. Accompanying photo data tags the date, time of day and temperature.

Because the camera's motion-detector sensor is quite sensitive, there were many false triggering shots due to blowing leaves or flying birds. That's why the largest collected photo dataset contained over 12,000 images. Volunteer stewards, including Jim Frier, Susan Aufheimer and Jack McEnroe, dedicated hours and hours reviewing these



"Coyotes typically visit the drinker in pairs, with one standing on alert while the other takes a drink."

photos looking for unusual animals or new species. In all, 11 different mammal species were photographed, as well as many amphibians, reptiles and birds.

That big gorgeous mountain lion in the above photo was a frequent visitor to the Thompson Peak "Drinker," the most popular gathering spot for animals captured on camera. The drinker is a concrete pond fed year round by rainwater collected in a large metal apron. The apron gravity feeds the water through a pipe into a storage cistern, and then into the wildlife pond. It's utilized by a wide array of critters, including bobcats, javelina, mule deer, coyote, striped skunk, rock squirrel, cottontail rabbit, raccoon, turkey vultures, owls, hawks, gray fox and bats." The mammals that generated the most photos were mule deer, coyote and javelina," notes Frier." One interesting observation I made from my photo review is that coyotes typically visit the drinker in pairs, with one standing on alert while the other takes a drink."

While there are likely other mammals yet to be captured by the trail cameras (such as a badger recently photographed at Brown's Ranch by Jack McEnroe), the majority of species have been catalogued. "One conclusion we can make is that our field mammal surveyors did an excellent and thorough job, because the photos didn't show us anything we had not already expected to find," says Tluczek. The Field Institute cameras have been taken down for now and will be used in a variety of other studies. The next step for the mammal survey will be to monitor population dynamics of smaller mammals using live-trapping and release techniques at set locations.











# Microorganisms Sustain Desert

by Susan Aufheimer McDowell Sonoran Conservancy steward and Field Institute citizen scientist

w often have you heard it said, please stay on the trail? You've seen signs at trailheads that say the same thing. But why? What could possibly be so important that where you tread makes any difference whatsoever? It all looks like gravel!

Now, imagine walking down a desert trail at any time of day, looking off into the distance, and seeing millions upon millions of plants and animals hard at work finding food and raising families. That's a long shot, you say? Some people who are not familiar with our desert environment, look at the land and see rocks and cactuses and judge the land to be barren. Not so! The desert floor is teeming with life. You just need to change your perception of desert life.

### Think small. Think really small. Think micro.

The desert floor is home to microflora and microfauna tiny plants and animals—that colonize deserts throughout the world, not just the McDowell Sonoran Preserve. These microorganisms get together to form what is known as "biological soil crust," composed of bacteria, algae, mosses, lichen, and their byproducts.

Soil crust plays an important role in the desert's ecosystem. It is concentrated on the top of the soil and is a factor in keeping desert soil stable and free from wind and water erosion. It also provides nutrients to plants and helps to retain moisture in the soil, which aids in seed germination.

Soil crust is adaptable to harsh climates, but one thing it can't survive is compression—getting stepped on. Trampling by humans, livestock, or vehicles driven off-road breaks the sheaths and filaments built by the microorganisms, disabling their ability to function and thereby leaving the surface subject



Brown's Mountain Trail takes you to the summit. Photo by: B. White

to erosion. A careless step can kill off thousands of organisms that have been working for centuries, even millennia, to keep the desert floor stable. Injured crust can take up to 50 years to rebuild.

Would you know what soil crust looks like if you came upon it? You'll be surprised, because you might think it is something else, such as moss or even animal scat. In the desert around the Lost Dog Trailhead, for example, it occurs as dark, spotty clumps spread in irregular patches across the desert landscape. Soil crust will vary in color depending on the composition of microorganisms that are creating the soil crust. Cyanobacteria (also called blue-green algae) produce a dark, almost black color. Lichens, mosses, and algae produce a variety of colors including green, gold, brown, or black. Unfortunately, some soil crusts can be invisible, making the case for staying on the trail that much harder to sell.

The lesson that soil crust teaches us is one we can apply as we hike the McDowell Sonoran Preserve or go about our daily lives: All is not what it seems, so watch where you tread!



Some trails under the power lines have been redesigned to promote sustainability. Photo by: B. White

### Be a Citizen Scientist

by Susan Aufheimer McDowell Sonoran Conservancy steward and Field Institute citizen scientist re you curious about the plants and flowers growing in the McDowell Sonoran Preserve? Would you like to learn more about the mammals, flying insects, and birds that call the Preserve home? Become a citizen scientist! Join with McDowell Sonoran Conservancy stewards, and work side-by-side with scientists to study the Preserve's vast natural resources. As a citizen scientist, you'll get to explore parts of the Preserve most people can't visit on their own.

Just what is citizen science? It's essentially scientific research conducted under expert direction by people who don't work in the scientific field. Citizen scientists help experts by multiplying their data collection and analysis efforts. The McDowell Sonoran Field Institute, the Conservancy's research center, is actively developing a group of citizen scientists to collect data that can help inform long-term Preserve management decisions.

You're a good candidate for citizen scientist if you enjoy working with other volunteers, learning and using scientific methods and are interested in desert flora, fauna, geology, or history. But first you need to become a Conservancy steward and attend a new steward orientation class. You'll also attend several education classes, work on two research projects, and then pass a multiple-choice citizen-science test.

Let's put on our citizen scientist hats and go on a small-mammal, live-trapping research project. First, we'll attend a special class conducted by the small mammals principle investigator (PI). He's an expert in small-mammal biology, identification, and habitat. He'll describe the different animals we'll encounter, such as packrats, pocket mice, grey foxes, and maybe even ringtails, which are relatives of the coati and raccoon.

The PI explains how to bait and set live traps and how to safely handle the animals — usually the PI's job. He'll describe the kind of data that we'll collect. On the appointed day, we arrive at the predetermined location, maybe Tom's Thumb or Brown's Ranch Trailheads. We'll get there in late afternoon so traps can be set by sundown when small mammals come out of their dens and holes to hunt for food. Then we hike to the designated spot and set our traps. The location is usually offtrail so the PI will post a sign telling any passersby that this is a scientific expedition, to discourage curious hikers from walking off-trail too.

We carry traps and bait, which could include grain and peanut butter for attracting rodents, or cat food and gross-smelling bait made with fox urine that may attract larger small mammals, perhaps a spotted skunk or a gray fox. When we get to the assigned location, we bait and set down a trap about every 10 meters along a straight line. We'll set down 40 numbered traps, in order, in about an hour.

The next sunrise we return to the trapping location to collect our animals. We start early to limit the stress to our quarry and prevent them from getting too chilled from an overnight stay in a metal trap. Our PI has been known to remove a rodent from a trap and tuck it into his shirt pocket to keep it warm until we can record key data.

Now for the fun stuff! After all traps are collected, we remove an animal and start noting critical information. If it's a rodent, we weigh it, determine its sex, measure its overall length, and determine the length of its hind foot. This information enables us to identify the species. Larger small mammals, such as foxes and skunks, aren't handled; we estimate their measurements. When we're done, we return each animal to where it was trapped, so we don't disorient the animal by taking it to an unfamiliar location. Some small mammals live within yards of their homes for their entire lives.

If you think that was fun, just wait until you try light-trapping where we enter the Preserve at night and set up a white screen that's backlit to attract night-flying insects. There's also arthropod trapping which involves sinking cups into the ground so that beetles, scorpions, centipedes, and other fascinating insects walk up to a cup and fall in, if we're lucky. Isn't it time for you to take advantage of the many opportunities to learn about the creatures, plants, rocks, and human history of the Preserve?

Some trails under the power lines have been redesigned to promote sustainability. Photo by: B. White





### The Ecological Resource Plan: Science by the People, for the People of Scottsdale

By Nancy Howe McDowell Sonoran Conservancy lead steward

V Vith the City of Scottsdale making great strides in acquiring land for the McDowell Sonoran Preserve, the McDowell Sonoran Conservancy is turning to the power and creativity of its Field Institute to answer next questions: How do you manage nearly 47 square miles of Sonoran desert inside Preserve boundaries? What does a well-managed urban/preserve interface look like and how does it function?

In the Preserve's timeline, the first 20 years were spent identifying boundaries, establishing funding sources, buying the land, and opening the Preserve to users by building trails, establishing trailheads, and creating recreational opportunities. Going forward, the City as land owner and the Conservancy as land stewards will deepen their partnership as they collaborate on a scientific foundation to identify long-term management policies.

The pivot point around which this new partnership turns is a comprehensive Resource Management Plan (RMP), a multiyear effort coordinated by the City and comprised of many volumes, each addressing a particular component of the Preserve and agreed-upon short- and long-term management goals. The Field Institute will lead the effort to develop the first volume, the Ecological Resource Plan (ERP). It will identify the Preserve's biological resources, and the management goals for those resources.

The ERP is foundational—documenting a baseline of data that describes the Preserve now. The ERP is also a living document. As volunteers collect new data, scientific advisors and land managers will update ERP, making comparisons between baseline and new data, and assessing whether or not management goals and objectives are being met.

"Ultimately, the citizens of Scottsdale and the City Council are responsible for how we manage the Preserve – they own the land," reminds Scott Hamilton, Scottsdale's senior preserve trail planner. "But you can't manage the land until you know what you have. The Conservancy's early work training stewards to perform surveys and document species takes public involvement to a whole new level."

Melanie Tluczek, McDowell Sonoran Field Institute manager, agrees that the ingenuity and resourcefulness of the citizen science program, and the willingness of volunteers to do the hard work of data collection

Trails were renamed and signed to help direct visitors. Photo by: B. White

and documentation, redefines what is possible for the ERP. "The Preserve's RMP will address topics as diverse and complex as health and safety, cultural and archeological resources, and illegal activities. But you must start with an inventory of what exists, and that's where we have a wonderful opportunity to lay the foundation with in-depth, rich baseline data. The database of Preserve biology that we already have enables us to track changes, or the lack of changes, to these same, highly descriptive metrics over time," she said. "What we will be able to deliver in a relatively short time is stunning in its comprehensiveness."

Tluczek is referring to flora and fauna inventories that the Conservancy launched in 2011, in partnership with local scientists and volunteers. Dave Weber, president of the Arizona chapter of the North American Field Herping Association, applied for the first permit to conduct a fauna survey in the Preserve, explains Tluczek. "Dave was the guinea pig for the City, and together, we developed the process and built relationships that take advantage of our close partnerships with volunteers and research scientists."

Flora studies also started in the spring of 2011, led by botanist Steve Jones. "Steve's research approach leveraged our stewards' perseverance and their long-term relationship with the Preserve," says Tluczek. Stewards return to the Preserve year after year, and Jones was able to train the same volunteers over a period of years. "Steve gave these experienced stewards 'look-out' lists for flora. He asked people to search for specific plants and when they found them, we had explicit GPS locations and descriptions," Tluczek explains.

Moving forward, many participation options will open to steward volunteers who want to engage in the ERP preparation. Under Tluczek's supervision, stewards can help author the document, including baseline data, measurement standards, and stakeholders' views of management objectives for the Preserve's biological resources in the decades ahead. "In the field, stewards work under the guidance of principle scientists, and their independent perspectives bring fresh ideas that deepen our understanding and influence how we collect data," she notes. "That improves the ERP."

The anticipated expertise and detail in the ERP inspires the entire Scottsdale team. "We all agree that science should inform our decisions, but the City doesn't have a staff scientist. The financial benefits we reap from the citizen scientists' expertise are extraordinary, but the advantages go far beyond the budget," says Hamilton. "Scottsdale citizens are directly involved in science. That deep engagement with the land redefines what public involvement in participatory government means."

Trails were renamed and signed to help direct visitors. Photo by: B. White



### Mapping the Geology of the Preserve

by Susan Aufheimer McDowell Sonoran Conservancy steward and Field Institute citizen scientist



Trails were renamed and signed to help direct visitors. Photo by: B. White

he scenic beauty of Scottsdale's McDowell Sonoran Preserve is captured in the stunning rocks and mountains that stretch across the Preserve, from Sunrise Peak in the south to Brown's Mountain in the north. Mile after mile of dramatic landscape rolls by in peaks and valleys. Some parts are strewn with piles of granite boulders weathered into shapes of mushrooms and billiard balls; other parts feature colorful metamorphic rocks split into angular chunks with sharp edges and flat faces.

The McDowell Mountains can trace their heritage back 1.7 billion years ago when a chaotic mix of tectonic forces set in motion the formation of the rocks we see today. After all this time, no one has conducted a complete geologic survey of the Preserve—until now! The Field Institute, the research center of the McDowell Sonoran Conservancy, will begin a series of geologic projects aimed at developing a more comprehensive understanding of the intricate geology of the Preserve.

In its first project, the Field Institute will work with research geologist Brian Gootee from the Arizona Geological Survey (AZGS) to combine existing maps digitally to develop a baseline geologic map of the entire Preserve and surrounding area. Then the Field Institute will add its own geologic research to this basic map.

One project will be mapping the large quartz outcrops that exist throughout the Preserve. Minor quartz veins are common throughout the metro area, but the huge outcrops seen in the McDowells are unusual. The extent of these quartz outcrops, the connection between them, and how they were formed are unknown today. One such quartz formation can be seen from Quartz Trail, about a mile north of Taliesin Overlook, via a short side trail.

Another project will be conducted in conjunction with AZGS to investigate the timing, origin, and formation process of travertine limestone found by Conservancy stewards in the McDowell Mountains. This unique deposit is the only one known anywhere in the Phoenix area.

These and future projects will allow the Field Institute, in partnership with its citizen scientists and the Arizona Geological Survey, to develop a more complete geological record of the varied rock formations that make up the Mc-Dowell Sonoran Preserve.

Source: Dan Gruber, McDowell Sonoran Conservancy master steward and Field Institute citizen scientist.

### Partner Profile: Nina Mason Pulliam Charitable Trust

he Nina Mason Pulliam Charitable Trust has supported the McDowell Sonoran Field Institute (MSFI) since its inception. The Pulliam Trust was established upon the death of Nina Mason Pulliam in 1997 to help people in need; protect animals and nature; and enrich community life in her home states of Indiana and Arizona. Mrs. Pulliam was the publisher of The Arizona Republic and The Phoenix Gazette until 1978. In addition to being a journalist, she was a business leader, a humanitarian and a lover of all creatures.

We are proud to partner with The Pulliam Trust to inventory and assess the plant and animal life in the McDowell Sonoran Preserve. A 3-year grant from Pulliam enabled MSFI to complete this important work. This assessment formed the foundation for our baseline study of the ecology of the Preserve. The objective of this biological inventory was to catalogue the plant and animal inhabitants of the Preserve for research and educational purposes. The work was accomplished in partnership with scientists and experts who trained volunteers as citizen scientists.

Pulliam's support of MSFI provided the foundation for future research. We are fortunate to have partners in the community like Pulliam who share our passion for protecting nature. We look forward to an ongoing relationship with the Trust and hope to partner with Pulliam on many exciting projects in the future.



NINA MASON PULLIAM

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# Join Our Circle of Friends

The McDowell Sonoran Conservancy champions the sustainability of the McDowell Sonoran Preserve for the benefit of this and future generations. Our mission is a promise to our children, and theirs – to protect and promote the McDowell Sonoran Preserve so that it will flourish for years to come. Help us keep our promise to the future and return this form with your gift today.

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# Holiday Hikes in the Preserve

Studies show that people tend to gain and keep one pound each holiday season. Increased physical activity was one of two factors shown to reduce holiday weight gain. The Conservancy's holiday public hikes let you experience the Preserve's natural wonders and work off that extra pound:

#### Thanksgiving Day "More Pie Please"

7:45 a.m. at Lost Dog Wash Trailhead. Burn off some calories with family and friends on this fitness hike and you won't feel guilty about that second piece of pie!

#### December 3 "Mistletoe and Holly"

8:45 a.m. at Tom's Thumb Trailhead. Discover the hidden, festive connections between desert plants and animals and the holidays.

#### Christmas Day "Gateway Loop"

8:45 a.m. at Gateway Trailhead. Hike into the heart of the McDowells.

#### New Year's Eve "Gateway to Silver Bell Pass"

8:45 a.m. at Gateway Trailhead. A serious workout for hardy hikers.

For more information, visit www.mcdowellsonoran.org.

Trails were renamed and signed to help direct visitors. Photo by: B. White

