



Proceedings McDowell Sonoran Preserve Research Symposium

October 24-25, 2015

Symposium sessions conducted at:
Scottsdale Community College
Center for Urban and Native Wildlife
McDowell Sonoran Preserve



Background

Scientists and historians have been conducting research on Scottsdale's McDowell Sonoran Preserve for decades. The McDowell Sonoran Conservancy Field Institute created the first McDowell Sonoran Preserve Research Symposium to bring together researchers, students, citizens and community leaders to share and learn about the scientific and historical research conducted within Scottsdale's McDowell Sonoran Preserve and the surrounding area. This event was hosted by the McDowell Sonoran Conservancy Field Institute and Scottsdale Community College's Center for Native and Urban Wildlife. The goals were to 1) promote awareness of the research being undertaken on the Preserve and nearby Sonoran Desert, 2) encourage networking among scientists, students, and the public and 3) trigger new research and collaborations that benefit the Preserve and surrounding parks, preserves and natural areas.

The first symposium drew 150 people. Attendees strongly supported holding another symposium – of the 32% of attendees who responded to the post-event survey, 94% said they would attend another one (6% were neutral).

| Profile of attendees at 2015 symposium | | |
|---|--------|---------|
| Participant category | Number | Percent |
| Agency | 18 | 12% |
| Academic | 32 | 21% |
| Student | 36 | 23% |
| Public | 54 | 35% |
| Total | 154 | |

Morning Session Keynote Speaker



Virginia Korte,
Scottsdale City Council Member

Virginia Korte, who worked on the formation of the City of Scottsdale's McDowell Sonoran Preserve (MSP) from the 1990s to the present, related the political history of the Preserve's creation. She began by summarizing the open space mindset that grew in Scottsdale from 1960s to the 1990s. Next, she described how concern over losing the unspoiled views of the McDowell Mountains grew as large landowners began selling their undeveloped land to developers in the 1980s. This concern, she noted, resulted in the formation of the McDowell Sonoran Land Trust in 1990. Korte talked about how that organization was instrumental in making the purchase of the McDowells and the surrounding land a top priority for the City of Scottsdale. She went on to describe the work done to pass multiple sales taxes that provided money to buy the land, and the other ballot initiatives that allowed its purchase. Finally, Korte noted the amount of sales tax and bond money spent for land purchase, improvements, and debt service. She ended by listing the benefits that the Preserve brings to the City of Scottsdale.

Afternoon Session Keynote Speaker



Dr. Sharon Hall
Arizona State University School of Life Sciences; Central Arizona – Phoenix Long Term Ecological Research Scientist; and Sustainability Scientist, Global Institute of Sustainability

Dr. Hall presented results from the on-going project she works on for the Central Arizona – Phoenix Long Term Ecological Research (CAP LTER) program. In her LTER project, she investigates the differential effects of pollutants and pollution patterns on native and non-native plants. The pollutants under investigation are reactive nitrogen, ozone, and carbon dioxide. The pollution patterns measure the pollutant concentrations in selected open spaces in three geographical locations in the Phoenix Valley: the West Valley, Phoenix urban parks, and the East Valley. Dr. Hall graphed the measured pollutant concentration in each geographical area and showed that wind patterns distribute the pollutants differently across the Valley and each of the selected open spaces. She then showed the effects of the pollution differentials on the growth rate of the same kind of plant in each location.

Oral Presentations

Geologic History Of The McDowell Mountains

Steven J. Skotnicki

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Detailed geologic mapping between 2005 and 2014 has to the creation of the first full 1:12,000-scale geologic map of the McDowell Mountains. The range is mostly composed of Proterozoic metamorphic rocks that comprise a 10-km thick sequence of ash-flow tuffs, quartzites, lava flows, and breccias—six times thicker than the depth of the Grand Canyon. The sequence is cut by two large Proterozoic-age thrust faults that shoved the southern part of the range up over the northern part and created several large-scale folds. The rocks were then deeply buried and metamorphosed and intruded by four different granitic plutons. A sole radiometric age on the oldest rock of 1630 million years ago suggests that the entire sequence may have been deposited and deformed within a time period not well represented in Arizona and could be the only significant igneous rocks of this age in the state. More than 550 rock samples have been collected, along with hundreds of structural measurements and photos. The geologic map was digitized by a volunteer team within the McDowell Sonoran Conservancy. A current project proposal involves obtaining 20 additional radiometric dates, which will include detrital-zircon and monazite ages.

Ghost Road: The Stoneman Road in the McDowell Sonoran Preserve

Doug Watson

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My paper will describe how the structured use of historical maps can be applied to the discovery of lost roads and related elements of the Arizona territorial period. The principal example will be the use of maps to execute a concerted ground search during 2011-2013 for a segment of the Stoneman military road that ran from Fort Whipple, near Prescott, to Fort McDowell, near the confluence of the Salt and Verde rivers, from 1865 to 1890. That segment is located in the City of Scottsdale McDowell Sonoran Preserve, Northern Region, Township 5 North, Range 5 East, Gila and Salt River Meridian, Arizona. When the Army closed Fort McDowell in 1890, they did not leave a current map of the Stoneman Road. The road was used sparingly by local ranchers for a time, eventually fell into disuse and in large part disappeared by the mid-19th century. It became, in effect, a ghost road. The search for this ghost trail involved collection and cross-analysis of scores of maps from a variety of sources, cattle ranching reports and journal entries from a variety of pioneers, including officers from both military posts and newspaper reporters from Prescott. A key ingredient in successfully locating the road were maps prepared by General Land Office Surveyor Sidney Blout, particularly his 1919 Plat of Township 5 North, Range 5 East Gila Salt River Meridian in the McDowell Mountain Preserve and related field notes. In addition, two 1904 United States Geological Survey maps by USGS Topographer Claude Birdseye, whose north boundaries overlap with the 1919 Plat south boundary and demonstrated a road linkage all the way to Fort McDowell, verifying information appearing in maps and sketches from the 1850s through the 1890s. Then, I will show how these maps were used to plan a successful series of field surveys to identify vestiges of road segments within the McDowell Sonoran Preserve, with a particular focus on Section #23 Township 5 North, Range 5 East Gila Salt River Meridian, near Brown's Ranch. Finally, I will show some existing Preserve trails that may be part of the Stoneman Road.

Oral Presentations

Vegetation and Flora of Scottsdale's McDowell Sonoran Preserve

Steve Jones, Chelsey Hull

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As part of the effort to establish baseline catalogs of all species present in the City of Scottsdale's 30,000 acre McDowell Sonoran Preserve, we collected, mounted and preserved specimens of vascular plants within the boundaries of the Preserve. In addition to field collections, we cultivated soil samples from across the preserve in a greenhouse. Rare plants were photo-vouchered. The current catalog includes 384 taxa in 61 plant families, including seven taxa discovered after publication of the catalog. The daisy, grass, borage, bean and cactus families are well represented in the catalog. The greenhouse study produced 47 taxa, two of which were not collected from the field. In addition to the catalog, we identified and named 14 upland vegetation types across the Preserve, and mapped their boundaries using aerial photography and visits to the field.

Ground Dwelling Arthropods in Scottsdale's McDowell Sonoran Preserve: Results From A Three Year Study

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Arthropods are a diverse group of organisms that include the insects, spiders, ticks and scorpions among many others. Since 2012, investigators with the Central Arizona–Phoenix Long-Term Ecological Research (CAP LTER) program at Arizona State University have been working with the McDowell Sonoran Field Institute to monitor arthropods at multiple locations throughout the Preserve. Pitfall traps, small cups buried flush with the ground surface, are used to collect ground-dwelling arthropods (primarily those that crawl on the ground). Set seasonally, the traps are left open for approximately 72 hours at which time the organisms that have fallen into the traps are collected, and the organisms are identified to the finest possible taxonomic resolution and counted. This effort is contributing to the faunal inventory of the Preserve, and long-term monitoring may allow us to detect any changes in the ecosystem through time. More than 14,000 arthropods have been collected since the beginning of the project. Ants, springtails and mites are by far the most common types of arthropods, but diversity in the Preserve is high with approximately 35 orders and 123 families of arthropods having been identified. Arthropod abundance is highest in the spring and summer, and there is variation among the number and types of arthropods at the different sampling locations that span the Preserve. Among the organisms identified is an invasive Argentine ant, *Brachymyrmex patagonicus*. Continued monitoring may help to determine if *Brachymyrmex* and other potential, future changes may have an impact on the ecology of the Preserve.

Oral Presentations

A Story Of Survival At Brown's Ranch: Revegetation In Tall Pots

Dr. John Weser

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Director, Center for Native And Urban Wildlife

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In 2001, The Center for Native and Urban Wildlife, the McDowell Sonoran Land Trust and the City of Scottsdale embarked on a project to re-vegetate a historically-grazed area near Brown's Ranch on Scottsdale's McDowell Sonoran Preserve. Re-vegetation consisted of planting mesquite and Palo Verde trees that were grown from seeds in a Scottsdale Community College plant propagation area using a tall-pot technique. Enclosures were used to protect a portion of the planted trees from herbivory. Tree survival data was collected in 2002 and 2003 for the entire site, with partial data recollected in mid-fall of 2015. Comparisons were made among planting locations within the study area and overall plant survival was presented. Additionally, bird species diversity and abundance were collected as possible indicators of habitat improvement. Future plans to evaluate plant survival and growth on the overall site and to evaluate possible interactions with bird species data for the area is discussed.

A Survey of Herpetofauna Occurring in Scottsdale's McDowell Sonoran Preserve

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The use of Citizen Scientists and trained volunteers is becoming increasingly more important in times of tight government budgets. By combining the knowledge base of Citizen Scientists and the free labor of trained preserve volunteers, the City of Scottsdale, Arizona, was able to save over \$20,000 in costs surveying the herpetofauna (reptiles and amphibians) occurring within the McDowell Sonoran Preserve. Over a period of three years, with multiple expeditions into the preserve, Citizen Scientists and trained preserve volunteers were able to catalogue 34 species of herpetofauna consisting of 11 families and 29 genera. This all volunteer effort allowed the McDowell Sonoran Preserve to have a baseline summary of the herpetofauna within the preserve at no cost to the taxpayers of Scottsdale, Arizona.

Oral Presentations

Non-native Plant Species in the McDowell Sonoran Preserve: Assessing The Feasibility and Efficacy Of New Technology In Vegetation Monitoring And Plant Ecology

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Three non-native plant species are currently the subject of research on the interactions and possible impacts on native plant community and diversity. Beginning in 2011 as an undergraduate internship project, occurrence maps were collected for Buffelgrass (*Pennisetum ciliare*), Fountain grass (*P. setaceum*) and Salt Cedar (*Tamarix chinensis*) in the McDowell Sonoran Preserve. During the formation of the McDowell Sonoran Field Institute several research goals were identified to foster scientifically based management decisions. Interactions between non-native species and native vegetation communities was identified as a key research goal and thus prompted a “ground mapping” effort by stewards and other volunteers to construct a more accurate distribution map for the three aforementioned species. Although the initial maps produced in 2011 yielded useful data for management decisions, more information on the status of these non-native plant populations is needed to determine if the current distribution of these species and if local populations are increasing. We are currently conducting test flights using UAV remote sensing techniques to monitor the status of non-native plant populations in the Preserve. Early results indicate that high-resolution aerial imagery in the visible spectrum (RGB) and using near infrared light filters (NGB) may be a suitable method for monitoring long term vegetation change and yield similar data to classic techniques such as ground-mapping. We plan to explore the suite of possibilities available in plant ecology and vegetation monitoring using this new technology and compare the accuracy to classic methods.

Oral Presentations

McDowell Sonoran Conservancy Stewards And The Experience Of “Place”: A Focus Group Pilot Study

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This presentation will share the results of a focus group pilot study (N=20) that investigates the experience of being a McDowell Sonoran Conservancy steward, and how that experience shapes one’s sense of place—or the emotional ties to one’s physical and social environment. The McDowell Sonoran Conservancy (MSC) mission is to enable stewards to “connect the community to the Preserve through education, research, advocacy, partnerships and safe, respectful access”. As members of the very community we serve, the act of stewardship is in itself a form of connection to this place we value. Further, the MSC vision statement includes a desire to be recognized as a model throughout the country as a leader in urban preserve management. Therefore, it is important to identify ways in which the stewardship model is beneficial for participating stewards in their connection to place, as well as the ways in which this stewardship model can be applied to other conservancies and contexts. Four 90-minute focus groups were conducted in April/May 2015 to discuss the steward experience and how stewards connect to places in the Preserve and beyond. Participants were recruited through the MSC weekly email, and the sample was stratified according to retired/non-retired/semi-retired status. The focus groups were audio recorded, transcribed and coded using MAX-QDA text-analysis software for emergent themes. Some preliminary themes were identified and include the sense of ‘discovery’ in the early years of the Preserve, the importance of continuing education opportunities, the interaction between physical and social aspects of place and the effect of one’s life course on their participation in and experience of volunteering with the Preserve. These themes will inform future directions of research on the stewardship model and the sense of place experienced through volunteering.

Oral Presentations

Panel Discussion

The Future of Conservation in the Phoenix Valley

Panel Members:

Kroy Ekblaw – Preserve Director, City of Scottsdale

RJ Cardin – Director, Maricopa State Parks

Ian Dowdy – Director, Sun Corridor Programs, Sonoran Institute

Ken Vandenscher – Deputy Director, Parks & Recreation Department, Natural Resources Division of Phoenix Parks

Dr. Helen Rowe, Director of the Field Institute, introduced the panel discussion with remarks about the regional challenges facing conservation and preservation organizations in the Phoenix Valley. She then highlighted some of the coalition efforts underway among organizations associated with the Valley.

The panel members discussed three questions:

- What is your organization's vision for natural resource protection over the next 25 years? What are biggest assets and constraints for achieving that vision?
- Given your organization's mandate and challenges, what natural resource management issues could be best addressed through regional collaboration? How would collaboration on these priorities benefit your organization?
- Thinking about these management issues, to what extent is biological data or other scientific information available to support progress within your organization? Regionally? Ideally what kind of biological information is needed?

Dr. Rowe gave a short summary of the points discussed by the panel members, and then opened the discussion up for questions from the audience. Members of the audience asked the following questions:

- With increasing visitors to the region's managed open spaces, how will you develop the limits of acceptable change this will bring?
- What is the degree of collaboration of the local groups with government agencies at the federal, state and county levels?
- Developed lands that surround the Valley's preserved lands and impact these lands. What is your strategy to influence this impact?
- How does the use of citizen scientists fit into the vision of your organization?
- How can you influence researches to fashion projects and communicate findings that provide meaning?

Poster Presentations

Co-creating Citizen Science in the Phoenix Mountain Preserve: The North Mountain Plant Inventory Project

Stacie Beute, Wendy Hodgson, Kim McCue - Desert Botanical Garden

Cass Blodgett - Arizona Native Plant Society

Ken Vonderscher - City of Phoenix Parks & Recreation Dept., Natural Resources Division

Susanne Rothwell, Phoenix Mountains Preservation Council

Public participation in scientific research (PPSR), commonly called citizen science, has the potential to gather scientific data at large spatial and temporal scale, advance scientific literacy in participants, facilitate communication between scientists and stakeholders and grow the capacity for science-informed policy and management. The potential for a PPSR project to capture desired scientific, individual and socio-ecological outcomes is linked to the model of PPSR engaged (based primarily on the level of public participation in the research process) and the degree to which the project is relevant to and meets the needs and interests of its volunteer participants. Although the potential for PPSR is great, many projects fail to capitalize on the potential presented by PPSR. In early 2012, stakeholders from Desert Botanical Garden, Phoenix Mountains Preservation Council, North Mountain Visitor Center, Desert Botanical Garden, City of Phoenix Park and Recreation Department and later Arizona Native Plant Society convened a series of public meetings forums and informational sessions in an effort to align interests and goals toward the co-creation a citizen science-based research project focused on the North Mountain/Shaw Butte section of the Phoenix Mountains Preserve. Using deliberate design methods, the team successfully aligned scientific and public interests to co-create the North Mountain Plant Inventory Project. The Project launched in December of 2012 and is still in operation today. While official evaluation of outcomes is pending, evidence suggests the Project has been successful in achieving intended outcomes by design. Additionally, the Project has produced a series of unintended, positive outputs and outcomes generated by public participants. We demonstrate that when seeking a suite of scientific, individual and socio-ecological outcomes, a deliberate design process inclusive of the diversity of stakeholders' interests is an effective strategy.

Poster Presentations

Brown's Ranch Mapping Project

Don Meserve, Jane Ginn, Melanie Tluczek, Dan Gruber
McDowell Sonoran Field Institute

The Brown's Ranch Mapping Project is being conducted by the MSCFI and the PastFinders group from Citizen Science because concerned volunteers considered this historic archaeological ranching site threatened after Brown's Ranch Trailhead opened and the influx of many trail users. The project goal is to collect accurate data on the features remaining within this recorded site and to accurately map and describe the historic ranching features. This project provides an excellent baseline of existing conditions. The city of Scottsdale can use this information for planning and setting policies to best protect and potentially interpret this significant historic ranching site. The team first determined that prior surveys and archaeology reports were completed in 1990 and 1997 and that the site has been recorded. Second it was determined that the project must meet Arizona State Museum (ASM) standards for archaeological surveys and reports to ASM. MSCFI and the city worked together to fund and contract with Logan Simpson Inc. certified archaeology firm to oversee the field work and reports to meet ASM standards. A weather balloon and camera from ASU were used for high quality aerial photographs of the area using a process called 'Structure in Motion' (SiM). A computer program compiled roughly 1000+/- photos from the air into a 3D map of the site. A comparison was made between our 2015 data on the features and the 1990 and 1997 maps and feature descriptions to document how the features have changed. Individuals with ranching expertise are also assisting the team with describing how each historic feature was used in the historic cattle ranching operation. The Brown's Ranch Mapping Project is ongoing. Final reports to the city, MSFI, ASM and the Charros, a funding source, are in progress at present.

Wetlands in the Salt River Channel and Potential for Nitrogen Removal

Amalia M. Handler, Amanda K. Suchy, Nancy B. Grimm, Juliet C. Stromberg - School of Life Sciences, Arizona State University

Monica M. Palta - School of Earth and Space Exploration, Arizona State University,

Daniel L. Childers - School of Sustainability, Arizona State University

Wetlands have developed in the Salt River channel near downtown Phoenix, Arizona. These wetland ecosystems are supported by nutrient-rich urban runoff water entering via storm drains into the river channel. Because high concentrations of nitrate can have negative consequences for human health and ecosystems, multiple investigators are examining the capacity of the Salt River wetlands to remove nitrate. Completed projects examine nitrate removal across a range of scales. Reach scale measurements indicate that nitrogen concentrations are lowered overall by the wetland ecosystem. Patch scale measurements indicate the wetland soils may be an important location for nitrate attenuation as concentrations of nitrate were one order of magnitude lower in wetland soils compared to surface water. Further, incubations of soil samples show particular vegetation patches in these wetlands have higher capacity to remove nitrate from the ecosystem. Current work is focused on determining rates of nitrate removal at the reach and patch scale. Although the Salt River wetlands are not a constructed ecosystem, our research indicates a high capacity for nitrogen attenuation, a valued ecosystem service.

Poster Presentations

Exploring The Influence Of Place Attachment On Fee Acceptance: A Comparative Study At Two Southwestern Regional Parks

Milo Neild, Eric Steffey, Dr. Megha Budruk

School of Community Resources & Development, Arizona State University

Park managers are often tasked with balancing conservation and visitor recreational experiences at the areas they serve. User fees have proven to be an effective management tool in limiting the social and environmental impacts of over use in protected areas. The utilization of user fees however has also been met with great opposition. To understand this dynamic, previous research has focused on exploring the underlying variables that influence user fee acceptance. Place attachment is one such variable of interest. Previous research has shown that user fee acceptance has been positively influenced by place dependence but negatively influenced by place identity. Place dependence and identity are two commonly accepted dimensions of place attachment. This study compares visitor attitudes towards user fees and its relationship to place attachment at two Maricopa County Regional Parks located in central Arizona. Data were collected via a self-administered exit survey given to visitors recreating at McDowell Mountain Regional Park and White Tank Mountain Regional Park. Based on a previous visitor use study of the Maricopa County Regional Parks, primary activities within the two parks differed with McDowell Mountain Regional Park centered on mountain biking and White Tank Mountain Regional Park on hiking along with social activities. Through our findings, we hope to assess three research questions: 1) Is there a positive causal relationship between place dependence and acceptance of user fees? 2) Does place identity have a negative causal relationship with acceptance of user fees? And 3) How do these relationships differ among the two parks given that they are popular for different kinds of activities? Findings will provide an insight into visitor's level of acceptance of fees in the Maricopa County Regional Parks and how these relationships vary by park. Such information will provide vital information for researchers and park managers making critical decisions about the future of fee programs in parks.

Urbanization Alters Terrestrial Herbivore Composition But Not Abundance

Jessica Alvarez Guevara, Becky A. Ball, and Sharon J. Hall

School of Mathematical and Natural Sciences, New College of Interdisciplinary Arts and Sciences, Arizona State University

Desert ecosystems are one of the fastest urbanizing areas on the planet. This rapid shift has the potential to alter the abundances and species richness of herbivore and plant communities. Herbivores, for example, are expected to be more abundant in cities due to the concentration of food resources and reduction in carnivore populations. Despite this assumption, previous research conducted in urban Phoenix has shown that top-down herbivory led to equally reduced biomass. Since there are no published data reporting the abundance and density of herbivores within and outside Phoenix, it is unclear if this insignificant difference in herbivory at rural and urban sites is due to unaltered herbivore populations, or altered activity levels that counteract abundance differences. Vertebrate herbivore populations were surveyed at four sites inside and four sites outside of the city core during fall 2014 and spring 2015 in order to determine whether abundances and diversity differ significantly between urban and rural sites. In order to census species composition and abundance at these sites, 100 Sherman traps and 16 larger wire traps that are designed to attract and capture small vertebrates such as mice, rats and squirrels were set at each site for two consecutive trap nights. Results suggest that the commonly assumed effect of urbanization on herbivore abundance does not apply to small rodent herbivore populations in a desert city. A significant difference between small rodent genus diversity, however, was observed and shows certain genera of small rodents dominate the urban sites.

Poster Presentations

Seed Bank Study Of McDowell Sonoran Preserve Flora

Chelsey Hull

McDowell Sonoran Field Institute, McDowell Sonoran Conservancy,

Desert plants are known for being drought survivors with many adaptations to overcome extreme and or extended drought. Many desert plants possess seeds that lie dormant within soils for years, waiting for optimal germination conditions to appear. Due to poor rainfall regimes during the 2-year flora survey conducted within the McDowell Sonoran Preserve, an effort was made to collect and examine the soil seed bank for species that were thought to be in the area but not found in the surveys. Twenty-three sites were chosen either for a specific plant species thought to be in the area or for a specific ecosystem that was of interest and each was sampled in three separate places at the site. The top 2cm of soil were collected and spread on a sterile media in a small draining tray. To optimize conditions for germination, trays were then watered on an automatic system within the Scottsdale Community College greenhouse and allowed to grow out for identification. Each site had two replicate trays of the three site collections resulting in six trays per site. In addition, 12 trays were placed with just sterile soil mix as control plots to ensure no weed seed was present in the soil mixture used or potentially introduced by greenhouse plants that may have had fruiting weeds during the study. A total of 47 taxa were identified, eight of which were new to the Preserve checklist as of 2012. Of these, six were collected in the field in 2013, while the two remaining *Conyza canadensis* and *Juncus bufonius* were not found in the field. This study showed a healthy abundance and diversity of native species present in the Preserve's soil seed bank. Seeds were viable and germinated readily given the right conditions. This study also demonstrates the benefits of seed bank studies along side ground surveys for determining a broad spectrum of plant species even if not actively growing.

A New Method of High-resolution Aerial Photography For Resource Management

Brian F. Gootee - Arizona Geological Survey, McDowell Sonoran Conservancy Field Institute

Daniel G. Gruber - McDowell Sonoran Conservancy Field Institute

An excellent basemap can improve field data collections for a variety of research projects. We piloted a cost-effective approach to collecting high-resolution aerial photography from three research sites in the McDowell Sonoran Preserve, Scottsdale, Arizona. Aerial photography was collected by a high-resolution digital camera attached to a weather balloon. This approach was used successfully to map geological features and document a cultural resource site. An average of 5+ hectares/hour was surveyed. Photographs were processed using Agisoft software to create oblique aerial photographs, orthographic aerial imagery, 3D point cloud data, digital elevation map (DEM), photograph-textured DEM, topographic contour map and shaded relief maps. The quality of the results was limited only by the camera resolution, balloon height and number of overlapping photographs but was within 6 centimeters/pixel, comparable to LIDAR at a tiny fraction of the cost. This technique of mapping 3D features from overlapping photos, referred to as Structure from Motion (SfM), can be applied to landscapes, 3D objects, trench walls and enclosed spaces, covering up to several square kilometers. This method can also be used repeatedly to quantitatively show changes in volume and extent such as erosion, landslides and vegetation growth.

Poster Presentations

A Recipe For Trail Mix: Quantifying Usage of Mix-Use Trails

Debbie Langenfeld, Melanie Tluczek, Lisa Miller, Leona Weinstein
McDowell Sonoran Field Institute, McDowell Sonoran Conservancy

There's little empirical data on the effects of trail usage on heavily used nature areas. In 2014 the McDowell Sonoran Field Institute (MSFI) embarked on an effort to count the usage on selected mixed-use trails in the McDowell Sonoran Preserve. Beginning in February 2014 and running until February 2015 the 'Human Trail Count' study uses standardized in-field observations in which volunteers manually tabulate the number and type of non-motorized users along ten assigned study locations representing high, medium and low use trails. The data is collected one Saturday per month (excluding December) at peak usage times based on season. Counts take place regardless of weather conditions unless trails are closed by the City of Scottsdale. For two consecutive hours at ten minute intervals, all hikers, bikers and horseback riders that walk past the volunteers are counted. The data is used as part of a larger study to understand the impact of trail use on erosion and surrounding vegetation. Results show an increase in usage between 2014 and 2015 at nearly all study trails. Some trails are used mostly by hikers, some by bikers and seldom by horses. Manual trail counting is in some ways superior to mechanical sensors that don't differentiate between mixed user types. There are multiple areas of opportunity for data sharing including the City of Scottsdale, other groups within the McDowell Sonoran Conservancy and other conservancy organizations across the world. In addition, it is surprisingly easy to recruit volunteers. Given the current results, it's anticipated that the study could be extended for a third year, expanded to include additional trails and/or more collection days, and refined further by adding dogs or gender to the mix.

McDowell Sonoran Preserve: A Pre-Hispanic Cultural Landscape

T. Kathleen Henderson and Connie A. Darby
Desert Archaeology, Inc.

Desert Archaeology, Inc. has had opportunity over the past several years to conduct numerous cultural resources surveys of portions of the McDowell Sonoran Preserve in advance of Preserve land purchases and the development of public trails. More than 6,500 acres were examined and 50 archaeological sites were recorded. Most of these sites are Prehispanic in age and reflect a diversity of types, including a Hohokam ballcourt village, seasonal habitation sites, rock shelters with bedrock grinding stations, dryland agricultural sites, procurement and processing areas and petroglyph locales. Although materials of the Hohokam culture dominate among these sites, evidence of earlier Archaic and later Yavapai groups is also present. Most remarkable is the fact that these sites occur within a natural setting—the Preserve—that is largely unchanged from the time that these now-archaeological sites were occupied and used. Given this setting, we suggest the many pre-Historic era archaeological sites within the Preserve collectively represent a Prehispanic cultural landscape. In this poster we present and expand upon this concept of the Preserve as a cultural landscape and how its use in approaching preservation or study of the Prehispanic sites can provide a broader and richer understanding of the Preserve's archaeological resources.

Poster Presentations

Recurrent Occupation of the McDowell Mountains

Chris North, Scott Courtright, John Rapp
PaleoWest Archaeology

PaleoWest Archaeology completed data recovery excavations at the Adero Canyon Site in the McDowell Mountains in early 2015. Our investigations revealed two large middens at least 50 cm deep, one of which also contained a distinct roasting pit in its upper fill. Despite the presence of deep midden deposits, no architectural features were identified. Numerous Late Archaic–Early Agricultural projectile points were recovered from surface and subsurface contexts including Gypsum, Cortaro, Empire, San Pedro, and Cienega types. Several radiocarbon dates were also obtained that support an Early Agricultural through Hohokam Pioneer period occupation, with one radiocarbon date from the roasting pit suggesting Classic period Hohokam use of the site. A significant number of Tizon Wiped sherds were also recovered from the surface of the site, indicating a protohistoric or early historic Yavapai occupation. The project's findings help to fill in data gaps on the poorly understood Late Archaic–Early Agricultural period and protohistoric–early historic period occupation of the Phoenix Basin.

Evaluating Sustainable Landscape Performance: A Case Study Investigation In A Periurban Desert Park

Kaylee R. Colter, Chris A. Martin
College of Letters and Sciences, Arizona State University

More methods for evaluating and quantifying landscape performance benefits must be developed in response to increased public demand to construct sustainable and usable designed landscape spaces. During summer 2014, a case study investigation pairing researchers with practitioners was conducted to document specific landscape performance benefits provided by George "Doc" Cavalliere Park. "Doc" park is a recently-developed, 13.8-Hectare, peri-urban public park located in north Scottsdale, Arizona. Surrounding the park is a low-density residential neighborhood interspersed with remnant upper subdivision Sonoran Desert habitat. This peri-urban park is certified by the Sustainable Sites Initiative (SITES). Utilizing resources from the project designers along with original research, 12 landscape performance benefits unique to the goals of this project were developed and evaluated. Benefits spanned economic, social and environmental categories to target: stormwater management, water use, energy conservation, habitat creation, microclimate modification and park use. These results showed the importance of tailoring sustainable practices to each specific project site. Experiences gained from this case study investigation revealed challenges associated with quantifying the benefits of sustainable-designed public landscapes spaces.

Symposium Photos



Photos by Lynne Russell

About The McDowell Sonoran Conservancy

Our Mission

The McDowell Sonoran Conservancy is a non-profit conservation organization that relies on our more than 600 volunteer Stewards to help protect and promote the McDowell Sonoran Preserve.

We do this in so many ways - from trail building to patrolling the trails, guiding hikes and mountain bike rides, formal and informal education and research. Our goal is that future generations will be able to enjoy this ecological treasure the same way that we do today.

Our Vision

The McDowell Sonoran Conservancy will be the leader in urban preserve management through the excellence with which it exercises stewardship over Scottsdale's McDowell Sonoran Preserve. Through the research conducted by our Field Institute and our educational programs, our Stewards will be able to effectively care for the preserve and share our expertise. These activities will result in generations of citizens and visitors enjoying the Preserve in a respectful and informed manner. Our service and expertise will be recognized as a model throughout the country and garner support to expand our impact.