



MCDOWELL
SONORAN
CONSERVANCY

Mountain Lines

MAGAZINE OF THE MCDOWELL SONORAN CONSERVANCY

FALL 2021





Justin Owen, CNAP

As we head towards cooler Fall temperatures, we finally get to spend more time outside! The pandemic has reminded us all of the physical and mental health benefits of spending time in natural open spaces. Let's use these places to recharge and reconnect.

While it hasn't been the 30th anniversary year we were planning, it has given us a great opportunity to evaluate and plan. We will always honor our past and be forever thankful for the visionaries who

shaped and drove us in our beginnings. We are also thankful every day for our hundreds of steward volunteers who have made, and continue to make our work possible. Without their passion, commitment, and drive we would not be able to accomplish everything we do. The pandemic has been challenging for all non-profits and I can assure you that our future has never been brighter thanks to our amazing supporters. We are at the leading edge of scientific research and collaboration and our new education strategy positions us to provide connected and impactful opportunities for many different groups across Scottsdale, Arizona and beyond. Our stewardship of the McDowell Sonoran Preserve and Sonoran Desert continues to be a core part of who we are and what we do. We are excited to focus on the future and look forward to sharing more with you over the coming months and years.

Stay safe, and I look forward to seeing you out on the trails soon. ▲▲

BOARD OF DIRECTORS

Shirley Baum, Chair
John DeWulf, Vice Chair
Trish Stark, Treasurer
Andrea Aker, Secretary

Cynthia Bozik	Rick Pearce
Richard Bourke	Jane Rau
Michael D'Andrea	Lynne Russell
Doug Diehl	Peter Schlosser, PhD
Jalina Kerr	Margie Traylor
Hon. Mary Manross	Merl Waschler
Don Martin	John White
Susan Mitchell	Mark Winkleman

CORPORATE ADVISORY BOARD

Tony Bolazina	Steven Hilton
Bernard Clark	Todd LaPorte
Bennett Dorrance	Tammy McLeod, PhD
	Mike Tully

MCDOWELL SONORAN CONSERVANCY STAFF

Chief Executive Officer
Justin Owen, CNAP

Chief Operating Officer
Jakki Casey

Interim Director of Development
Patrick McWhorter

Director of Marketing
Carlotta Soares

Director of Science and Education
Melanie Tluczek

Parsons Field Institute Manager
Mary Fastiggi

Finance Manager
Victoria Girard

Education Manager
Nicole Kallman

Parsons Field Institute Manager
Tiffany Sprague

Senior Administrative Coordinator
Robin Sprague

Administrative Coordinator
Debbie McKeighan

McDowell Sonoran Conservancy

7729 East Greenway Road, Suite 100
Scottsdale, AZ 85260
480.998.7971

mcdowellsonoran.org
info@mcdowellsonoran.org

Mountain Lines is published quarterly by the McDowell Sonoran Conservancy, a 501(c)(3) nonprofit organization

Barbara Montgomery-Ratcliff, Editor
McDowell Sonoran Conservancy
Lead Steward

Creative design donated by
McDowell Sonoran Conservancy
steward Dennis Eckel

Eckel Advertising & Photography

AZH2O: Water and the Human History of the McDowell Mountains

By Len Marcisz,
McDowell Sonoran Conservancy Legacy Steward

Part 3: Water and Western Settlement

Mark Twain was fond of observing: "Whiskey is for drinking. Water is for fighting." This was certainly true in Arizona. For example, on November 27, 1928, Phoenix police were summoned to the state capitol building to break up a fistfight between George W. P. Hunt, Arizona's governor, and Fred T. Colter, a state senator. The cause? Colorado river water use.

The first U.S. citizens to view the McDowell Mountains up close came by following water. During late 1829 and early 1830, famed mountain man Ewing Young led a fur trapping expedition from New Mexico down the Salt River to its confluence with the Verde River, then north along the Verde and eventually west to California. Quite likely, his expedition traveled along the west bank of the Verde, passing through today's community of Rio Verde. The cook on the expedition was Christopher Carson, better known as the legendary Kit Carson.

U.S. settlement near the McDowell mountains was inhibited as central Arizona was dominated by Yavapai and Apache cultures resistant to incursions by others. When Yavapai and Apache

raiding began to disrupt gold and silver mining in the Bradshaw Mountains during the Civil War, the U.S. government established a series of military posts to protect the civilian population and business interests.

Among the first posts to be

built was Camp McDowell—later renamed Fort McDowell.

Initially located at the confluence of the Salt and Verde rivers, it was relocated northward to the confluence of the Verde River and Sycamore Creek to be near an Apache and Yavapai raiding and trading trail that ran west from the Four Peaks area along Sycamore Creek and across the Verde River into the Bradshaws. The military post was active from 1865 through 1890. The establishment of Camp McDowell and eventual military confinement of the Yavapai and Apache on reservations rendered the Salt River Valley safe for U.S. settlement, which,

naturally, followed the water.

In the spring of 1867, John Y. T. Smith, the post shop keeper at Fort McDowell, noticed abundant tall grass growing along old Hohokam canals near what is today the intersection of 40th Street and Washington in Phoenix.



Early Phoenix entrepreneur, John Swilling (left), created a profitable business in the mid-1800s by excavating old Hohokam canals and developing the adjacent land for agriculture. Photo courtesy of historyadventuring.com

About Us

The McDowell Sonoran Conservancy preserves and advances natural open space through science, education, and stewardship. We create a culture that ensures, preserves, and values natural open spaces for all to enjoy.

Table of Contents

AZH2O: Water and the Human History of the McDowell Mountains.....3

New Pima Dynamite Trailhead..... 8

Results of a Trail Restoration Study.....10

A Favorite Hike—Sunrise Trailhead to Sunrise Peak and Andrews-Kinsey Trail 12

See the McDowell Mountains in 3-D!..... 16

Celebrating 16 Years of Trailhead Ambassadors.....18

Ecological Connections Among Dead Trees, Bacteria, Beetles and Bees 22

Revising the Conservancy's Approach to Education 24

Sonoran Desert 101: Teaching that Everything is Connected and Always Changing! 26

Connect with us:



Smith established a haying operation at the site, selling the hay to the cavalry stationed at McDowell. In December a colleague of his, Jack Swilling, organized a group of investors to establish a canal company, excavated the old Hohokam canals, and began to irrigate land along the banks of the Salt River. Swilling anticipated profitable income from the canals, sales of crops grown on the irrigated land, and land sales along the canal system. Smith and Swilling's entrepreneurial activities drew the attention of other settlers, and a small community began to develop near the canal system. Known by various names, including "Pumpkinville," the settlement was eventually named "Phoenix."

By the mid-1870s, development had spread north of the McDowells as gold was discovered by prospectors along Cave Creek, which became an indispensable water source for mining. In the 1880s, settlers along the lower Verde River copied Swilling and excavated old Hohokam canals, began farming, and sold their produce to the soldiers at the nearby fort. During the same decade, a small farming community was established southwest of the McDowells by a retired military chaplain, Winfield Scott. Scott chose the site because of its proximity to the newly constructed Arizona Canal.

During the 1890s, settlement moved toward the McDowell foothills and into the range itself. Ranching (the miners needed to eat) expanded along the Verde River. A compulsive prospector, Frank Frazier, began homesteading in the McDowells. He

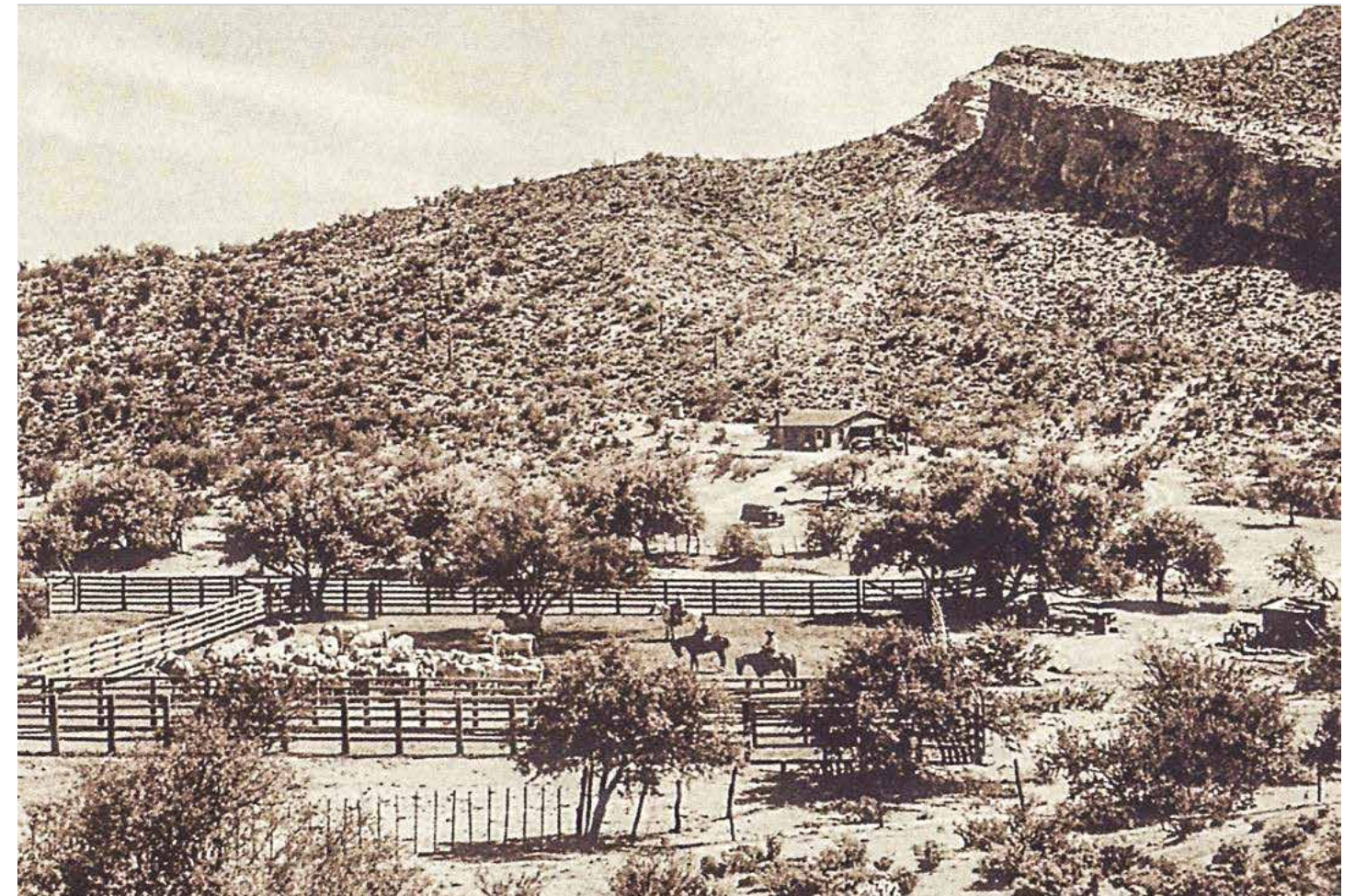
established the Silverleaf mining claim and also claimed the most productive spring in the range, now known as Frazier Spring.

Major ranching expansion around the McDowells occurred in the early 20th Century, driven by a booming U.S. economy but governed by access

to water. The massive industrial and urban growth of the early 20th century created a hot market for beef, particularly in the Midwest and California. In 1904, cattlemen from throughout the territory met in Phoenix and organized the Arizona Cattle Growers Association—cows were now big business.



The remnants of rock work at Frazier Spring, which was a valuable source of water, along with dug wells, that supported Brown's Ranch during dry spells. Photo by Cathy Johnson



E. O. Brown's "Upper Ranch" operations at the base of Brown's Mountain developed into a successful cattle ranch that was active from about 1916 into the 1960s. Photo courtesy of Scottsdale Historical Society

Edwin Orpheus Brown encountered this economic development upon his arrival in Scottsdale that same year. Brown came to Scottsdale to assist his widowed sister-in-law in running the general store and post office, but he quickly became the town's preeminent entrepreneur. After his sister-in-law's death, he became the owner of the general store, postmaster, and eventually parlayed his profits into ownership of the local cotton gin, waterworks, and ice plant and became irrigation director, vice president of the Western Oil Company, and controlling stockholder of Farmer's State Bank.

Sometime before 1910, Brown began to run cattle on the outskirts of Scottsdale. With acreage near the town increasingly consumed by the expan-

sion of cotton farming and orchards, Brown relocated his ranching operation to the McDowells during the period of 1916-1919. He acquired Frazier Spring and routed water to tanks across the 44,000-acre ranch. Remains of the piping can still be seen in Scottsdale's McDowell Sonoran Preserve.

The Brown family expanded the ranch over the years, acquiring land via homesteading, purchase, federal and state leases, land exchanges, and debt collection—the latter a byproduct of E. O. Brown's control of the local bank and general store, which provided insights into the financial insolvency of some ranchers. On occasion, this resulted in bad feelings. When Brown wished to acquire Refugio Ochoa's spring through foreclosure on his ranch, Refugio

refused to pass control of the spring to Brown. Instead, Refugio sold the land to the neighboring Moore family, who renamed the ranch the X-2.

Water availability influenced much of the ranching around the McDowells. In addition to their acquisition of Frazier Spring, the Brown family sank a well near their homestead at Brown's Mountain and constructed an earthen dam north of Fraesfield Mountain with the capacity to store 8 million gallons of water. In 2010 the dam was deemed potentially hazardous to hikers and was dismantled. The Whiskey Bottle Trail overlooks the remains. The Pemberton Ranch on the eastern slopes of the McDowells was famous for its artesian well that produced "sweet water." The previously noted Moore family owned

two ranches: the X-2, which included Ochoa Spring, and the Box Bar on the banks of the Verde River. Not all ranchers were so fortunate, though. Harold Baxter homesteaded the Lost Dog area from 1924 through 1944. He eventually gave up after sinking several wells over the years but failing to draw sufficient water to run cattle.

With major water storage and management developments, such as the Salt River Project, begun in 1903, and the Central Arizona Project, begun in 1973, sufficient water was provided to the Salt River Valley to enable major agricultural and urban development. Some of the development began to impinge upon the McDowells which, in turn, led local citizens to create the McDowell Sonoran Land Trust and launch a successful years-long campaign to create today's McDowell Sonoran Preserve.

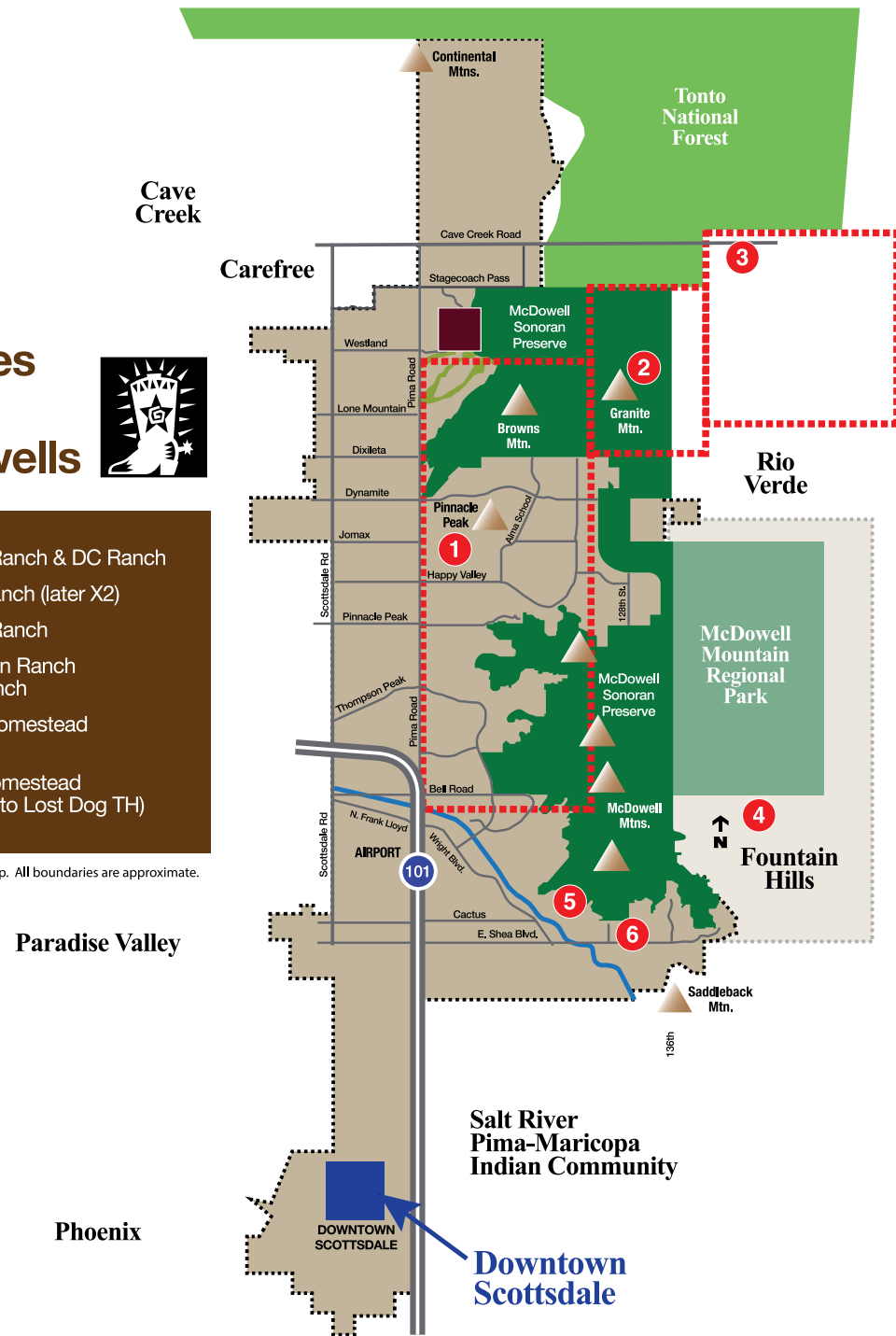
We are currently living through a prolonged drought that carries the potential for eventual water rationing, disputes between urban and agricultural interests and between the various states that use water from the overallocated Colorado River. The future may well bring us back to Mark Twain's observation: "Whiskey is for drinking. Water is for fighting." ▲▲

Ranches in the McDowells



- 1 Brown's Ranch & DC Ranch
- 2 Ochoa Ranch (later X2)
- 3 Box Bar Ranch
- 4 Pemberton Ranch P-Bar Ranch
- 5 Greene Homestead (Ancala)
- 6 Baxter Homestead (Entrance to Lost Dog TH)

This is a conceptual map. All boundaries are approximate.



The McDowell Sonoran Conservancy actively preserves the land and the history of the land through science, education, and stewardship. For more information, go to mcdowellsonoran.org. Map by Len Marcisz and Dennis Eckel

Meet Arizona's huge Sonorasaurus, a Townsend's Big-eared Bat, "Bob" the ancient Xiphonactis and so much more!

Visit the **RE-IMAGINED River of Time** in Fountain Hills.

Paddle down the Lower Verde River in our new, experiential center, as you explore dinosaurs, learn about ancient people, and go batty with scientists of the McDowell Sonoran Conservancy in our new bat lab.

Capture your discoveries throughout the gallery in photos and selfies that put you in the center of the story!

History - Science - Art

Grand Reopening
OCTOBER 2, 2021
10:00 am - 4:00 pm

480-837-2612
info@rotmuseum.org
www.riveroftime.museum
12901 N La Montana Dr Fountain Hills AZ 85268

It all happens at the River!





Scottsdale Community Services

Making Scottsdale the premier community for everyone!



Beautiful outdoor spaces and classes.



Support services and programs.



Free access to books, movies, music and programs.



Over 30,500 acres of Sonoran Desert waiting to be explored.

Visit ScottsdaleAZ.gov for more information.



Construction of the Pima Dynamite Trailhead began in August 2020 and will be completed in September 2021. Photo by Dennis Eckel

New Pima Dynamite Trailhead

By Kerry Olsson,
McDowell Sonoran Conservancy Lead Steward

Opening this fall is the new Pima Dynamite Trailhead at the corner of Pima Road and Dynamite Boulevard in northern Scottsdale. It is the last planned trailhead for Scottsdale's McDowell Sonoran Preserve and provides access to the western region of the Brown's Ranch area of the Sonoran Desert.

The new trailhead blends well into the native landscape of the site. Integrated into the design are



Dual entrances for the trailhead from Pima Road and Dynamite Boulevard determined its name. Photo by Dennis Eckel

entrances from both Pima Road and Dynamite Boulevard, longer parking slots to accommodate vehicles with bike racks, a dedicated parking lot for vehicles with horse trailers, a shaded amphitheater for group events and educational presentations, drinking water, and restroom facilities.

Pima Dynamite is one of eight trailheads providing access to the 230 miles of trails in the 30,580 acres of the largest urban preserve in the country.

The trails are designed for passive recreational opportunities including hiking, horseback riding, and mountain biking. They are also designed with the environment at the forefront in order to protect the Preserve while providing visitors with the experience of the natural Sonoran Desert.

An adventure from the trailhead will reward you with many wonders of the Sonoran Desert. You may see a mountain lion, bobcat, deer, javelina, Gila monster, desert tortoise, or rattlesnake. Let your imagination run wild among the rock formations to see familiar shapes and patterns. Grab your mountain bike and enjoy miles of the best trails in Arizona. Hike to the top of four different vista points. The Scorpion Point Overlook, for instance, provides a 360-degree view of Scottsdale, Phoenix, Carefree, Tonto National Forest, the McDowell Mountains, Brown's and Cone mountains, and



Six trails will radiate away from the trailhead like spokes in a wheel, with benches installed around the outside of the wheel. Photo by Dennis Eckel

Pinnacle Peak.

Equestrians will enjoy a serene trek up Rawhide Wash Trail, which hikers and bikers tend to avoid due to the sandy terrain. There is a dedicated trail entrance from the equestrian center to access Rawhide Wash and a connection to other trails.

Trail extensions connect the existing Hawknest, Axle Grease, Latigo, Powerline Road, and Rawhide Wash

trails to the new trailhead. Additionally, trails have been constructed south of Latigo Trail, providing direct access to view an amazing crested saguaro, climb to a new vista, and provide bikers with new technically challenging terrain.

Construction of the trailhead also considered the sensitive nature of the Preserve. Not only were the native trees salvaged and replanted, but the project also exceeded normal procedures by salvaging roughly 50 Mormon tea and creosote bushes and small cacti, harvesting soil crust, crushing and reusing the former rock yard, and paving over the top of the previously disturbed rock yard.

The all-new spoke and wheel design for trail access gives visitors access to six different trails directly from the trailhead with easy ability to go out one trail and come back on another. Existing trails were integrated

as the spokes to provide connection to the new trailhead. Mountain bikers can take bypass trails around to the back of the trailhead. This design will decrease congestion and open trail access for a more enjoyable experience.

Come out and enjoy the new facility and trails to access the wonders of the Sonoran Desert in our beautiful nature preserve. ▲▲



View of the new Pima Dynamite Trailhead from the visitors' parking lot. Photo by Dennis Eckel

Results of a Trail Restoration Study

By Lisa Rivera,
McDowell Sonoran Conservancy Lead Steward and Certified Citizen Scientist

In 2016, a long-term ecological restoration study began 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 Parsons Field Institute tested various techniques for reestablishing native vegetation on retired trails.

There are many degraded areas within the Preserve—old roads, closed trails, historic grazing sites—characterized by compacted soil and sparse vegetation. The Preserve ordinance



Infiltrimeters, designed by steward Bill Sowle, allowed us to compare water infiltration rates between ripped and unripped soils. Principal investigator Helen Rowe discovered this can be slow business in highly compacted soils. Photo by Tiffany Sprague



To determine effectiveness of seeding and soil ripping treatments, we monitored vegetation in 0.5-m² plots each spring. Botanist JP Solves and steward Debbie Langenfeld found little plant growth in this plot. Photo by Tiffany Sprague

requires that efforts be made to restore these areas, as it helps to improve habitat connectivity, restore ecological function, and increase the natural beauty of the Preserve.

Unfortunately, land managers lack solid information about how to effectively reestablish native vegetation in arid environments. Typically, Preserve managers loosen compacted soil with a mechanical excavator (known as “ripping”) and apply cacti or dead vegetation to keep visitors out of restoration sites and to allow

for natural recovery of these areas. The goal of this study was to compare these and other methods to determine the most successful and quickest ways to restore degraded lands.

This four-year study had three objectives: 1) assess the success and timing of seeding using commercial (purchased) seeds; 2) evaluate whether the application of locally-sourced soil and vegetation litter from beneath nearby shrubs can be an effective seeding treatment compared to the use of commercial seeds; and

3) compare the practice of ripping soil versus taking no action to loosen compacted soil.

We predicted that seeding treatments and soil ripping would result in similar native plant coverage and species diversity as the native desert community compared to non-ripped and non-seeded control plots. We applied the seeding treatments in summer and fall of 2016, a year of fairly normal monsoon and winter rainfall. In years two and four of the study, our sites experienced some drought conditions.

Fewer than half of the seeded species established and persisted over time, but three species performed well and should be considered for future restoration projects. Overall, the study results suggest that the use of commercial seeds is an unreliable method for arid land restoration.

However, the use of local soils and litter as a seed treatment was effective early in our study. Therefore, this seeding treatment shows promise as an inexpensive but moderately labor intensive method for quickly reestablishing a diversity of local native plants in degraded areas.

In addition, the results suggest that soil ripping, a costly method commonly used within the Preserve, might not be beneficial in reestablishing the native plant community or worth the labor and expense. Although ripping increased soil moisture retention and increased



Botanist Steve Jones carefully balances himself to not disturb vegetation in the plot while using his myopic vision to identify a tiny plant. Photo by Debbie Langenfeld

native seed establishment, it increased the presence of non-native plants and decreased native plants when compared to the non-ripped plots.

Most surprisingly, the results also suggest that the local plant community has the potential to recover naturally within four years in small areas if the disturbances are removed. Therefore, it is important for restoration sites to be closed off and for efforts to be made to inhibit human activity within the area. These practices may result in degraded areas being restored cheaply, easily, and relatively quickly, without the need to rip soil or sow seeds.

The findings of this study not only

help us understand the best practices for restoring degraded lands and increasing native plant diversity within the Preserve but can also be used by other land managers throughout the Sonoran Desert.

We would like to thank everyone who was involved in this project, especially the Conservancy stewards who assisted in setting up the experimental sites, creating tools, and participating in long days of field work. These efforts helped us fill a void in ecological restoration research and enable us to use science to guide future restoration efforts. ▲▲

A Favorite Hike—Sunrise Trailhead to Sunrise Peak and Andrews–Kinsey Trail

By Jeanine Allsup,
McDowell Sonoran Conservancy Master Steward



The best views often require an uphill trek. Photo by Dennis Eckel

Beginning a hike at the Sunrise Trailhead is a perfect way to start a day, especially if you're an early riser. This trail can be busy with hikers, particularly on weekends, but it's a real treat if you are fortunate enough to go on a weekday morning.

Sunrise Trailhead is in a residential neighborhood, but the neighborhood below is quickly lost to the steep, rocky terrain that awaits above. The first 1.2 miles bring you to a scenic view area, a perfect spot for a quick break to take in the surroundings and catch a breath before forging ahead to Sunrise Peak, which lies about 1 mile straight up.

Getting to Sunrise Peak is exhilarating and well worth the push to see the spectacular views that will make you feel on top of the world. At the peak, stunning views of Four Peaks to the northeast, the Superstitions to the southeast, and South Mountain and Camelback Mountain to the southwest unfold before you. Hold on to your hat up there as most days are breezy. The weather is unpredictable, so a light jacket is useful to have year-round. By now, you have hiked about two miles and gained about 1,000 feet in elevation.

Now that you have your heart pumping and blood flowing, take the trail that veers left down the steep, rocky peak, reconnecting with the Sunrise Trail. In about a half mile, there's an old horse hitching rail, although you might find more bikes hitched there than horses. Continuing to the right, head down the Andrews–Kinsey Trail, which connects Scottsdale's McDowell Sonoran Preserve to the Fountain Hills Preserve in about two miles. Now that you have those legs awake, you can switch gears, go on auto-pilot, and enjoy the rest of the hike and its magnificent views.

The Andrews–Kinsey Trail is more moderate and less rugged, with an elevation change of about 400 feet. Named after preservation champions Chet Andrews and Roy Kinsey, the Andrews–Kinsey Trail is a favorite of hikers and



bikers alike. Both Andrews and Kinsey were instrumental in forming steward programs in their respective communities, Scottsdale and Fountain Hills. Given their time and service, it is appropriate that this trail bears both their names.

If the winter rainfall has been sufficient, the trail might be awash with the vibrant colors of spring wildflowers. About a mile down the trail, there's a south-facing scenic view with a 2,900-foot elevation. Don't forget to stop and "smell the roses" while you're there. In the distance, you will have a great view of Camelback Mountain. Then, as you continue along the path, more scenic views, with plentiful vegetation, jagged rocks, and a narrow path overlooking the canyon, unfold. The view is breathtaking. Sometimes, it moves me to tears.

As you follow this winding trail, your journey soon ends as you make a few quick twists and turns on your way to the boundary where the Scottsdale Preserve meets the Fountain Hills Preserve. After a short break—and a much-deserved snack—you are ready to turn around and return to Sunrise Trailhead, where it all began. Don't take backtracking on this trail for granted. The view going in the opposite direction is stunning and presents an entirely different perspective of Adero Canyon.

The Sunrise/Andrews–Kinsey trek is 8.5 miles long and offers an elevation gain of about 2,000 feet. If you like mixing a physically challenging trail with a moderate, beautifully landscaped trail, these two offer the perfect combination. They are sure to put a smile on your face. ▲▲

Top photo: If the weather conditions have been right through the Fall and Winter, in Spring you may see beautiful cascading carpets of wild flowers with cholla, barrel and saguaro cacti interspersed. Photo by Jeanine Allsup

Bottom photo: Views like this one from Andrews–Kinsey Trail deserve a pause in our hiking or biking to take in the natural beauty of the trail. Photo by Jeanine Allsup

The 360 degree views from the top of Sunrise Peak include the Central Arizona Project canal, the southern part of Fountain Hills, Red Mountain (also called Mt. McDowell), the Goldfield range and the Superstition Mountains. Photo by Dennis Eckel





The Chu family at the ceremony celebrating their gracious gift. Gateway visitors for many years to come will appreciate the Chu family's contribution. Photo by Jim Tillinghast

See the McDowell Mountains in 3-D!

By Denise Villalon,
McDowell Sonoran Conservancy Steward

When the Gateway Trailhead in Scottsdale's McDowell Sonoran Preserve opened to the public in the spring of 2009, it featured a large, three-dimensional, table-top topographic map of the area, including the Bajada Nature Trail. Both the map and trail were designed to convey information about unique features of the geology, flora, and fauna of the Sonoran Desert to give visitors a more complete, immersive desert experience. Both have contributed greatly to visitors' understanding of how our well-adapted plants and animals do not just survive but thrive.

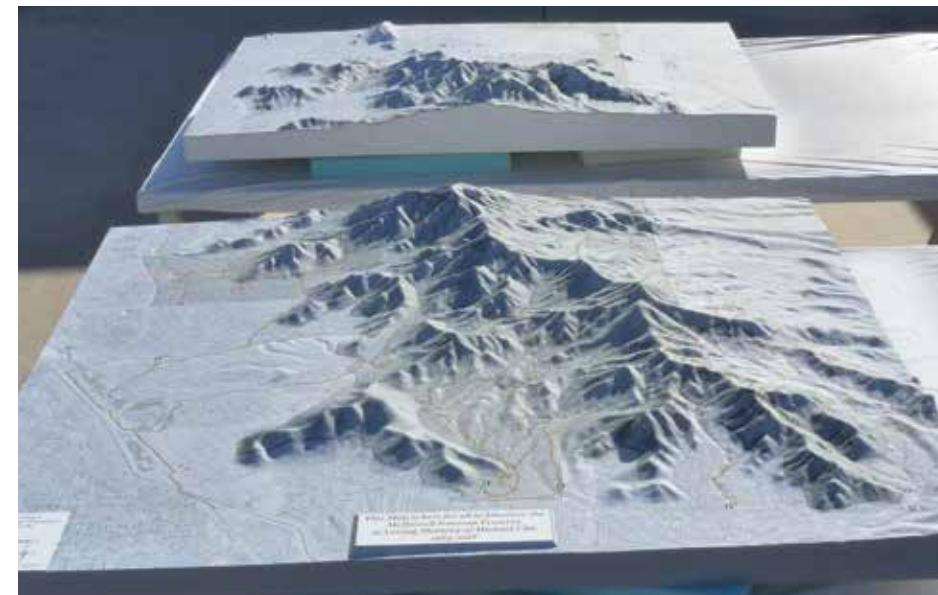
However, recently the map started showing serious signs of delamination and was in need of replacement.

Happily, a new 58x82 inch 3D topographic map of the McDowell Mountains was recently installed at Gateway. The map, which was unveiled on Saturday, May 15th, 2021, is a gift from the Chu family in memory of their son and brother, Michael. A small gathering of family, friends, and representatives from the McDowell Sonoran Conservancy and the City of Scottsdale was present for the ceremony.

The map was manufactured by a company located in Fillmore, California,

using digital data provided by the City of Scottsdale to cut the model out of two panels of high-density polyurethane foam. Each panel took about eight hours to machine. Then the panels were coated with primer, and the image of the map was printed on their surfaces using a custom 3D inkjet printer, a process that took six hours for each panel. Finally, a protective coating was applied, and the panels were precision trimmed to minimize visibility of the seam. The map is protected by a 240-pound acrylic cover, which was funded by the City.

Now, visitors can get a bird's



Manufacturing the map was a multi-step process from gathering the topographical information to the final protective coating. Photo courtesy of Solid Terrain Modeling

eye perspective of the McDowells and their expanse, something that would not be possible standing at the base of the mountains at a trailhead. Hikers, cyclists, and equestrians have the unique opportunity to select a desired route through the mountains from above and are able to study finer

details of chosen trails than are usually included on a paper or digital map. The 3D relief also offers the visitor a wider view of the scope of trails that have been built and maintained by the City of Scottsdale and the Conservancy. Additionally, attached to the front of the map is a description of the eleva-



Chu family members along with trailhead visitors and Conservancy stewards all enjoy planning routes using the new map. Photo by Jim Tillinghast

tion profiles for 11 trails in the southern section of the Preserve.

For those with a curiosity about the McDowells and how these complex mountains formed millions of years ago, the topographic map is also a teaching tool. The observer is able to see that the range runs roughly from north to south but that the mountain ridges themselves are oriented east to west. A complete map of the geology of the McDowells was completed over a ten-year period by Dr. Steven J. Skotnicki and digitized by a team of Conservancy stewards under the direction of Brian F. Gootee, research geologist with the Arizona Geological Survey. It features 86 different variations of rock and was published in 2018. The map is available at repository.azgs.gov/uri_gin/azgs/dlio/1890.

Perhaps most importantly, the new topographic map offers visitors who may be unable to hike or bike in the McDowells a unique sensory experience while at the Gateway Trailhead of what it must be like to be amidst the mountains, looking up at their towering peaks and down toward their deep canyons. The inscription on the map reads, "This Map is here for all to Discover the McDowell Sonoran Preserve in Loving Memory of Michael Chu." ▲▲



The "big map" is a popular gathering point for hikers and bikers as they talk with Pathfinders in preparation for going out on the trails.

Celebrating 16 Years of Trailhead Ambassadors

By B.J. Tatro, McDowell Sonoran Conservancy Legacy Steward, and Barbara Montgomery-Ratcliff, McDowell Sonoran Conservancy Lead Steward

How many of you have talked to a blue-shirted McDowell Sonoran Conservancy volunteer steward at a trailhead before or after a hike, bike, or horse ride in Scottsdale's McDowell Sonoran Preserve? That steward was probably a member of the Conservancy's

Pathfinder Program. Pathfinders are stationed at the trailheads to answer visitors' questions; advise them about desert safety, trail routes, and visitors' responsibilities as Preserve users; and to promote the Conservancy/City of Scottsdale partnership in managing the Preserve. As we celebrate the many

milestones over the Conservancy's last 30 years, we tell the story here about how the Pathfinder Program was conceived and implemented.

The idea for Pathfinders began in informal conversations among Conservancy stewards in coffee shops in early 2005—back then, there



Reidun Daeffler, Sue Handke, and Fred Mirmelstein wear Pathfinder shirts from different periods during the program's history. Photo by Jim Tillinghast

were no Conservancy meeting places like Conservancy offices or trailhead conference rooms. Nevertheless, stewards gathered to share ideas for services to be provided in the future when there would be multiple trailheads and many more Preserve users. The early group included Chet Andrews ("Steward #1"), Pat Catalano, Alice Demetra, Dan Gruber, Len Marcisz, Mary Lou Mulloy, and B. J. Tatro.

The group foresaw the value of having ambassadors at trailheads to provide information, promote SAFE ENJOYMENT (the pathfinders mantra), and encourage support for the Conservancy and Preserve. As a first step, a pilot was conducted in May 2005 to evaluate the potential value of the program to visitors and the Conservancy's ability to implement it. The pilot was a clear success!



Maps – whether foldable paper ones, electronic ones on phones or large laminated ones on a steel base – are indispensable tools for Pathfinders as they give advice to visitors.

Through the summer of 2005, the program structure was developed by Conservancy stewards with City of Scottsdale support. Many names for the program were considered, but Bernie Finkel (then Steward Chair) suggested the one that was chosen—the Pathfinder Program. Bernie asked B. J. Tatro to be the first Pathfinder chair and to develop the program. Soon B. J. was joined by the other seven original Pathfinders: Chet Andrews, Pat Catalano, Alice Demetra, Larry Levy, Jenna Lillibridge, Mary Lou Mulloy, and Gary Shapiro.

By November 2005, 12 Pathfinders were working at two trailheads—Sunrise and 128th Street. In December 2005, the Arizona Republic ran an article about the Pathfinder Program, entitled "Eyes and Ears of the Conservancy." The program had arrived, and the community embraced it.

Once Lost Dog Wash Trailhead was dedicated in March 2006, pathfinding was discontinued at 128th Street. Initially, Pathfinders worked at Sunrise and Lost Dog Wash trailheads on weekends. Over time, weekday hours were added. Gateway Trailhead opened in 2009, and initially Pathfinders were deployed there on weekends. Stewards Sue Handke, Jerry Harris, and others stepped up, and soon Pathfinders were available every day at this busy trailhead. Although Pathfinder services were discontinued at Sunrise Trailhead, trailheads continued to be added—Tom's Thumb (2012), Brown's Ranch (2013), Fraesfield (2019), Granite Mountain (2019), and Pima-Dynamite (2021).



Pathfinders typically ask visitors questions about previous desert experience in order to provide useful advice. Photo by Dennis Eckel

With each new trailhead addition, the Pathfinder Program grew as well. Starting with the initial eight, the number of Pathfinders had grown to 173 by March 2021. Pathfinder volunteer hours also grew from 272 for the 2006–2007 season to 4,169 for the 2019–2020 season, a 1,433% increase. Adding the Pima-Dynamite Trailhead will require even more Pathfinders.

From the beginning, the Pathfinder team managed its own logistics, including schedules and hours, defining the Pathfinder role, and recruiting and training new Pathfinders. A leadership infrastructure was needed to support the growing demand for Pathfinders. Thus, a Scheduling Coordinator position was created, filled by Steward Reidun Daeffler. In 2009, the program adopted trailhead-specific

teams and additional leadership positions to support program growth. Today, the leadership team numbers 18 and includes a Chair, Assistant Chair, Communication Lead, Safety Lead, and Trailhead Leads and Assistant Leads for each of the six (soon to be seven) manned trailheads.

In the first few years, administrative support was not available from the still-developing Conservancy staff. Therefore, the Pathfinder Chair and Scheduling Coordinator set up spreadsheets to capture Pathfinder contact information, training, continuing education, trailhead preferences, and shift schedules. Over the years, technology progressed and, now, using a single phone app, Pathfinders can sign up for shifts, submit their shift reports, log their volunteer hours,

and consult records of their training activities. Leadership uses the same technology to pull summary reports to inform future planning.

Physical resources also have changed. Initially, trailheads did not have storage facilities for Pathfinder use. Materials were kept in bins on B. J. Tatro's front porch near Lost Dog Wash Trailhead, and Pathfinders stopped by to pick them up. B. J. always wondered what her neighbors thought was going on with cars pulling up at all hours! Today, the Conservancy and the City supply the needed materials, and Trailhead Leads tailor trailhead-specific information—all conveniently stored at each trailhead.

It's clear that our Pathfinders need to be great, knowledgeable stewards. Therefore, Pathfinder training includes

being a qualified steward, attending the Pathfinder orientation class, doing at least two trailhead training sessions with experienced Pathfinders, and attending the first aid class offered by the City and the Conservancy. Thereafter, Pathfinders must attend the orientation session and the first aid class once every two years and are encouraged to take Conservancy courses about the Preserve flora, fauna, geology, and ecology.

Pathfinders also need the ability to adapt quickly to unexpected circumstances. For example, Pathfinders have searched for lost hikers and bikers, managed care for visitors with heat exhaustion, helped countless fearful children and adults understand how to act safely around a rattlesnake sunning itself near the trailhead, and convinced children clutching souvenir rocks to leave them in the Preserve for the lizards' homes, packrats' nests, or worms' shade.

Perhaps the Pathfinder Program's



For the safety of pets and wildlife in the Preserve, owners are required to keep their pet on a short leash – be it a dog or, in this case, Cuzco, a llama, who visited Alice Demetra in the early days of the program.

biggest challenge came on March 13, 2020, when safety concerns related to the pandemic led to a halt of the traditional Pathfinder activities at trailheads. Since then, Pathfinders have helped to keep maps stocked at trailheads and hiked/biked the trails. Throughout this period, Pathfinders worked with the City of Scottsdale and Conservancy to create new signage with safety precautions and trail route suggestions for hikers, bikers, and equestrians. This spring, pathfinding pilots were conducted to test new procedures in light of the pandemic. Activities over this past year have had laser focus on one thing—to be ready to restart pathfinding when conditions allow.

The Stewardship 2010 study described an organizational model for the Conservancy that would allow hundreds of volunteers to be productively deployed in many different initiatives and be connected to each other, the Conservancy, and City of

Scottsdale, all in support of the Conservancy's mission. The Pathfinder Program served as one of the models for the study's recommendations because of its strong steward leadership, team approach, clear expectations, structured activities, social interactions, regular communications, and opportunities for learning, all qualities

PATHFINDER PROGRAM CHAIRS

B.J. Tatro, 2005–2010

Tom Heideman, 2010–2012

Bill Parker, 2012–2013

Rick Cooper, 2013–2015

Gene Eilers, 2015–2017

Phil Pounds, 2017–2019

Barbara Montgomery-Ratcliff, 2019–2021

Rory Cassedy, 2021–

that continue today.

Pathfinders know they make a difference. For this reason, the essence of the program—effective communication with visitors—has remained the same through the years. Pathfinders also have fun doing what they do! Who else has so many stories to tell about how they helped people safely enjoy the Preserve? Who else has encountered barefoot hikers, llamas on lead ropes and cats on leashes, trailhead rattlesnakes, lost kids, lost husbands, lost car keys, overheated dogs, and dogs covered in cholla balls? Pathfinders, of course! They truly make a difference...just ask anyone who has benefitted from their information, guidance, assistance, or simple friendly welcome. Next time you're at a trailhead, stop by and say hello to the Pathfinders. Maybe ask them for one of their great Pathfinder tales! ▲▲



Packrats are also known as woodrats due to their habit of collecting wood and cholla joints for their above-ground nests. This rat has used a downed tree for support and protection of its nest. Photo by Dennis Eckel

Ecological Connections Among Dead Trees, Bacteria, Beetles and Bees

By Steve Jones, Botanist

Central Arizona entered a long-term drought period beginning around 1990, in part as a result of the increase of greenhouse gases in the atmosphere leading to a general planetary warming. With occasional breaks (the heavy precipitation in October 2018 stands out), trends suggest a period of aridification—lower precipitation and higher temperatures—for the foreseeable future in central Arizona.

Analysis of packrat middens in the southwestern United States have

revealed vegetation changes over the last 40,000 years. Landscapes here have shown an increase in plant species adapted to warmer and drier conditions over that period. However, the rate of change in climate conditions over that time was much more gradual than the rate measured in the last hundred years. One study of recent trends suggests that the abrupt change in seasonality of winter rains, beginning in December rather than October, promotes germination of cold-weather over warm-weather

winter annual plants.

Another result of this recent surge is an increase in the death rate of trees and shrubs in our wildlands. Although these conditions have provided more material for organisms that normally break down dead plants, those organisms are also negatively affected by the drier conditions. In particular, fungi and bacteria require a certain amount of moisture to survive and thrive. Insect numbers also fall during dry periods, in part due to the lack of moisture. These positive feedback loops will likely

result in an increase in the number of standing dead trees in Scottsdale's McDowell Sonoran Preserve and surrounding wildlands.

The dominant trees here are four members of the bean family: foothills palo verde (*Parkinsonia microphylla*), blue palo verde (*Parkinsonia florida*), velvet mesquite (*Prosopis velutina*), and desert ironwood (*Olneya tesota*). Blue palo verde are the shortest-lived, less than 100 years on average, and its wood is the fastest to break down after death. Ironwood's dense and toxin-filled wood surpasses them all for longevity. Pieces of downed ironwood found in the desert have been carbon-dated to 1,600 years old. Its wood does not so much rot as erode; the toxins have to be washed out to allow organisms to break it down.

The main organisms involved in decomposition of the wood are fungi, bacteria, and insects—known in some circles as “FBI.” Their actions benefit not only themselves; they also reduce the cellulose and lignin that make up tree wood to nutrients that can be used by other organisms. For instance, beetles, particularly long-horned wood-boring beetles, lay eggs under the bark of dead and dying trees. The larvae that hatch have strong jaws that can tunnel through wood, leaving broken-down frass, meaning debris, along the way.

The tunnels the beetles leave behind are frequently used by native bees for raising their young. Female bees clear the tunnels of frass, stock the tunnel with nectar and pollen for their larvae to feed upon, lay an egg



The cross-section of this downed mesquite tree shows some tunnels bored by beetle larvae. Photo by Dennis Eckel

on the food, and seal the tunnel. The larvae consume the food, pupate within the tunnel, and emerge as adults the next flowering season to continue the cycle. Organizations such as the Center for Native and Urban Wildlife at Scottsdale Community College encourage people to create habitat for native bees by drilling appropriate-sized holes in the trunks of dead trees on their property.

The relationships among climate, trees, fungi, bacteria, and insects illustrate ecological connections that cycle nutrients through the biotic community. As climate conditions change, these connections are impacted. Reduced rainfall and higher temperatures have negative effects on

most species, including the activity of the “FBI” species responsible for decomposition of dead vegetation. One result: more standing dead trees. ▲▲



These holes drilled four years ago have hosted several generations of native bee. Upper holes are 3/8 inch wide, lower holes 1/4 inch, all 4 to 6 inches deep. Photo by Steve Jones

Revising the Conservancy's Approach to Education

By Phyllis Burks, McDowell Sonoran Conservancy Steward

It was June 2020. It was hot, and the pandemic was on people's minds. In this context, McDowell Sonoran Conservancy Legacy Steward Dan Gruber and I were reviewing a report from the 2018 Education Strategy Committee, which highlighted the need for a more cohesive curriculum and a new infrastructure to support education, one of the Conservancy's three defining pillars along with science and stewardship.

When the pandemic guidelines canceled all of the Conservancy's in-person gatherings, we were forced to rethink our educational programs and offerings. We saw a need to develop expertise in online distance learning and on-demand classes and activities. Also, as we talked with stewards, staff, and Conservancy friends, we found they were confused about how education was structured and functioned within the Conservancy.

To address these concerns, the Conservancy created the Educational Implementation Committee (EIC) and charged it with developing a plan for education that would do the following:

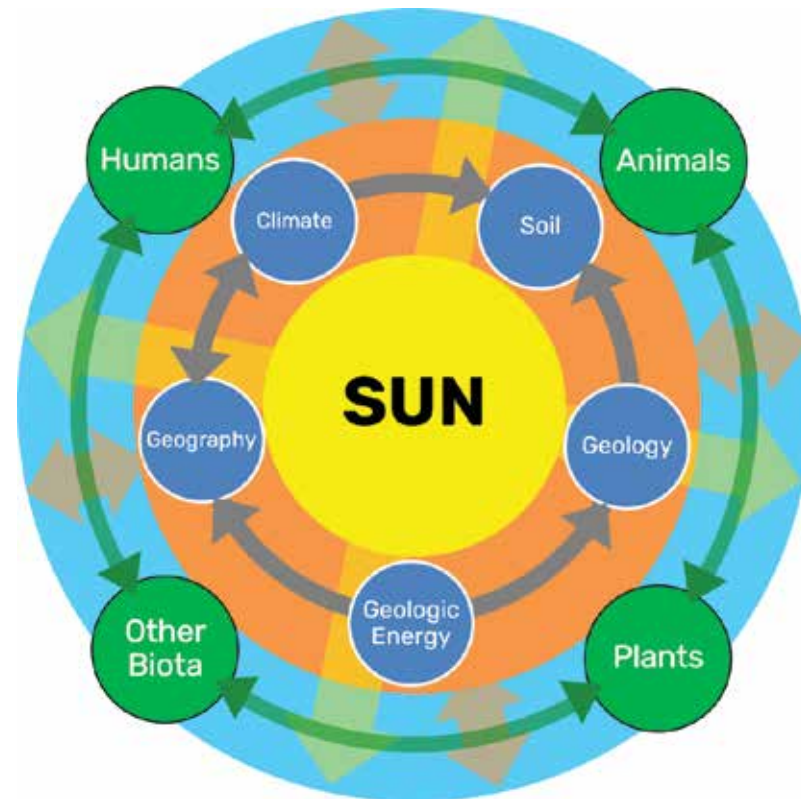
1. Meet the needs of 21st century learning styles.
2. Appeal to diverse audiences.
3. Provide an internal resource for stewards and staff.

4. Have a cohesive curriculum that spirals from entry-level interest to advanced level field research.
5. Develop engaging and accessible educational experiences for K-12 students.

The EIC's first task was to articulate the mission for educational endeavors. The following mission statement was adopted: To inspire, develop, and support environmental stewardship of

the Sonoran Desert and natural open space through impactful education.

As the mission took shape, the EIC began to envision a process for creating a curriculum that is both cohesive and flexible. Therefore, the committee proposed a new educational framework that focused on the idea that everything in an ecosystem is connected and always changing. They also developed a list of major areas



The Conservancy's new educational framework emphasizes the interconnectedness of climate, geology, plants and animals, including humans, in the Sonoran Desert. Graphic designed by the Education Implementation Committee



Different fields of study—life sciences, geology, human history, and environmental science—come together to help us understand the amazing Sonoran Desert ecosystem. Photo by Lynne Janney Russell

of focus for Conservancy offerings, including life sciences, earth sciences, ecology and environmental science, human ecology, and basic information about Scottsdale's McDowell Sonoran Preserve and the Sonoran Desert. Each area represents a lens through which to view and learn about the Sonoran Desert. Together, the areas provide a holistic understanding of this complex ecosystem, which facilitates a more organized approach for the develop-

ment of new educational offerings.

As the year progressed, the EIC transformed the Conservancy's in-person Expedition Days—a popular educational experience for school aged children—to an online format. The full program has five interactive modules developed with the assistance of the PastFinders Program, the McDowell Sonoran Conservancy's Parsons Field Institute, several Arizona State University professors, and numerous



Exploration and curiosity are not just for kids. The Conservancy creates educational opportunities that engage audiences of all ages and inspire personal action. Photo by Lynne Janney Russell

stewards and staff. More than 70 classes from local school districts registered for the program, which is now available to them on the Conservancy's website.

Finally, the EIC developed a plan to gradually implement a consolidated, staff-managed education system in which course topics, target audiences, channels of delivery, and venues are coordinated for each course to provide the most effective learning experience for participants. The revised Education Program provides a structure for Conservancy education that is similar to the Parsons Field Institute, with staff, associated with the Sonoran Education Center, providing organizational guidance and moving the Conservancy's education mission forward in collaboration with dedicated volunteer stewards who are members of the Education Program. The Education Program is assisted in its efforts by project teams. Currently, there are five: Curriculum Team, Inventory and Review Team, New Education Offerings, Glossary Team, and Kid's Passport Team.

As the Conservancy continues to grow and strengthen our education pillar, we are committed to engaging diverse audiences in environmental education that inspires caring for, and personal investment in, our amazing Sonoran Desert. We invite you to look online at the many educational opportunities offered by the Conservancy for adults and children by going to <https://www.mcdowellsonoran.org/education>.



Sonoran Desert 101: Teaching that Everything is Connected and Always Changing!

By Dan Gruber,
McDowell Sonoran Conservancy Legacy Steward

From its beginning, the McDowell Sonoran Conservancy has used formal and informal education to help the public and stewards better appreciate the Sonoran Desert and the importance of Scottsdale's McDowell Sonoran Preserve. Knowledge about the central features of the Desert—its plants, animals, and natural and human history—helps all of us be better stewards of the land and its inhabitants.

The structure of Conservancy education has changed over the years and continues to evolve, reflecting advances in educational methods and content. A newly created online course called Sonoran Desert 101 (SD 101) is a case in point. Based on the research and planning of a team of Conservancy staff and stewards, the course focuses on the central features of the Sonoran Desert at an intermediate level of learning—beyond what is found in introductory brochures and brief informational exchanges yet not at advanced coursework levels. The course is intended for the public and Conservancy stewards.

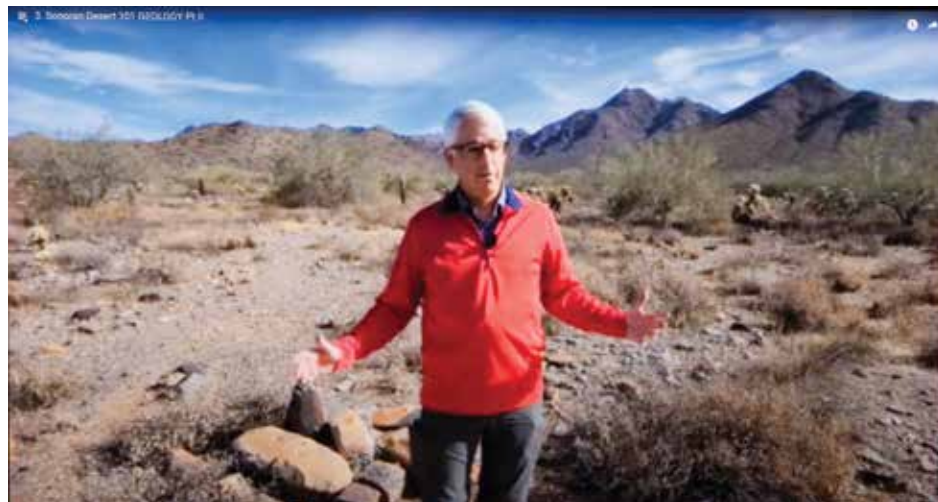
SD 101 also reflects the Conservancy's newly adopted educational approach, based on the principle that in an ecosystem "everything is connected and always changing." The course

teaches that ecosystems reflect the interactions between living things and their environment. Ecosystem success depends on adaptations by plants and animals to the specific environmental challenges they face.

To illustrate, here in the desert, two major challenges obviously are lack of water and high heat. SD 101 points out that these challenges result from the impact of geological processes over millions of years, which have shaped the land, produced the soil, and contributed to the climate. The course examines how successful desert species have adapted to the lack of water and high heat by enduring them, evading them, or escaping them altogether. For

instance, cactus and other succulents endure the lack of water by storing it when it's available. Other plants are drought-tolerant, shedding leaves and branches or becoming dormant when it's hot and dry. Annual plants, like our wildflowers, escape the challenges altogether by compressing their life cycle into the period when temperatures are benign and water is available. Many birds and some larger animals escape by migrating to less challenging environments during desert summer.

SD 101 also examines how humans have responded to and also modified the environment. Early hunter-gatherers depended on available water and game and moved to follow them.



Online SD 101 uses videos in which Conservancy experts present essential information for understanding the Sonoran Desert.

Later, humans in pre-Columbian local cultures built canals and used agriculture to provide food, leading to permanent settlements. Europeans dramatically altered the environment, in some cases building on the work of the earlier Native American cultures. Looking forward, climate change is expected to make the Sonoran Desert hotter and drier overall but with an increased frequency of extreme temperature and rainfall events. Desert plants and animals, including people, will have to adapt to these changes or be replaced by other species that can adapt.

We invite you to take SD 101. It is free and accessible to the public by going to the playlist of educational

What's Different about the Sonoran Desert?

Two substantial rainy seasons

Mild winters

Result in:

High biodiversity



© 2020 McDowell Sonoran Conservancy

12

SD 101 examines common characteristics of all deserts and the unique characteristics of the Sonoran Desert.

videos on the Conservancy's YouTube channel: <https://bit.ly/Conservancyvideos>.

Stewards can access SD 101

in Steward World by going to the education page and clicking on SD 101 Videos. ▲▲

Four Easy Ways to Support the Conservancy



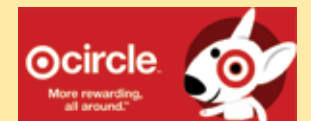
Shop from the comfort of your home and earn rewards for the McDowell Sonoran Conservancy using AmazonSmile. To link your Amazon purchases to the Conservancy, visit smile.amazon.com and select "McDowell Sonoran Conservancy" from its list of approved charities.



Now you can support the Conservancy when you shop at Fry's by joining its Community Rewards Program. Join the program by visiting frysfood.com and selecting "Fry's Community Rewards" under "Community" at the bottom of the page. Select "McDowell Sonoran Conservancy" from the list of eligible organizations.



You can create a Facebook fundraiser in support of the Conservancy. Just log into Facebook and click "Fundraiser" under "Create" in the left column. Click on "Nonprofit" and then search for "McDowell Sonoran Conservancy." from the dropdown list under "Nonprofit." Share your fundraiser with friends and family and let them know why you support our mission.



The McDowell Sonoran Conservancy is proud to announce that it's now a part of the Target Community Giving Program known as Target Circle. List the Conservancy as your non-profit partner and Target will direct a charitable donation each time you shop and use the Target Circle app.



MCDOWELL
SONORAN
CONSERVANCY

7729 East Greenway Road
Suite 100
Scottsdale, AZ 85260

Connect with us:



The Scottsdale McDowell Sonoran Preserve is owned by the City of Scottsdale and is managed through a unique partnership between the City of Scottsdale and the McDowell Sonoran Conservancy. Our shared goal for the Preserve is to maintain it in a natural state while providing appropriate recreational and educational opportunities for this and future generations.

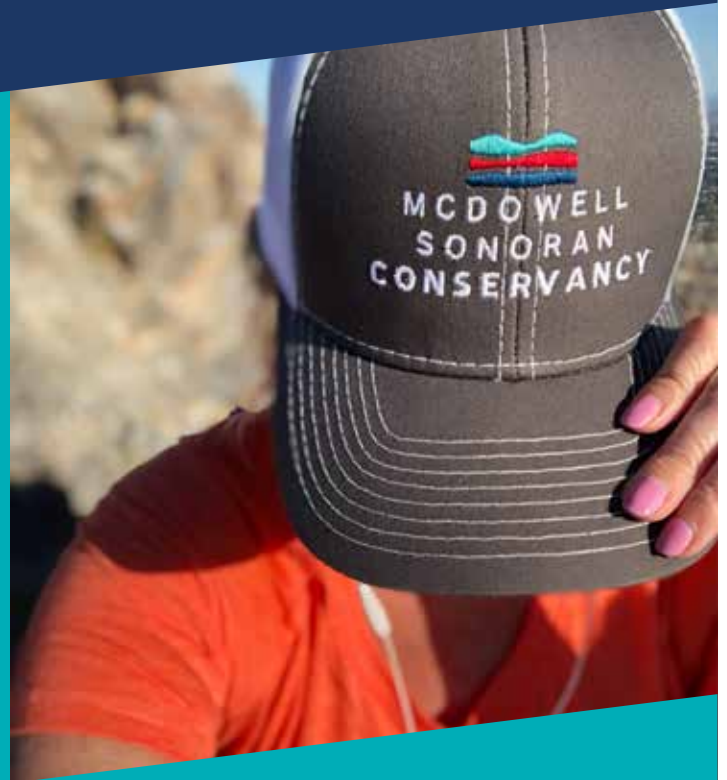
Hats On.

We've got your head covered.

Visit conservancymerchandise.org
to purchase your swag today!



MCDOWELL
SONORAN
CONSERVANCY



mcdowellsonoran.org | info@mcdowellsonoran.org