

MCDOWELL
SONORAN
— CONSERVANCY —



Mountain Lines

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Sowing Seeds in the Preserve



This issue of the Mountain Lines is themed "Sowing Seeds in the Preserve". Seeds represent new beginnings, youth, reproduction, a 'source,' a catalyst, and many other things in different cultures. This seemed to be the perfect theme for our summer issue.

MSC's fiscal year runs from July through June. The first quarter, July, August, and September, is spent planning and preparing for the busy season, which launches with McDowell Sonoran Month in October. This process of rejuvenating, and in some cases, creating programming is much like seeding a garden that we will tend throughout the year.

Nature is also producing seeds over the summer. Spring's flowers have produced fruit that are now ripening and the Preserve's animal residents are producing new families. Even the land itself is renewed through summer monsoon rains – we hope!

Seeds face a great challenge when sprouting in the summer. Water is sporadic and the sun is intense. As plants dry out, a tender seedling makes a tasty treat for hungry wildlife. Seedlings are not without protection, however. Scientists credit the unassuming triangle leaf bursage as being, perhaps, the most important plant in the Sonoran Desert because of its role as a nurse plant. The seedlings of literally hundreds of species get their start under the tight, shady canopy of this scrubby plant.

MSC needs its own form of nurse plants for the summer as well. We begin our year in the toughest economic quarter for businesses in the Valley. Initiating our programs while fundraising income is low strains the organization, just as the lack of water and intense sun strains the seedlings we protect.

In the spring issue, I challenged you to introduce someone to the Preserve while the weather was mild and the landscape was in full bloom. You rose to the challenge! Trail counters recorded levels of visitation greater than we had hoped and participation in programming soared. The Gateway logbook shared comments from many, many people who were experiencing the Preserve for the first time.

In this summer issue, I ask that you consider making a gift during this quarter to help us sprout our programming for the upcoming year. Be our bursage! With your caring support, we will continue to meet our mission of completing and sustaining the Preserve and partnering with the community to engage everyone with our living treasure.

See you on the trails!

Ruthie

Thank you to the ASU Non-profit Institute Public Allies program for partnering with MSC to provide June Cho for a 10-month residency. June - We wish the best in all you do. Thank you for your energy and commitment.

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Cover Photo: Storksbill filaree by R. Carll
Back Cover Photo: 2009 Focus on Conservation entry by C. Collins

Corrections: The photo caption on page 5 of the last issue of the Mountain Lines should have been credited to Kris James. M. Wallace should have been listed as M. Jensen.

About MSC

The McDowell Sonoran Conservancy champions the completion and sustainability of the McDowell Sonoran Preserve for the benefit of this and future generations. We connect the community to the Preserve through public and private partnerships, environmental education and stewardship.

Mountain Lines

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Teen Stewards

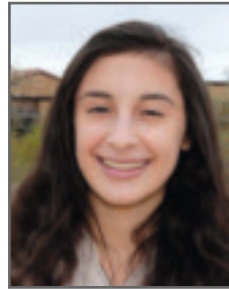
By Brenton Woodward and Kayla Shipp, Foothills Academy Seniors

We originally became Stewards for a school project. As a graduation requirement at our high school, seniors pick a non-profit organization with whom they want to volunteer for 100 hours. We were initially drawn to the MSC because it would allow us to go outside and hike, something we both enjoyed. Nature is something that is best appreciated first-hand by active exploration, and hiking is, for us, an excellent way of doing this. A volunteer organization that incorporated hiking as part of its operation seemed a fitting choice. After attending Steward Training, hiking the Gateway Loop and helping out in the office, we were further convinced that we had found a fulfilling and comfortable volunteer environment.

Another reason we wanted to work with the Conservancy was the allure of saving the environment. Every aware person has some sense of obligation to the environment, it seems, but not all have a clear idea as to how they can take direct action. As we learned more about the MSC and the Preserve, we realized the importance of the organization and the work that it was doing, and knew we were part of a vital effort to protect a piece of the dwindling natural environment in our community. Here was a way of making an impact, of contributing to a movement that had produced visible, tangible results. Here was a way to take environmental conservation from an abstract concept to a personal mission. Here was our chance to make a difference in a meaningful way.

When we joined the McDowell Sonoran Conservancy, we were two of the three teenagers in our steward class of around two dozen. We looked around and saw middle-aged men and women who worked in offices, who owned businesses, who were comfortably retired, who were basically upstanding members of society; and there we were, high school students, eating our free breakfast and trying not to feel out of place. What we noticed immediately, however, was that we were treated as peers by everyone we met. New and seasoned Stewards alike greeted us warmly and made us feel welcome, and we were given every opportunity to get involved and make an impact in whatever way we chose. This cheerful and supportive reception has continued throughout our work with the MSC, whether in the office or on the trails.

In addition to our trail patrol and office assistance duties, we are on the Photography Contest Committee and the *Mountain Lines* Committee, where we serve as the youth insight and try to help the MSC reach young people more effectively. Ruthie and Linda, as the leaders of the committees, have especially have made us feel like crucial parts of the team and always consult us for our opinions, but all of the committee members give us respect and attention beyond our years. That is basically what has made our time with the MSC so pleasant and rewarding—that universal welcoming and inclusion. As the saying goes, teenagers are people who act like children if they aren't treated like adults. There has never been any danger of that throughout our time as Stewards, and both of us appreciate that and have benefited from many novel and educational experiences because of it. Being a Steward is an opportunity not only to contribute to a cause, or to fulfill a requirement, but also for personal growth. This is due in part to the nature of the work and the mission of the organization, but most of the credit goes to the people, the other Stewards and staff who make such an effort to create a nurturing and productive environment.



Kayla Shipp



Brenton Woodward



Support for this program
generously provided by APS.

Youth in the Preserve

The presence and protection of natural areas and wildlife, such as is found in the McDowell Sonoran Preserve, enhances the quality of our lives. In fact, a growing body of research shows that contact with the natural world improves long-term physical and psychological health.



Unfortunately, data suggests that only 31% of children today are playing outdoors, compared with greater than 70% of their mothers. Advances in technology, TV watching, and the video game explosion have created the phenomena of “nature deficit disorder” in children today. A symptom of this disorder, directly related to a decline in kids’ contact with nature, is the rising obesity epidemic.

At McDowell Sonoran Conservancy, we are working hard to change this trend. We know that we need to get kids out into nature in order to value it. As children experience nature, they are required to make decisions not presented in a more planned environment—ones that develop a sense of ownership within each child.

MSC is clearly focused on offering programs that will get youth outdoors. Programs include the teen steward program, family hikes, conservation activities and interactive programming at trailhead access areas.

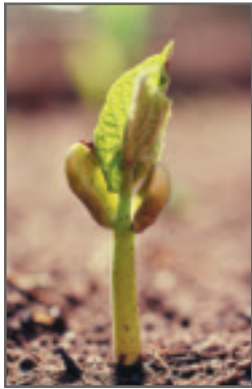
We provide opportunities for the type of learning that is fostered in the natural environment, including spontaneity, challenge, creativity, curiosity, surprise, problem-solving, adaptation, discovery, and exploration. For more information about MSC youth programming, please visit our website at www.mcdowellsonoran.org

We have a powerful potential in our youth, and we must have the courage to change old ideas and practices so that we may direct their power toward good ends.

– Mary McLeod Bethune

Sowing Seeds in the Preserve

By Ruthie Carll MS, MSC Executive Director



Like a baby just before it is born, a seed is already an individual slightly different from each of its parents. The seed has structures that will develop into leaves, stems, and roots and until it sprouts, it is fairly safe in its protective seed coat, waiting for the right conditions to occur.

After sprouting, the young plant (seedling) lacks the tools needed to compete for resources or to fend off predators. If the young plant has sprouted beneath its parent, it has gained temporary protection, but in the long run will be in

competition with its parents throughout their lives. In the case of perennials – plants that live for more than a single season or year—this is particularly important. Annuals – plants that live for short periods – die before their seeds sprout the following year, so competition is not a factor.

For plants, ensuring that the next generation begins life with the best chances for survival means moving away from home and providing tools to successfully sprout. After that, the seedlings are on their own! This article reveals some of the amazing ways plants sow their seeds.

In order to understand how plants sow their seeds, you need to know the botanical definition of a fruit. Regardless of what the grocery calls a fruit, botanically, fruits are the part of a plant that hold or move a seed. This means that tomatoes, string bean pods, and peanut shells are all fruit. Even the fuzzy parachute of a dandelion is a fruit!

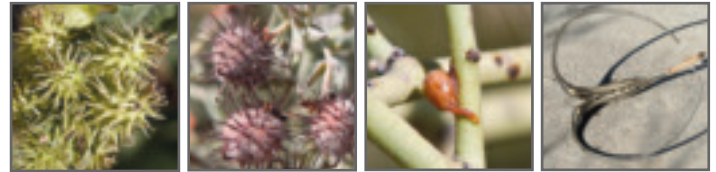
Moving Away From Home

Until a seed matures, the fruit's main task is to keep the seed safe while it develops. During this time, fruit are usually small and green, allowing them to go unobserved. When the seeds inside are ready, they signal this by the production of a hormone message that says, "It's time – I'm ready to go!" Now, the fruit, which was protecting the seeds, must metamorphose into something completely different – a transporter. The outcome of the change depends on each individual species' strategy for distribution.

Using the Outside of an Animal to Move

Some plant species have evolved tools that allow them to use animals to move their seeds. Triangle leaf bursage (a) and white ratany (b) are two common plants whose fruit have hooks that attach to fur. Mistletoe also uses the outside of an animal and manages to solve two challenges with one adaptation. Not only does mistletoe need to move its seeds, it needs the seeds to be specifically deposited on the branch of a tree where, as a parasite, it will grow its roots into the wood of its host. Mistletoe berries, which are quite sticky, are the favorite food of the Phaenopepla, a small black bird. While the bird is gathering berries, berries also stick to the bird's legs. The bird will fly to another branch to clean off the fruit, which then becomes stuck on this new branch (c). Fruits that rely on animals for transport

are not always small. This devil's claw (d) is perfectly adapted to wrap around the foot of a large animal like a coyote, javelina, deer, or jackrabbit. As the animal struggles to free itself from this annoying attachment, the pod breaks open and the seeds drop out.



a) b) c) d)

Using the Inside of an Animal to Move

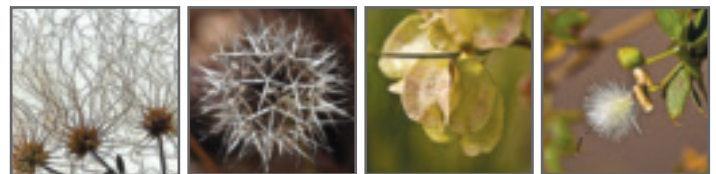
Other plant species rely on their seeds being moved by animals – in their stomachs. In this case, fruit and seeds must have complementary adaptations. First, the fruit must entice an animal to eat it and then the seed must be tough enough to survive the journey through the animal until it is passed later in its dung. What would tempt an animal to eat a fruit? Sugar and water! When the seeds are ready, the fruit of these plants will swell, becoming juicy and sweet. They usually change color too, making them easy to spot. While many people mistakenly think that plants produce food for us as some form of altruism, in reality, they are producing bait to lure us into doing something for them – transporting their young to a new home! While there are many examples of plants that produce this type of tempting fruit, perhaps the best at this in the Preserve are cacti such as this prickly pear (e) and saguaro (f).



e) f)

Using the Wind to Move

Wind is a common way seeds are moved. Sooner or later wind always comes by and it doesn't need to be attracted or rewarded. The fruit of species that use the wind will grow sails such as clematis (g), parachutes such as silver puff (h) or wings such as hop(i.) To be buoyant enough to be blown along the ground, creosotebush seeds are covered with hair allowing them to easily roll (j).



g) h) i) j)

Using Propulsion to Move

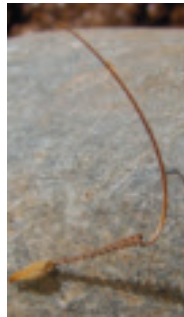
Some plants take matters into their own hands. Their fruit develops springs and levers that allow the seeds to be literally thrown to their new home. Notice the pods on this fairy duster in these photos before (k) and after (l) exploding. The one that is closed has not ripened. The other has burst open and hurled its seeds up to 10 feet away – enough to ensure that the parent plant is out of competition range.



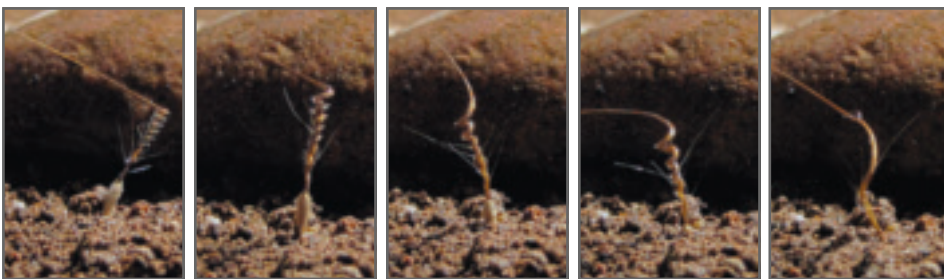
k) l)

Using Water to Move

Perhaps my favorite example of a fruit that is highly evolved is a common weed – storkbill fillaree (cover photo.) The fruit of this plant is miraculous! It moves the seed, determines when to sprout, and then actually plants the seed in the ground. First, the fruit (m) has stiff hairs and a hook at the end that helps it attach to a passing animal. Once it falls off, the seed/fruit waits on top of the soil until the next rainfall. The fruit will begin to uncoil when it gets wet (n.) The hook at the end of the fruit will anchor the seed on something like the rock below. This holds the fruit still and causes the seed end to spin. The tip of the seed is pointed so as the fruit unwinds, the seed is pushed into the soil. If the rainfall was brief, the soil will not be soft enough for the fruit to push in the seed. This is not a problem. The fruit will recoil as it dries and will go through this process the next time it gets wet. When the area has received enough rain, the soil will be loose enough for the fruit to plant its seed, finishing its mission of caring for and moving the baby plant (n.)



m)



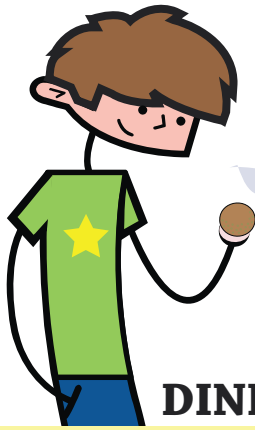
n)

Plants have been on this planet long before animals arrived. They are more strategic and sophisticated than we imagine. This is especially true for desert plants, as this environment is harsh for organisms that rely so heavily on water. The Preserve lies in a special area of a special desert. The Sonoran Desert, with its two rainy seasons, is the most lush of all deserts. The Preserve, located on its northern edge, has a tremendous variety of plants. I hope that during your next trip into the Preserve, you'll find a fruit of some kind and take a moment to appreciate these amazing, complex, and interesting structures.



Summer mornings are a great time to visit the barrier-free Bajada Nature Trail to see the flowers and fruit of summer-blooming plants.

Photographs for this article taken by: ©CORBIS,
R. Carll, J. Hamilton, M. Jensen, S. Jones, and B. White



Family Fun Pages

I just learned that seeds are actually baby plants. When it is time to sprout, they need to move to a place where they'll have enough sun, water, and space to grow. Since seeds don't have legs, they need something else to get around.

DINNER DISCUSSION*: How To Hitch A Ride

When we hear the word 'fruit' most of us think of apples and oranges. Scientists, however, use the word 'fruit' to mean 'the parts of a plant that protect and move a seed.' For example, peanuts are seeds, and their shell, which protects them, is a type of fruit.

Here is a challenge for you to discuss. Imagine that a golf ball is a seed and you have to move it across the room without touching it. You can, however, attach something to it so that it can use wind, water, your pet, or a 'thrower' like a pitching machine to throw it. What you invent will be the ball's 'fruit.'

Step 1: Choose a moving method for your golf ball seed. (Wind, water, your pet, or a 'thrower')

Step 2: Invent a tool (the fruit) that will help the ball (seed) use the method of moving that you chose. For example, if you chose water, a life jacket would help the seed float to the other side of the room.

Step 3: Ask each other questions about your seeds and fruit. Do the inventions seem like they would work? What improvements could be made to the fruit? What problems could a seed with this type of fruit face?

Step 4: Talk about some real-life seeds. Can you find any in your yard? What strategy might they be using to move around? Could people be 'seed-movers'? What kind of fruit would a seed need if a person was their moving method?

**Dear adults, The articles in this issue will help prepare you for this discussion. There are no wrong answers to these questions - only possibilities. And remember, encouraging kids to think creatively and stretch beyond their first thoughts helps build the critical thinking skills needed in science!*

Take it Further: Make your invention a reality! Create the fruit and seed pairing that you imagined. Test your creation with the moving method you chose. You'll be doing a real-life experiment!

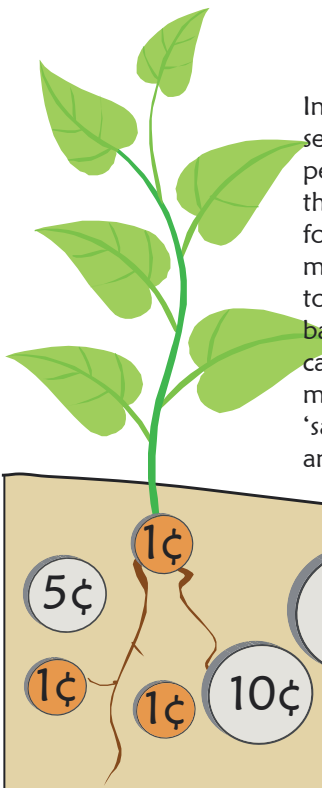
Welcome to the

Seed Bank of the Preserve

Saving for a nice rainy day.

In the desert, there are many many seeds in the soil waiting for the perfect time to sprout. Scientists call this the 'soil seed bank.' Saving seeds for the future is just like saving money. It makes sure that, after tough times go by, new things, like baby plants, can sprout! The seeds can be thought of like coins. The more seeds in the soil, the more 'savings' for the future. Take a try at answering these seed bank questions!

- 1) What is the total amount of seed money in this bank?
- 2) What seed coins could you use from this bank to make \$1.37? Is there another combination of seed coins that would also equal this same amount?
- 3) You need to have 75¢ to start your budget each year. You want to save enough to start the next 3 years. Do you have enough seed money in the bank? If not, how much more seed money do you need to add to your savings?



Seed Search!

Creosotebushes produce A LOT of seeds. Their fruit, covered with white hair, helps seeds move. Can you guess how? The hairs make the seed 'springy' so it can blow easily across the desert floor!

Can you find each of these seeds in this photograph of a creosotebush branch?



Let's Sprout Some Words

How many new words can you make from the letters in three words?

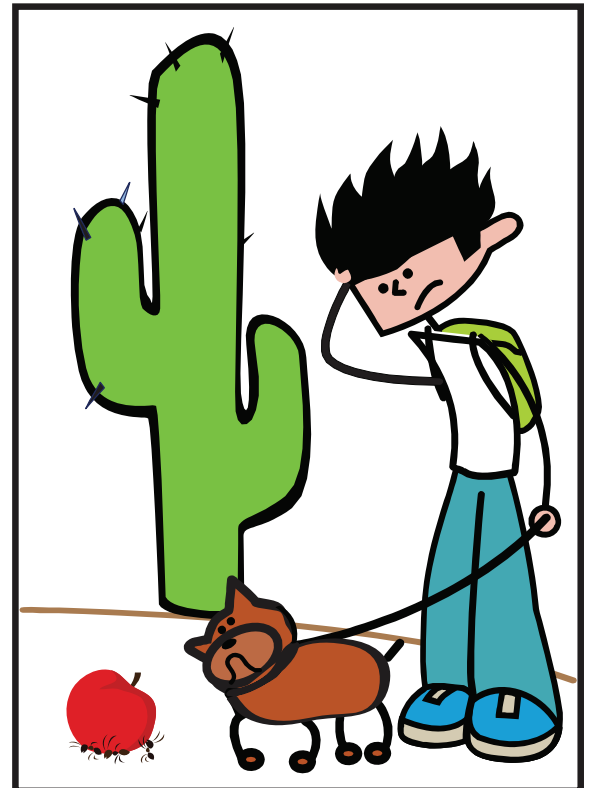
FRUITS MOVE SEEDS

5 Words = Jumpin' Jackrabbit! • 10 Words = Terrific Tortoise! • 15 Words or More = Wise Whiptail Lizard!

I love going for hikes in the Preserve with my dog Jack. I do a comic for the school newspaper about things that happen on my hikes. I have a challenge for you. I've drawn the comic to the right. You provide the caption. But there's a catch! You have to use the words 'Fruit' and 'Seed' in your caption.

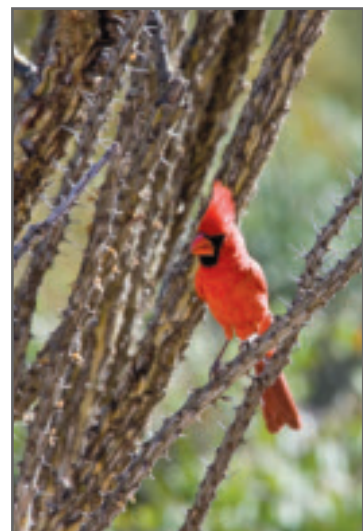


Mail your caption to MSC. We'll put some on our website and our favorite will be featured in the next issue of the Mountain Lines. Submissions from adults are welcome too!



Preserving our Desert and Mountains: The McDowell Sonoran Field Institute

By Ruthie Carll MS, MSC Executive Director



Photographs by: G. Andrejko, R. Carll, M. Jensen, S. Jones, A. Rodriguez, B. White

MSC now boasts more than 400 volunteers, financial stability, a contract with the City of Scottsdale (the land owner), an Executive Director who is an ecologist, and a top-to-bottom commitment to research as a guide for our stewardship of the McDowell Sonoran Preserve. Altogether, this means MSC is ideally positioned and prepared to launch a significant research initiative – the McDowell Sonoran Field Institute. While not a physical entity, the MSFI will be a process or forum for those interested in the ecology of the desert – from scientists to laymen – to discover, learn, and share new information. Seed funding has been acquired and MSC has commitments from the following partner institutions to provide the needed research expertise and leadership: ASU Global Institute of Sustainability, ASU College of Life Sciences, ASU School of Earth and Space Exploration, ASU School of Geographical Sciences and Urban Planning, ASU School of Social Transformation, Arizona Geologic Survey, and the Arizona Game and Fish Department.

The mission of the McDowell Sonoran Field Institute will be to protect the McDowell Sonoran Preserve by advancing research in the natural, earth, and social sciences; by providing scientific information to guide management practices and educate the community; and by strengthening the community through life-long learning opportunities.

AREAS OF RESEARCH

- **Biodiversity:** Study of all living things in the McDowell Sonoran Preserve
- **Sustainability:** Study of what we need to do to ensure the ecology of the McDowell Sonoran Preserve is protected
- **Geology and Earth Sciences:** Study of the land, what it is made of, and the natural forces at work
- **Human Impact:** Analysis of the impact humans have had, and continue to have, on the McDowell Sonoran Preserve including the social science aspects such as the influence of women in the cultural history of the McDowells.

CURRENT STATE OF LOCAL, ENVIRONMENTAL RESEARCH

Interviews with partner organizations revealed a trend of environmental research studies focusing on remote, exotic locations resulting in a lack of attention to the local habitat. More scientists at partner institutions study subjects overseas than in the local environment – even though the Preserve is considered by Arizona Game and Fish to be the most significant wildlife corridor in the Valley because it connects to millions of acres

of habitat in the Tonto National Forest. When completed, the McDowell Sonoran Preserve will be the largest urban preserve in the nation, though only recently have researchers of sustainability turned their eyes to the Preserve's wildland-urban interface, an I believe this should be 82-mile long, densely populated, fragile habitat that encircles the Preserve.

etation due to human impact. Currently, no catalog of flora or fauna within the boundaries of the McDowell Sonoran Preserve exists. In fact, local biologist Steve Jones has estimated that of the supposed 1,100 species believed to exist in the Preserve, only 396 have been identified and catalogued.



The ecology of the Preserve is significant as species from both the Lower Colorado River Valley and the Arizona Upland subdivisions coexist. The Preserve has 12 individual peaks and a 4,000-ft. elevation change and consists of old metamorphic rock to younger granite formations. These unique characteristics create a number of micro-habitats with specialized biotic communities and significant vegetative variability in each area.

Local scientists believe the Preserve's ecological integrity, or health of the ecosystem through measurements of biodiversity, is high. However, this is not something to take for granted. Often in areas that experience a diversity decline, the decline is irreversible by the time it is noticed. Unfortunately, the rapidly growing population in Phoenix—along with invasive species and diminishing water resources—are threatening the ecological balance of the Preserve.

The Field Institute's first priority is to conduct ecological monitoring of plant and animal life. Ecological monitoring has grown in importance as policy makers and the general public demand more accurate information on the status and trends of a wide range of natural resources, from air quality to wildlife populations, and from entire ecosystems to individual species.

This initial project will permanently document the plant, animal, and lichen species. Areas near trails will be particularly examined for signs of degradation to the topography and veg-

Monitoring of habitat components (vegetation cover, water resources, and soil stabilization) will supplement species monitoring. For instance, the Preserve supports healthy populations of many species because it offers remote areas for wildlife. The Preserve provides a functional corridor for wildlife to range between one of the state's largest regional parks, McDowell Regional Park, and the millions of acres of wilderness in the Tonto National Forest. Ensuring the viability of this functional corridor is a priority to ensure species survival and safe migration. Species that relocate seasonally do so safely and effectively using the corridor. Animals can find new mates in the neighboring natural areas connected by the Preserve so that genetic diversity can be maintained, ultimately having a positive impact on the overall population of wildlife found in this region. A diverse wildlife population allows for a more sustainable community.

MSC is positioned to assist highly educated and trained individuals to conduct research in the Preserve, expanding the potential productivity of partnering research institutions while at the same time conducting the highest quality stewardship of the Preserve. Participation in the research activities by youth through seniors will build community by providing a vehicle for lifelong learning and service. The outcome of the research projects will inform decision-makers, support teachers, and provide content for public education.

Getting Ready for Monsoon Storm Season

Monsoon Facts and Figures 1896-1992

Average date of monsoon start	July 7
Average date of monsoon end	September 3
Earliest monsoon start recorded	June 16, 1925
Latest monsoon start recorded	July 25, 1987
Average total number of monsoon days	56
Greatest number of monsoon days recorded	99 in 1984

Photograph by R. Buchbinder

Trail Maintenance and Hiker Safety are Paramount Concerns

Newcomers to Arizona soon learn that yes indeed, we have a monsoon season. It's real and it can be a whopper – especially if you're unfortunate enough to be caught outside when one of these storms rolls into town. For Preserve staff and volunteers responsible for trail maintenance and hiker safety, the monsoons present unusual challenges that must be anticipated and addressed.

A Brief History of the Monsoon

The name 'monsoon' comes from the Arabic word 'mausim' meaning 'season' or 'wind-shift.' Throughout southwest North America, our monsoon season occurs during the summer and is characterized by large-scale wind and rainfall shifts. Intense heat in the summer causes a wind shift from the winter's west or northwest direction to a south or southeasterly direction, bringing moist air and rainfall from the eastern Pacific and the Gulf of California into Arizona. This monsoonal circulation does not produce thunderstorms every day during the months of July through September, but enough rain falls to provide, on average, 32% of our normal yearly rainfall.

Managing the Trails during Monsoon Season

As the old saying goes, forewarned is forearmed. Claire Miller, Scottsdale's Preserve Manager, mobilizes her trail maintenance volunteers to do a thorough assessment of the trails prior to the start of the monsoons. This usually requires early morning projects to avoid the increasingly hot temperatures. Miller notes that MSC's

Trail Blitz Reporting Crews and Emergency Trail Hit Crews are ready to get out and report on any problems. These crews were used very effectively during this year's heavy winter rains.

One of the unique aspects of monsoon season is its unpredictability, making it harder for trail maintenance crews to do advance planning, says Joni Millavec, MSC's Trail Construction and Maintenance Chair. Once such a storm passes through, it's important to get out and get the water OFF the trail. Good trail maintenance goes a long way – making sure that the trail out-slopes haven't developed berms that block water flow, and keeping drain dips clear and ready to handle water coming off trails. If this isn't done, or if the storm overwhelms existing protective measures, the result is a long stream of water that runs down the middle of the trail and causes a deep rut.

Safety hazards identified after a monsoon may make it necessary to close a small trail segment until it can be repaired. Sunrise Trail, for example, has been closed when large boulders slid onto the trail. Saguaros can and have toppled over, requiring several people to cut up and move segments off the trail so hikers could safely pass.

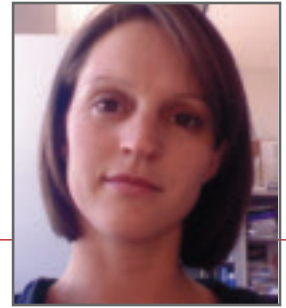
Hiker Safety during a Monsoon

Nothing is more important to Scottsdale's Preserve staff than hiker safety. One of the best ways to avoid a problem is to practice good hike pre-planning, says Miller. If it's monsoon season, avoid afternoon hikes because that's usually when the monsoon occurs. If you do get caught, Claire recommends that you do your best to get off the trail and back to your car or a trailhead facility as fast as you can. But if you can't do that, and the storm includes lightning,

continued on next page

Margaret (Meg) White

PhD candidate/EPA STAR fellow, Plant Biology, School of Life Sciences, Arizona State University
 Adjunct Biology Faculty, Scottsdale Community College
 Restoration Ecologist, Center for Native and Urban Wildlife (CNUW), Scottsdale Community College



Q: What is your research focus?

For over 10 years, I've been involved with various aspects of urban ecology research; my current research interests lie at the intersection of restoration science, riparian ecosystems, landscape ecology, and environmental policy. For the past year, in cooperation with CNUW, I have been studying the seed bank of the upland desert washes at Brown's Ranch, a former working cattle ranch of 880 acres located within the McDowell Sonoran Preserve. This work helps us to better understand above-and below-ground vegetation diversity and patterns. The site is a mix of formerly grazed upland desert habitat and a complex of desert washes of various sizes. The work goal is to establish baseline information on the state of the vegetation at Brown's Ranch to guide future restoration decisions.

continued from page 10

understand that this is serious. Lightning strikes cause hundreds of deaths each year in the U.S. Follow these safety tips (courtesy Claire Miller and Ed Phillips/KTAR radio Arizona Almanac) during a monsoonal lightning storm:

- **Avoid tall trees! Seek shelter in low places like washes or under a rock overhang (keeping in mind that other animals may want to join you there.)**
- **Put down your metal hiking stick! Avoid power lines, wire fences, and metal pipes.**
- **Get away from open water.**
- **If you're hiking in a group in the open, stay several yards apart.**
- **If you're caught in an open area far from shelter and you feel your hair stand on end, lightning may be about to strike you. Drop to your knees and bend forward, putting your hands on your knees. Do not lie flat on the ground.**

We all love our McDowell Sonoran Preserve and by following commonsense safety rules, we can enjoy it year round, even when our unruly monsoon storms make their yearly visit.

Information courtesy <http://ag.arizona.edu/maricopa/garden/html/weather/monsoon.htm>

Q: What is a seed bank and why is it important?

Seed banks have been studied for over a century. In fact, one of the earliest published seed-bank descriptions was by Charles Darwin, who counted the seedlings that germinated from a sample of pond mud.

A soil seed bank is the collective name for the pool of seeds, often dormant, stored within the soil of many terrestrial ecosystems. Seeds can remain viable in the soil for different periods of time depending on species and soil conditions. Seed longevity is decisive for how long a species is present in the seed bank after the fresh seed supply has been interrupted, perhaps by a fire or flood. Species that form persistent seed banks tend to have the greatest seed longevity, and this is one of the strategies plants employ to successfully replace themselves.

Historically, conservation and restoration practitioners have focused on maximizing above-ground population size, but scientists are now recognizing that a clear understanding of seed bank dynamics is also crucial to managing ecosystems.

Q: Tell us more about the Brown's Ranch seed bank study.

At any given time along desert rivers, a proportion of the "potential" plant community exists only as viable seeds in the soil seed banks. Seed banks are abundant and diverse in floodplain soils and these seed pools allow individuals to germinate opportunistically in response to episodic floods and rains. The seed bank study at Brown's Ranch will establish baseline conditions concerning the plant community's diversity there. It is important to understand what species exist and what species are responding under current conditions. The study will allow CNUW to gain insight into what types of species germinate when water availability is not limited. Using this data, CNUW will be able to gain more insight into appropriate species for restoration along the ephemeral washes.

Q: How specifically do you collect the necessary samples for your study?

Over the past year, we have collected seeds at Brown's Ranch at two different times to capture the full range of annual and woody plant diversity. These times were spring (May) before the monsoon season, and fall (September/October) after summer monsoons end. The site was divided into six previously identified washes: East and West Canotia Washes, East and West Horned Lizard Washes, Honeysuckle Wash, and Two Snakes Wash. We sampled the seed bank by collecting surface soil and litter and conducted a soil seed bank emergence study. This process involves germinating a seed and identifying the seedling. Some of the most common species we've had come up in our first round of seed bank study are stork's bill (*Erodium cicutarium*), red bromegrass (*Bromus rubens*), spreading fleabane (*Erigeron divergens*), and velvet mesquite (*Prosopis velutina*).

Soil samples are randomly collected from all 6 washes with 20 samples collected along each wash, totaling 120 soil samples during each sampling season. Collection of soils occurs within a 2-meter buffer of the wash banks, and includes the wash channel as well. We sample to a depth of no greater than 5 centimeters using soil core samplers or trowels. Sites were randomly chosen along the wash length using a random number generator, to capture both in-channel and bank soil seed diversity.

Fortunately, CNUW has decided to continue this study for one more year to capture a higher sample size and rule out anomalous research or collection issues. CNUW also plans to sample the areas between the washes in the future to capture more diversity data on the upland desert regions.

Why do Invasive Plants Target the McDowell Sonoran Preserve?

Sowing seeds of change through education and action

By Barb Pringle, MSC Steward and McDowell Sonoran Preserve Commission Promotions Committee Member

Anyone who loves our McDowell Sonoran Preserve cannot help but notice the presence of invasive plants. Sadly, no area is immune from these invaders that crowd out natives, degrade habitat for desert wildlife, and increase the chance of a catastrophic fire. Even the Tom's Thumb and East End areas, far from housing development, are infested with large stands of red brome-grass and Saharan Mustard, two of the worst invasives found in the Preserve. As more and more people enjoy the Preserve and are unknowingly transporting invasive plant seeds, we can expect to see more unwanted plant invasions both near the Preserve access areas, as well as within the more remote interior.

Fortunately, this threat has not gone unnoticed by the City of Scottsdale (COS), the McDowell Sonoran Preserve Commission (MSPC) and the McDowell Sonoran Conservancy (MSC). The MSPC, led by the tireless efforts of Chair Jerry Miller, who is a committed enemy of invasive plants, authored a comprehensive *Invasive Weeds Control Plan* as one part of its Preserve Management Plan. This document provides a route forward as we seek to clear the washes, bajadas, and mountain tops of these green invaders.

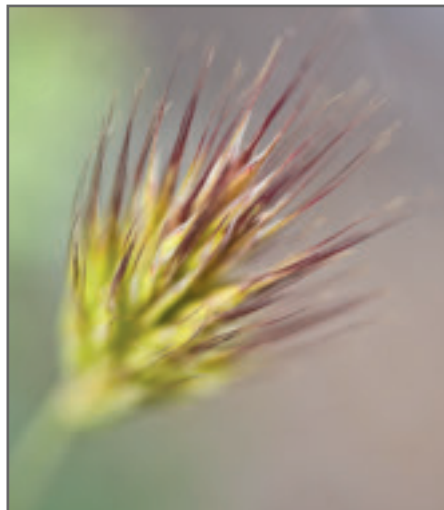
The Eight Enemies

The plan includes an initial list of eight plant species, seven of which are non-native, but all of which have become dominant monocultures in certain Preserve areas and which provide large fire fuel-loads.

1. Buffel Grass (*Pennisetum ciliare*)
2. Fountain Grass (*Pennisetum setaceum*)
3. Salt Cedar or Tamarisk (*Tamarix ramossisima* spp.)
4. Malta Starthistle (*Centaurea melitensis*)
5. Saharan/African Mustard (*Brassica tournifortii*)
6. Desert Broom (*Baccharis sarothoides*)
7. Bermuda Grass (*Cynodyn dactylon*)
8. Red Brome-grass (*Bromus rubens*)



Fountain Grass
(*Pennisetum setaceum*)



Red Brome-grass (*Bromus rubens*)

Education and Training

“The roles of education and training are essential for a successful program. There is no chance of accomplishing the goals and garnering the massive resources required without buy-in and cooperation from the public,” according to the plan. Public education is ongoing, with the COS Fire Department playing an especially active role by educating homeowner associations on identification and removal of invasives in their neighborhoods and yards. More still needs to be done in education outreach to garden clubs, nurserymen's associations, botanical societies and other communities adjacent to Scottsdale so that the word spreads across our entire region.

Over the past few years, a small group of professionals and volunteers from various groups, including MSC, have been involved in invasive removal. These people can serve as a valuable resource to educate future volunteers on the proper methods to identify, remove and monitor invasive plants. Some training materials are already available, most notably COS's *Invasive Plant Brochure* and the COS-Channel 11 *Invasive Plants* video that was completed and broadcast beginning in 2009.

A crucial component in the weed management program is a database describing the location of targeted weeds, size of the infestation colony, plant maturity and effects of any removal project which may have taken place. The job of mapping the Preserve and city neighborhoods can be daunting and will depend on inputs from many trained workers, according to the plan. The COS is looking at ways to develop and maintain such a database and will undoubtedly need volunteers to help fill in the blanks. As this management plan moves forward, I hope many of you will step up and offer your time, talent and sweat equity so we help protect our magnificent Preserve for current and future generations to enjoy.



Seeds can even use humans to move around. Invasive grasses can easily move into the Preserve on a shoe.

Photos by B. White and D. Bierman



Cathedral Rock, far left, an unusual rock formation in an area of the future Preserve.

When a living thing evolves to imitate something else, it is called biomimicry. This hawk moth caterpillar's coloring mimics the leaves of its host plant, datura.

Photos by D. Bierman and R. Carll

2010 MSC Summer Hike Schedule

All hikes start at 6:30 a.m.

Saturday June 5

Cathedral Rock Recreational Hike
Meets at Alma School Rd. Trailhead

Saturday June 12

Gateway Loop Recreational Hike
Meets at Gateway Trailhead

Saturday June 19

Biomimicry: Inspired by Nature Educational Hike
Meets at Lost Dog Trailhead

Saturday June 26

Old Jeep Trail Recreational Hike
Meets at Gateway Trailhead

Summer Hikes

A June 5th recreation hike to Cathedral Rock kicks off the free guided-hike summer series sponsored by MSC. The four summer hikes will get underway at 6:30 a.m. each Saturday in June.

"We try to start our summer hikes early and get back before it gets too hot," explained Steve Dodd, co-chair of the MSC Hike Committee. "With plenty of water, a good hat, proper clothing and SPF 3,000 sunscreen, it's still a pretty good time to hike."

The 5.5-mile Cathedral Rock hike goes to a striking rock formation that appears to have been a Native Peoples' gathering place and grain-processing site. The trail covers mild inclines only, and takes about 3 hours. The hike leaves from the Alma School Road trailhead located at the end of Alma School Road, about one mile north of Dynamite Road.

The Gateway Loop recreational hike on June 12 helps build awareness of the signs that animals leave in the Preserve, and teaches the basics of identifying those signs. The approximately 2-hour hike will make many stops for discussions and will cover a short, relatively flat trail in the Gateway area. The hike will leave from the Gateway Trailhead Ramada, located on Thompson Peak Parkway, 0.5 miles north of Bell Road.

Examples of how man has adapted ideas from plants and animals is the topic of Biomimicry: Inspired By Nature on June 19. The 2-hour hike on the Ringtail Loop will feature several stops for discussion. The hike leaves from the Ramada at the Lost Dog Trailhead on 124th St., 0.5 miles north of Via Linda.

The final hike of the summer on the Old Jeep Trail explores a remote, scenic portion of the Lost Dog area, through deep washes and high hillsides with sweeping views back towards the city. The 4.5-mile trail has some steep and rocky areas. The hike leaves from the Ramada at the Lost Dog Trailhead on 124th St., 0.5 miles north of Via Linda and will take about 2.5 hours.

MSC requires that all hikers bring ample water, and wear sturdy, closed toe shoes. Hikers are encouraged to bring snacks, and hats and sunscreen are also recommended for all hikes. No reservations are necessary and hikes start promptly at the designated times. No dogs are allowed on the guided hikes. A complete schedule and further information on the guided-hike program, as well as information about MSC, is available on www.mcdowellsonoran.org. Click "activities" on the navigation bar for hike information.

Legacy Circle: Planting Seeds for Future Generations

The Legacy Circle honors supporters who have chosen to support the MSC through a planned gift or a gift to support the Preservation Endowment.



Planned Giving

Through a planned gift, you are making an important choice to protect and steward our area's most important conservation lands. Your gift is a reflection of your own philanthropic goals and a statement about your personal values and interests. There are many different gift-giving options, and a number of them offer significant tax and income benefits for you as the donor.

Bequests and Living Trusts

Charitable bequests through wills and living trusts provide estate tax, and potential income tax, benefits and enable donors to make significant contributions that may not be possible during their lifetimes. Bequests and living trusts can be used to ensure that the donor's lifetime annual charitable contributions to the MSC programs become "endowed" or to make a special gift that will enhance MSC's ability to sustain its mission in the future.

Life Insurance

Many individuals have life insurance policies that can be used to benefit charities when the insured dies or, in some cases, during the life of the insured. Such policies, if left to non-charitable beneficiaries at the insured's death, will in most cases pass free of income tax, but they will be subject to estate taxation in the donor's estate, thus reducing what the non-charitable beneficiaries receive. For this reason, life insurance policies are often excellent assets to use for charitable giving.

Qualified Retirement Plan or IRA

Like life insurance, an IRA or qualified retirement plan can increase a donor's exposure to estate tax. However, these assets are actually subject to double taxation. Regardless of the size of an estate, non-charitable beneficiaries will have to pay federal income tax on any distributions. Gifts of such assets to MSC avoid *both* taxes.

Charitable Gift Annuity

By establishing a charitable gift annuity, you can make a gift of cash or securities to MSC in exchange for a guaranteed fixed income for life. In addition to an assured income for the remainder of your life, you receive an immediate tax deduction, tax-advantaged income, and an excellent rate of after-tax return.

Charitable Remainder Trusts

A charitable remainder unitrust provides for annual payments to designated beneficiary(ies) of a specified percentage—at least 5 percent of the value of the trust as it is valued each year. Since the value of trust assets may vary from year to year, the payments may also vary, hopefully increasing to help offset inflation. A charitable remainder annuity trust provides for payment of a fixed dollar amount—annually or at more frequent intervals—to the designated beneficiary(ies). With each trust type, you receive an immediate tax deduction and, at the death of the last beneficiary, the trust principal is distributed to MSC.



Charitable Lead Trust

Through a charitable lead trust, you can make a significant gift to the McDowell Sonoran Conservancy. You transfer assets to a trust that pays a yearly (or any determined frequency) income to MSC for your life or a specified number of years. At the termination of the trust, the principal is either returned to you or your designated beneficiaries. A "Family Lead Trust" is a great way to transfer significant assets to heirs with greatly reduced gift taxes.

Preservation Endowment

Since November, 2000 MSC has partnered with the Arizona Community Foundation on an endowment to support ongoing preservation program needs. This endowment allows MSC to enhance and expand critical preservation programs. These programs currently include producing informational publications; guiding educational hikes and rides; training and overseeing trail building crews; enabling elementary schoolchildren to visit the Preserve; and maintaining the Preserve Steward training classes.

Let us show you how you may increase your income, save on your taxes and help MSC. We recommend that you consult with your financial adviser about which method may be best for you, and then call us so we can help you plant seeds now for the benefit of future generations.

Find the seed at the bottom of your heart and bring forth a flower.

- Shigenori Kameoka

Photos by D. Bierman and B. White

NEWS AND NOTES:

SCOTTSDALE HALL OF FAME INDUCTS MSC

MSC was named a "History Maker" and inducted into the Scottsdale History Hall of Fame by the Past Presidents' Council of the Scottsdale Area Chamber of Commerce at the 17th Annual Scottsdale History Hall of Fame Dinner, Thursday, April 1, 2010 at the Chaparral Suites Resort and Conference Center.

Since creating this signature event in 1994, the Council has selected 106 past and present Scottsdale personalities and organizations to induct into the Scottsdale History Hall of Fame. Inductees have contributed immeasurably to the rich heritage of Scottsdale, dating back to its modern-day founding in 1888 by Army Chaplain Winfield Scott.

"PLATINUM" LEED CERTIFICATION GOES TO GATEWAY

In January 2010, the Gateway received a "platinum" designation, the highest certification possible through the U.S. Green Building Council's Leadership in Energy and Environmental Design program.

Only six Arizona structures are certified platinum through the LEED program. Two are in Scottsdale: the Preserve Gateway and the Downtown Scottsdale Fire Station at 7522 E. Indian School Road.

LEED is a national standard for "green" buildings that use environmental techniques to conserve materials, resources and reduce energy consumption while contributing to the health of its occupants.

There are four progressively higher and more demanding levels of certification (from lowest to highest): Certified, Silver, Gold and Platinum.

The Gateway Trailhead is designed to have a minimal impact on our desert. The Gateway's green building elements include

solar power generation, rainwater harvesting, rammed earth walls constructed of native soil from on-site excavation, structural steel made of high recycled content, native landscaping and parking lot and path surfaces made of stabilized, decomposed granite.

The Gateway is a "net zero" energy facility, meaning in a given year it generates more energy than it consumes from the utility grid.

JULY CANDIDATES FORUM

Join us at our upcoming candidates' forum on the future of the McDowell Sonoran Preserve at 7 p.m., July 14, at the Granite Reef Senior Center, 1700 N. Granite Reef Rd., in Scottsdale.

Invitees will include the candidates for the three City Council seats that are up for election in 2010. The city's general election is set for Aug. 24 and a runoff, if needed, is set for Nov. 2, 2010.

Under the session's format each of the candidates will make brief introductory remarks on the subject of the Preserve and the broader land-preservation issues, and then answer questions from a panel of news people and other experts. Questions from the public also will be entertained.



Join Our Circle of Friends

As a community member who values the outdoors, and specifically the Sonoran Desert, you understand the importance of preserving and maintaining open space now to ensure its availability in the future. This shared appreciation of the desert is why we are inviting you to join us today as a Friend of the Preserve... by returning the membership form below.

Yes!

I want to help preserve my desert and mountains by joining MSC's Circle of Friends.

- McDowell Sonoran Society (\$1,500+)**
 Steward Circle (\$1,000) Trailbuilder Circle (\$500) Caretaker Circle (\$250)
 Pathfinder Circle (\$100) Hiker Circle (\$50) Other _____

- Please charge my credit card A check is enclosed

Credit Card # _____ Expiration Date: _____

Name as it appears on the card _____

Name(s) by which you would like to be acknowledged _____

Address _____ Email _____

_____ Phone _____

- I would prefer that my gift remain anonymous

Mail to: McDowell Sonoran Conservancy • 16435 N. Scottsdale Rd. • Suite 110 • Scottsdale, AZ 85254

Dog Days of Summer...

Join us for National Trails Day at 6:30 a.m. on Saturday, June 5th at the Gateway to the McDowell Sonoran Preserve, 18333 North Thompson Peak Parkway, for a special free event celebrating our best hiking companion—man's best friend, the dog!

We will have experts on hand to talk about best practices for hiking with dogs, we'll share fun activities for dogs and their owners to enjoy, and provide refreshments for both people and our canine pals. Dogs must be on a leash at all times. Please attend only if your dog is well-socialized (no biters please!) RSVP to Nancy at 480-998-7971 extension 100, or via email at nancy@mcdowellsonoran.org



photograph by Debra Doss

WHEN:

Saturday, June 5, 6:30 a.m.

WHERE:

Gateway Access Area Amphitheater
18333 N. Thompson Peak Parkway
(between Bell and Legacy Blvd. – formerly Union Hills)

For more activities, check out the calendar of events on our website at www.mcdowellsonoran.org