



*Friends of Ironwood Forest*

*Spring 2022*

## ***The Bell Rocks and Flowers of Cocoraque Butte***

*by Janine Hernbrode*



Scholars who study human culture have made progress toward discovering some of the meanings of petroglyphs and other iconography belonging to ancient peoples. Many of you have heard about the deciphering of Mayan symbols in Mexico or the very old story of the Rosetta Stone of ancient Egypt,

but we have examples that are in our own backyard, even one study that includes the petroglyphs of the Cocoraque Butte Petroglyph Site in Ironwood Forest National Monument. Petroglyphs are not an alphabet, but they have specific meanings that represent parts of a belief system.



To understand the discovery, you need a little background about the Flower World. In most modern cultures the Flower World exists as linguistic fragments of the ancient and wide-spread Uto-Aztec belief system. It was identified in the songs and symbols of the pre-Hispanic American Southwest some years ago by a University of Arizona linguist, Jane H. Hill.

She noticed that the use of the word “flowery” in Native American songs had nothing to do with the English word “flowery”. She found Native Americans from 30 tribes related to the Uto-Aztec languages or their neighbors were mentioning specific flowers and using them as metaphors for the life force, the soul and the heart of living beings.

Their song lyrics labelled both objects and beings as “flowery”. The English definition given by the Cambridge Dictionary of English includes not only a proliferation of flowers as “flowery” but also includes flowery writing that “uses too many complicated or unusual words or phrases in an attempt to sound skillful.” This is a significant difference, and it can be tracked linguistically to the time before many of the 30 languages diverged from one another, possibly 7,000 to 9,000 years ago.

The ancient Mesoamerican belief is just part of an ideology. It outlines a spirit world that is beautifully chromatic and includes flowers, colorful birds, butterflies and rainbows. This beautiful world of flowers and sparkling, shiny, or iridescent colors can be evoked by seeing flowers. Even the spirits of



*All photos courtesy of The Rock Band*

living beings and ritual objects can be evoked by associating them with flowers.

Hill and Kelley Hays-Gilpin, from Northern Arizona University, identified four symbols in ancient paintings, jewelry, or other forms of material culture that could indicate that the flowery spirit world was present for ancient people. They found that before A.D. 1300, archaeological evidence of the Flower World Complex is clear among Ancestral Puebloan and Mimbres people but not among the Ancestral O’odham (the Hohokam).

They suggested someone look at Hohokam petroglyphs to see if flowers, birds, butterflies, and rainbows were part of the ancient iconography. The author and Peter Boyle documented the presence of Hohokam imagery, including flowers, birds, butterflies, and certain abstract forms representing flowers in petroglyphs at Sutherland Wash Rock Art District near Tucson.

A second recording project, at Cocoraque Butte, revealed similar Flower World imagery. Hernbrode and Boyle’s data suggest that belief in the power embodied in flowers and the other iconography of the Flower World may have had broad distribution in the Tucson area.

Today, the Tohono O’odham, descendants of the Hohokam, recognize that flowers can be important in healing, in gaining personal power, and in the practical aspects of agriculture. Music and song are an important way of evoking the power of flowers among modern people. Songs are considered “flowers for the ears.”





At Cocoraque Butte, Hernbrode and Boyle established the presence of flowers and the related imagery using the same approach previously utilized at Sutherland Wash.

In that project, Flower World imagery was defined as including 1) realistic flowers, petroglyphs that resemble local flowers; 2) abstract flowers, geometric images that have been interpreted as representing flowers based on ethnographic information; and 3) images of colorful and/or iridescent fauna such as birds and butterflies, as well as natural features such as rainbows and sparkling rocks.

Although images of rainbows are included in paintings among the Puebloans and the Mimbres, rainbows are difficult to identify in rock art. The project at Cocoraque Butte found arcs and nested arcs that could be rainbows, but without color it is difficult to say the images represent rainbows. Of course, petroglyphs themselves are not colorful, but they can depict colorful parts of nature. Of the total rock art elements recorded, 106 petroglyphs recorded at Cocoraque Butte are interpreted as appropriate iconography for the Flower World.

Abundant bird and butterfly imagery exists at Cocoraque Butte. Birds are depicted both from a front view with wings spread and from the side, most often with wings as single lines or little indication of wings at all. Easily identified butterfly imagery is also present. Butterflies appear either as single entities or integrated into more complex

panels. The project found that imagery of both realistic and abstract flowers plus the related complex including birds and butterflies is present at Cocoraque Butte, just as it is at Sutherland Wash.



But wait, the Flower World also includes the ritual uses of sound analogous to the sounds of bells. Sutherland Wash has areas of reverberating sound and rock art depicting sound in addition to a large cache of copper bells. The tiny copper bells were most likely imported from West Mexico where ancient metallurgy produced objects valued for trade.

Cocoraque Butte, as far as is known, has no stash of imported bells, but they were not needed. As improbable as it may seem, there are sizable tonal boulders at Cocoraque that provide the sound of bells when struck. There are many “bell rocks,” the boulders that produce a bell-like tone when struck. Some of these were professionally recorded in 1993, and it is clear from these recordings that the boulders produce a variety of tones.

The bell rocks at Cocoraque Butte are generally large granodiorite boulders, which differ substantially in size from the slender, elongate Kiva bells composed of many different types of rock that have been reported in the Puebloan region. Estimates of the weight of the bell rocks are based on their dimensions and the density of granodiorite. The median volume of the bell rocks is 7.1 cubic feet (range 0.8 to 49.2); the





median estimated weight is 1,009 pounds (range 79 to 5,015).

Gathering the data in order to analyze the presence of flowers and the related birds and butterflies and to record the bell rocks was a huge volunteer effort sponsored by the Arizona Archaeological and Historical Society and the Bureau of Land Management. Because of Cocoraque Butte's physically challenging landscape, only a small portion of the petroglyphs had been recorded previously.

The author assembled a group of volunteers dubbed "The Rock Band" to crawl over the boulders and record the petroglyphs at Cocoraque Butte's public site. The working hypothesis was that Cocoraque Butte would contain a significant quantity of imagery related to the Flower World, as well as features relating to sound production, just as there are at Sutherland Wash.

In all, over a two-year period, 31 volunteers recorded all of the petroglyphs on the seven hills at the base of the larger Cocoraque Butte and a few on the slopes of the Butte itself. The volunteers included recorders, who collected data, drew, and measured the images and photographers, who provided high-resolution photographs of the petroglyphs and the bell rocks.

All petroglyphs, bell rocks, grinding features, and artifacts found on the hills designated A to G were recorded. All were photographed and drawn, and GPS coordinates were recorded for each boulder containing petroglyphs and/or grinding features and/or wear indicating use as a bell rock. Tabulations were made in the field of all element types relating to the Flower World and selected other element types of interest.

All bell rocks that met two criteria were recorded: they produced a tone, and they showed evidence of use in the form of strike marks. The same information was gathered as for petroglyphs (photos, drawings of the boulder, and strike marks, patination, superimposition, etc.).

In addition, observations were made regarding the boulder itself, such as its



dimensions, geometry, and whether it is suspended in some fashion (such as spanning two other boulders), all of which are factors that affect tonal quality. Further, for each bell rock, we made audio recordings of the tones produced and measured the frequencies of the corresponding sound waves using Fast Fourier Transform (FFT) spectrum analysis.

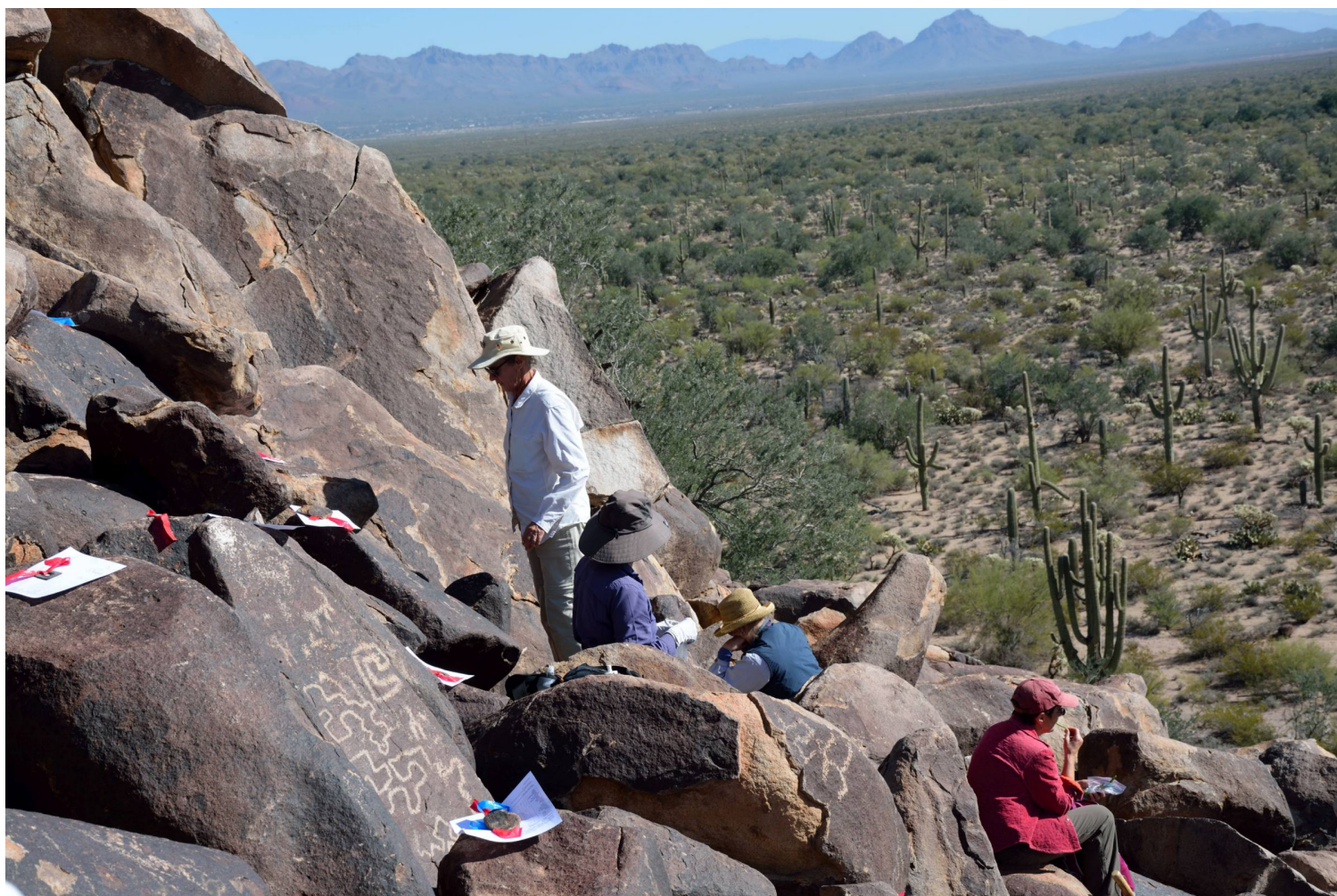
In total 796 petroglyph panels with 1,888 rock art elements and 83 bell rocks were recorded.

The presence of bell rocks at Cocoraque Butte was reported in the 1990s, with professional recordings of some of the bell rocks made in 1993. This study recorded 83 bell rocks. Of the 83 bell rocks, about half (41) are located on boulders with petroglyphs. Only bell rocks with strike marks were analyzed.

There are boulders present at this site without strike marks that ring, but these were not included in the study. Based on our analysis, it was concluded that 60 of the total 83 bell rocks showed evidence of use at around the same time the rock art was made.

The remaining 23 bell rocks may have been used in the same time frame, but the data could not conclude so based on this analysis. For example, in some cases new strike marks may have totally obscured earlier use. Preserving the evidence of use requires striking the stone with instruments





softer than the rock so the color of the strike zones is not altered. Hernbrode and Boyle used wooden mallets and strongly suggest others do the same.

While several bell rocks have similar tonal qualities, others have a wide range of different tones when struck. In one case, there are three bell rocks in close proximity to each other, each of which produces a different pitch. Since the three boulders are within reach of a single individual, that person could produce combinations of different pitches consecutively or simultaneously and, therefore, produce tonal music.

That is, they could be played one at a time, in combinations of two together, in combination of all three, resulting in seven different tones. These can then be combined into different patterns to form music. If several musicians were simultaneously engaged along with singers, they could have produced considerable complexity in music,

perhaps performed at ceremonial or celebratory events.

Images of flute players appear on both Hohokam ceramics and Hohokam petroglyphs. Since flutes are tonal instruments, their representation in the imagery produced by the Hohokam provides independent evidence that they had the means to produce tonal music and, in the opinion of the researchers, likely did so.

There is an interesting difference in the spatial distribution of three major groups of motifs. Flower World imagery comprised 6.3 percent of the glyphs in Hill A, which is about 50 percent higher than the concentration at the other hills in this study.

In contrast, the percentage of anthropomorphs (human-like beings) and zoomorphs (animal-like beings) is considerably lower at Hill A than at other locations. The researchers' working hypothesis is that this distribution of imagery may reflect differences in how the areas were utilized.



When analyzing the spatial distribution of three feature types—petroglyphs, bell rocks, and grinding features—as well as the spatial distribution of artifacts such as sherds, lithics, and ground stone, one area has the largest concentration of both petroglyphs and bell rocks. However, the largest number of grinding features and artifacts is found elsewhere at the site, primarily at a group of hills nearby.

The researchers suggest that this may indicate that people carried out many of their daily activities on the south side of the site. In contrast, we suspect that much of the group ceremonial activity may have occurred on the south face of the tallest, most impressive hill with the greatest collection of both petroglyphs and bell rocks with strike marks.

It is worth noting that the tones created by striking the bell rocks carries for some distance. It is easy to envision that the musical “performances” of individuals striking the bell rocks would be heard throughout the project area in each location.

The overall distribution of Flower World imagery is quite similar to the distribution of all petroglyphs and bell rocks. This diffuse pattern was also observed at Sutherland Wash, and it suggests to us that many individuals were involved in the production of petroglyphs, including those with religious significance, over a long period of time.

Following other scholars in the field of rock art research, the researchers infer that at Cocoraque Butte religious leadership was likely distributed among numerous individuals rather than limited to an elite, as would later become the case in Hohokam culture.

In conclusion, evidence has been found that the belief in the Flower World among the Hohokam was not unique to Sutherland Wash but was also present at Cocoraque Butte, showing it was a more broadly based belief system among the Hohokam that extended over a long period of time.

The Flower World complex is illustrated in the petroglyphs by both realistic flowers and abstract representations of flowers, as well as related chromatic imagery such as birds and butterflies. Very interestingly, these petroglyphs are intermixed with a large

number of bell rocks that produce a wide array of tones with which music might well have been produced.

Thus, as at Sutherland Wash, Cocoraque Butte evokes the Flower World metaphor both with visual imagery and the sound of bells.

In the researchers’ view, this work has methodological implications. Identification of the Flower World complex involves location of a specific set of related motifs, each of which can be expressed in a number of ways.

For example, flowers can be depicted with a number of realistic graphic forms that resemble various flowers found on the landscape. They can also be expressed as abstract symbols known from the ethnographic literature to represent flowers.

All of these images represent flowers and to some people are imbued with deep meaning. In conducting rock art research, the researchers believe it is important to recognize such commonalities in images and group them accordingly, rather than dividing the petroglyphs into a multitude of element types and potentially missing their interrelationships and meaning.

*For a full discussion of this paper, along with complete references, data, and photographs, please go to:*

Hernbrode, Janine and Peter Boyle.

“Petroglyphs and Bell Rocks at Cocoraque Butte: Further Evidence of the Flower World Belief Among the Hohokam”, *American Indian Rock Art*, Volume 42. Ken Hedges, Editor. American Rock Art Research Association, 2016, pp. 91-105.





# ***From the President***

*by Tom Hannagan*

To say the past year or two has been strange is a major understatement. Health concerns related to the pandemic have had a major effect on “normal” activities of the Friends of Ironwood Forest. It would be just as big an understatement to say that FIF has made the best of the circumstances.

There are three major areas we have successfully addressed lately. The first is to defend the Ironwood Forest National Monument from external threats. We’ve done that by fighting against the state’s plans for “recommending” a new interstate highway through the Avra Valley that would bisect IFNM from Saguaro National Park and the Tucson Mountains.

Our efforts, in conjunction with our conservation partners, have caused the Arizona Department of Transportation to reconsider the I-10 corridor and co-name it as a “preferred” route. That, at least, puts the I-10 route on the same footing as the Avra Valley route. We have met with federal legislators’ staffs, and they are aware of the broad opposition to the desert route. They also have informed us that no funds are available in the foreseeable future for any new construction in this area.

The other major defensive action was to alert Pima County Natural Resources Department of an exploration permit requested from the state by Silverbell Mine owners that could encroach into IFNM near the Silverbell Mountains. Pima County investigated this request and found that it does not permit any ground disturbance. We will be monitoring this situation to make sure no more intrusive “exploration” permits are granted.

The pandemic has seriously affected the FIF’s educational programs. To counter this we have done several things. The first was moving to Zoom-based presentations for any Friends who wanted to log into discussions about the Monument.

FIF has also completed a new, user-friendly map of IFNM. There are technical maps available from the BLM, but they are not very helpful to the average person wanting to visit IFNM for the

first time. The map is available on our website, and hard copies are being distributed to various libraries and visitor centers around the Tucson area.

Another educational achievement that’s rather impressive, I dare say, is a new book published by Q.T. (Tuan) Luong called *Our National Monuments*. Tuan is one of the photojournalists who wanted to counter the dastardly executive order in 2017 that targeted 22 national monuments that had been proclaimed by Presidents Clinton and Obama, including IFNM.

FIF was deeply concerned at the time and heavily engaged in making sure our federal representatives and senators did whatever they could to protect IFNM. The executive order ended up attacking two national monuments in Utah, Bears Ears and Grand Staircase Escalante.

Any of the 22 national monuments chronicled in Mr. Luong’s book could have graced the cover. Please note which one did so! Yes, it is a unique view of our beloved Ragged Top. See it on the next page.

To continue to do what we can to improve IFNM, FIF has joined with several other area wildlife conservation groups to remove unnecessary barbed wire in the valley corridors between the IFNM mountains and other nearby ranges. We have used online tools, Zoom and email, to coordinate volunteer efforts.

It is relatively easy to have the volunteers operate in scattered small groups that allow for social distancing. We know from many photos that medium to large species of wildlife travel amongst the ranges and basins in the vicinity of IFNM. The removal of legacy and redundant fencing is necessary for their health and survival.

Also, FIF continues to provide mini-grants to local scientists desiring to conduct surveys or studies of species found in IFNM. The most recent of these was issued to Larry Jones for the tracking and data accumulation of two species of lizards, Desert Iguana and Long-nosed Leopard Lizard.





# OUR NATIONAL MONUMENTS

AMERICA'S HIDDEN GEMS

QT LUONG

*Foreword by* SALLY JEWELL

*Marine National Monuments text and photographs by* IAN SHIVE

*With contributions from 27 citizen organizations protecting our public lands and waters at risk*



# ***Fence Removal: A Different Celebration***

*By Dave Barker*

The last couple of years have been very difficult for both individuals and organizations. Due to COVID, we have all had to alter our plans, cancel events, and take various measures to protect our health.

The Friends of Ironwood Forest and our agency partners at the Bureau of Land Management have had to drop virtually all of our traditional activities and celebrations—including volunteer work days—for the last two calendar years. It's a just another sad outcome of the pandemic.

However, on December 11, 2021, your FIF organization was able to combine our traditional National Public Lands Day celebration with a new (to us) activity. FIF helped manage and fund a fence removal project with a coalition of partners, including Arizona Game and Fish, Coalition for Sonoran Desert Protection, Tucson City Water, Friends of Buenos Aires NWR, and Saguaro National Park.

This coalition has initially labeled itself the Avra Valley Wildlife Connectivity working group. With a combined number of around 75 volunteers, lots of equipment, and two specialty wire winders, we were able to remove three miles of legacy and redundant barbed wire fencing that weighed 4,000 pounds!

The fencing was a fatal impediment to wildlife movement. We did this on a Tucson City Water property on West Tucker Road, on land that is near the eastern border of Ironwood Forest National Monument.

This activity has long been on "the drawing board" of some local entities.



*Photo by Jim Avramis*

Carolyn Campbell, Executive Director of the Coalition for Sonoran Desert Protection, commented:

*"There is such a wide range of public lands in Avra Valley—Saguaro National Park, Ironwood Forest National Monument, City of Tucson, Tohono O'Odham Nation, and Bureau of Reclamation. The individual agencies long ago identified unnecessary fencing on the lands they manage. These that present such a barrier—deadly in many cases—to wildlife movement.*

*It seemed an overwhelming task to overcome, but so many groups—public agencies and conservation groups alike—are united in the goal to actively remove fencing.*

*After such a successful volunteer turnout on National Public Lands Day in December, we look forward to tackling this problem piece by piece."*



Don Swann, Biologist, Saguaro National Park, reminds us that:

*“Many studies have shown that barbed wire fences can stop large animals, change their movement patterns, and keep them away from water and food sources they need to survive. In addition, sometimes animals are directly killed by fences when they try to jump over them but get entangled and cannot free themselves.*

*Wild animals don’t recognize boundaries, and many species need to be able to travel and migrate in order for their populations to survive. We are dedicated to protecting animals in and beyond Saguaro National Park and to work with our partners to help them as much as we can.”*



Photo by Jim Avramis

Members of FIF are reminded that stewardship of public lands often crosses boundaries, involves different agencies, and requires significant coordination. The December event had another very rewarding result. It allowed various non-profit advocacy groups to “sit down at the same table, and enjoy a meal together.” That’s not typically an easy task.

However, removing unneeded fencing and protecting wildlife established the common ground necessary for our groups to combine resources and efforts.

Happy Birthday, Public Lands!

(P.S. The sandwiches were awesome!)



### **About Ironwood Essence, the FIF newsletter**

For many years, publication of the Friends of Ironwood Forest newsletter has been the responsibility of Gaile James. She has also been our Secretary/Treasurer over those years, helping FIF become the organization it is today.

Gaile retired from the Board this spring. We are grateful for her many contributions to the organization, especially her invaluable work on the development of the newsletter we have now.

Thank you, Gaile!

Board member Dave Barker is taking over Gaile’s role as newsletter coordinator. He’ll be working with a talented couple, members Scott and Julie Roederer, who have volunteered to do the editing and technical work of publishing the newsletter for the past seven years.



# The Ironwood Gallery

*Send us your favorite photographs of IFNM.*



*Editor's note: This stunning photograph of Ragged Top at sunset was taken by Osha Gray Davidson, an award-winning author, freelance writer, and photographer. With his permission, we have used the photograph as part of our new masthead.*



## **Community Supporters**

Bach's Cactus Nursery  
BKW Farms, Inc.  
Dragoon Brewery  
Rusty Lizard Press  
Summit Hut Ltd.

## **FIF Partners**

Arizona Desert Big Horn Sheep Society  
Arizona Game and Fish Dept.  
Arizona Native Plant Society  
Arizona Wildlife Federation  
Bureau of Land Management  
Conservation Lands Foundation  
Friends of Buenos Aires National Wildlife  
Refuge  
Friends of Ironwood Forest Volunteers  
Saguaro National Park  
Marana Parks and Recreation  
Mule Deer Foundation  
Old Pueblo Archaeology Center  
Sierra Club Rincon Group  
Southwest Archaeology  
Coalition for Sonoran Desert Protection  
The Wilderness Society  
Tucson Audubon Society  
Tucson Cactus and Succulent Society

### **Our Mission**

*Friends of Ironwood Forest is a local non-profit organization that works for the permanent protection of the biological, geological, archaeological, and historical resources and values for which Ironwood Forest National Monument was established.*

*FIF provides critical volunteer labor for projects on the monument, works with the Bureau of Land Management and many other partners, and strives to increase community awareness through education, public outreach, and advocacy.*

### **Your Financial Contributions at Work**

*We rely on the financial support of people like you to help us with our mission to protect the natural and cultural resources of Ironwood Forest National Monument. We also work to increase awareness of the monument and improve visitor experience there.*

*Please consider donating to support our work. We couldn't do this without you. You can donate online at <https://ironwoodforest.org/donate>*