



Ironwood Essence

Friends of Ironwood Forest

Spring 2024

Are Saguaros Dying in Arizona?

by Jack Dash

There was a lot of talk in the news last summer about a mass saguaro collapse caused by heat and drought. This claim, and the media storm around it, requires a bit of unpacking.

The story begins with the fantastic research team at the Desert Botanical Garden (dbg.org) in Phoenix who have been surveying the saguaros on grounds at their garden while also seeking information from community members who report damaged or fallen saguaros.

What they have found is that the intense heat of years like 2020 and the summer of 2023 are creating detrimental conditions for saguaro survival. Specifically, the intense heat is causing the flesh of the plants to become soft, creating the conditions for structural collapse. High nighttime temperatures prevent efficient photosynthesis (cacti mostly photosynthesize at night), while drought stress weakens these plants, making them more susceptible to other issues like disease.

Urban vs Wild Saguaros

You can imagine that these factors will be particularly prevalent in a place like Phoenix where the urban heat-island effect is extreme, and where rainfall is lower than the Tucson area. An inability to tolerate extremes of sunlight and temperature will be even more pronounced in plants which have been recently transplanted and are growing in

environments that don't mimic where they naturally occur. In other words, a bare yard covered in a layer of gravel with pavers and block walls or a roadway median between four lanes of blacktop will be challenging areas for saguaros to survive extreme heat waves.

Inefficient Photosynthesis

The photosynthetic pathway utilized by succulent plants is known as Crassulacean Acid Metabolism (CAM) and is distinguished by the fact that much of the photosynthetic process takes place at night.

This pathway works well under high temperatures but begins to break down when evening temperatures are above about



Saguaro toppled by a wind storm

95 degrees Fahrenheit. This was the case for several weeks in a row last summer in Phoenix where temperatures rarely dropped below 100.

Under these conditions, saguaros and other succulents are not photosynthesizing efficiently and may be building up waste products in their cells. Luckily this was not the case in the Tucson area. Even through the extreme heat, our evening temperatures tended to drop below 95 degrees.

Prolonged periods of extreme heat and drought that impact photosynthesis and weaken tissue will provide a vector for other issues like *Erwinia* bacteria to make an appearance. Additionally, increasing irrigation to these plants may do more harm than good if photosynthesis isn't occurring efficiently. Moisture builds up in the cells of the plant and causes them to drop heavy limbs or even collapse.

Looking to the Future

Even outside of urban areas, increased average temperatures combined with intense heat waves and a lack of rainfall will likely spell trouble for saguaros and other desert plants. The nature of these impacts will vary by species and location, so it is important that we begin monitoring and protecting these species now.

With that said, at the Arizona-Sonora Desert Museum we are currently not observing the phenomena of sudden cactus collapse or limb dropping, nor are we finding obvious signs of damage on large saguaros.

It is certainly the case that extreme heat may be negatively impacting our large saguaros, but the types of symptoms that are showing up in Phoenix are not currently appearing at the Desert Museum or in the Tucson Mountains.

Of course, if summers like 2020 and 2023 are the new normal and if even hotter and drier summers can be expected to occur regularly, then we may begin to see this type of damage on grounds here at the Desert Museum.

Saguaro Recruitment

As we plan for the impacts of climate change on our Museum grounds and the

surrounding environment, our focus is less on what this will mean for large saguaros, which have a substantial amount of water holding capacity and resiliency, and more on seedling saguaros.

Plants that have germinated in the last 5, 10, or even 20 years and have not built up significant water storage capacity will be much more susceptible to both year-to-year variation and long-term climactic trends.

Desiccation and death of young saguaros will be exacerbated by possible die-off of important nurse plants like paloverdes, ragweeds, and mesquites that lack the capacity of succulents to store significant amounts of moisture to draw on during periods of drought.

From our perspective, impacts to saguaro recruitment is the most concerning phenomenon we have observed. Over time it is possible that saguaro populations may be increasingly less able to recruit new generations, and a long-term decline in numbers of these plants may occur in our area.



Climate Change and the Future of Desert Plants

The Sonoran Desert is in the midst of a long-term drought marked by a vicious cycle of unreliable rainfall, increased temperatures, and faster loss of moisture because of the higher temperatures.

Though our desert plants are adapted to drought, some of them may reach a point of no return, and our eco-systems may become less productive due to the extreme conditions.

It is apparent that a primary issue is increasing urbanization and habitat fragmentation in our region, which increases the pace at which climactic change is taking place. A move away from the current layout and materials used in our cities and a shift towards more sustainable materials and practices will be essential if we want to show

a true commitment to protecting our iconic Sonoran Desert species such as saguaros.

Recently, a powerful storm near the Desert Museum decimated many mature saguaros. The damage may be attributed to a microburst, straight-line winds, or perhaps tornado-like conditions. Violent and unpredictable storms like this seem to be increasingly frequent (though not entirely out of the ordinary) in our region, most likely due to climate change. This may prove to be yet another threat to saguaro populations—especially in isolated pockets.

For the time being, the Arizona-Sonora Desert Museum will continue to pursue our mission of conservation and education while monitoring our plants so that we can accurately report issues as we see them arising and investigate best practices for mitigating damage resulting from climate change.

Jack Dash is a horticulturist for the Arizona-Sonora Desert Museum. This article was originally published in ASDM's Desert Diaries, August 30, 2023 and is used by permission.

Drought Mechanism in Southern Arizona

On average here in southern Arizona, increasing temperatures are slowly and subtly shifting the water balance over time. The warmer the air, the more water it can hold and the faster it absorbs water from the soil and plants.

Thus, to mitigate drought, precipitation needs to increase to meet increasing moisture demand.

But, according to Dr. Mike Crimmins, climatologist at UA's Department of Environmental Science and Arizona Cooperative Extension, projections are uncertain but suggest that an increase in average precipitation over time is unlikely.

Ideally, the amount of average annual precipitation would match the amount of average annual potential evapotranspiration (PET, the ability for hot, dry air to remove water from the soil and other surfaces, both directly and through plants).

While average annual precipitation remains relatively steady, PET continues to increase, driven by higher temperatures.

Currently, it is estimated that PET removes the equivalent of six times the annual precipitation here in southern Arizona.

From a presentation by Dr. Crimmins at Tumamoc Hill on January 18, 2024.



From the President

by Tom Hannagan

If anything, the pace of things happening at the Friends of Ironwood Forest is accelerating. Our advocacy for the National Monument continues, focusing on the lawsuit against the proposed I-11 route favored by the Arizona Department of Transportation. We are in the process of adding an additional (fourth) claim to the legal action that addresses ADOT's ignoring the Endangered Species Act.

Our outreach efforts have recently included another successful exhibit at the Tucson Festival of Books. We spiced our booth this year with a few reptilian examples of IFNM wildlife, courtesy of Mike Cardwell, our resident herpetologist. It seems the attendees were, in fact, interested in more than books.

Our FIF Board membership now stands at a healthy ten dedicated individuals. They are all passionate about our mission of protecting and preserving IFNM. And, thankfully, they all pitch in on one or several of our various projects.

A highlight for me this spring was the resumption of FIF sponsoring school field trips in the Monument, near Ragged Top. Education remains an important mission of the Friends.

We hosted six groups of young folks from area high schools and the Arizona-Sonoran Desert Museum. Two FIF board members, Molly Wheelwright and Pi Polletta, organized these outings. FIF mini-grants assisted the schools with their transport expenses. It is always a pleasure to see and hear the students' reactions to the wilderness and the availability of public lands. And we learn how knowledgeable they are regarding the affect of climate change on ecology.

All of the above have benefitted from your encouragement and financial support. We

are grateful for your continuing support of our efforts in education, outreach, wildlife connectivity and advocacy for IFNM. I have a question for you: What do think is the significance of next year to IFNM?

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>

Board Member Bill Thornton Retires

Note: Recently “retired” board member Bill Thornton reflects on his decade of service on the board of directors of Friends of Ironwood Forest and shares his thoughts for the future.

Friends of Ironwood Forest is one of many organizations recognized by the Conservation Lands Foundation to support national monuments designated in the waning days of the Clinton administration. Our mission is to work for the conservation of IFNM and to advocate for its natural, cultural, and historic resources.

Local conservationists had long recognized the exceptional degree of biological diversity to be found on Ragged Top Mountain and surrounding lands. The monument designation enjoyed widespread support in Tucson and southern Arizona, including a unanimous resolution by the Pima County Board of Supervisors.



I was invited to join Friends of Ironwood Forest in 2010 and elected to the board of directors shortly afterwards. At that time, we had an office and a full-time executive director. We later became an all-volunteer board. It was not an easy transition. Many of us were not aware of the day-to-day tasks performed by our executive director. It was a steep learning curve.

I consider “Have a Beer for a Bighorn” as a significant accomplishment, bringing like-minded conservationists together to meet, mingle, and raise funds for “friends”. Due to my background in insurance, I was able to assist in securing the coverage required by the Bureau of Land Management at an affordable premium.

My other activities included recruiting members and new board members and recognizing contributions of present and past members. I also wrote op-ed pieces for the Arizona Daily Star and many letters to the editor regarding conservation issues. We contacted our representatives in the US Congress to request their support for the monument.

As an emeritus board member, I believe:

- Good communication within the board is essential.
- Projects should be clear as to timelines, needed help, and costs.
- Political administrations will come and go. Vigilance is needed to recognize and effectively respond to new threats to the monument, e.g., I-11. There’s a solid core of support for public lands, and we will speak up when they are threatened.
- We must support the activities of other board members. Some of those activities include Meet the Monument, Hike the Monument, trail maintenance, fence removal, buffelgrass removal, and fund-raising efforts.

- We must engage in and contribute to board meetings, attend in person or by Zoom, and speak up and listen.
- We must be aware of the activities of other conservation groups and seek opportunities to work together for common goals.

I am honored to have been a member of the board. I believe my contributions were appreciated and have made a difference. As an emeritus board member, I will continue to support IFNM to the extent I am able, physically and financially.



A New Website for Friends of Ironwood Forest

We have great news! Our new website is up and running. Of course it's not really a new website, but it is a significantly updated one and we're excited to be using it.

Our previous website was wonderful back when it was created over a decade ago. However, as the old adage goes—times change but website widgets do not.

As anyone who has updated a website knows, it's no simple task: information needs updating, photos need updating, and website widgets need updating.

We've also changed the organization of the information on the site to hopefully be a little more straightforward. We're especially excited about the News section, which allows us to upload timely information that is then saved so users can review all our news stories.

It's really better to use a website than talk about it, but here are some highlights for you to consider checking out. "The Friends" section is all about our organization—how we work, our board, and more. But we definitely don't do this work on our own, so be sure to check out our [Partners and Sponsors page](#).

"The Monument" section is, well, all about the monument. There are lots of subsections and plenty to look at here, but there are two sections we'd like to highlight.

The first is under "Visit" and it's the [Places of Interest page](#). While there are obviously many places on the monument to visit, these are some of the more popular and accessible ones.

Under "Learn", we have a page called [Educational Resources](#) with some fun videos and links to cool articles at the bottom.

We also love that our new site looks much, much better on mobile phones than the old version did. One thing to point out to mobile users is that you need to use the arrows to be able to see all the subsections (dropdowns).

We don't build and maintain our website for us; it's really for you, the people who care about Ironwood Forest National Monument.

So, please send us your suggestions or ideas on how to make it better for you or others. And please help us by sharing our website. We're proud of its new look and functionality.

Desert Fence Busters Increase Wildlife Connectivity

The efforts by Desert Fence Busters to improve wildlife movement by removing obsolete fencing in the Tucson area continues to gain momentum.

During twelve events in 2023, 176 volunteers from at least six non-governmental organizations (NGOs), supported by personnel from local, state, and federal governments, removed 11.5 miles of abandoned barbed wire fencing.

That brings the total of the group's three years of work to more than 40 miles of fencing that no longer impedes wildlife habitat connectivity or presents lethal entanglement hazards to mule deer and other species.

These efforts have opened up over 6,000 acres of contiguous desert habitat while re-

cycling more than 41,000 pounds of scrap metal.

Involved public agencies and NGOs include Arizona Game and Fish Department, the National Park Service, Pima County (Flood Control), City of Tucson (Tucson Water), Friends of Ironwood Forest, the Coalition for Sonoran Desert Protection, Tucson Audubon Society, BKW Farms, Friends of Buenos Aires National Wildlife Refuge, Arizona Wildlife Federation, and the Mule Deer Foundation.

To get involved with Desert Fence Busters, go to the Friends of Ironwood Forest or the Coalition for Sonoran Desert Protection websites, among others.



Desert Fence Busters prepare to tackle more old barbed wire in Avra Valley on Feb. 17, 2024.

Hidden Threat of Death Pipes And What Tucson Audubon is Doing to Tackle the Issue

by Olya Weekley



Every day birds have to navigate the dangers of living in close proximity to humans. One such threat, lurking in plain sight, is the open-top vertical pipe.

Commonly referred to as “death pipes”, these seemingly innocuous structures pose a significant risk to birds and other small wildlife. When seeking a place to nest, hibernate, or roost, small creatures become trapped within. Unable to climb the smooth surface of the pipe or spread their wings, they eventually die a slow, agonizing death.

Cavity-nesting birds are the most likely victims but not always. Lizards, snakes, small mammals, and insects have also fallen victim to these pipes.

Determining the true extent of bird and animal fatalities caused by open pipes is challenging since the victims are hidden until the pipes are removed.

A striking example of the magnitude of this issue occurred in 2009 when Audubon California dismantled a 20-foot-tall pipe from an abandoned irrigation system that had been in place for 50 years. To their shock, they discovered hundreds of animals, including kestrels, flickers, bluebirds, and fence lizards. Until then, the existence of this particular death trap was unknown.

Tucson Audubon (TA) is tackling this issue in southeast Arizona with the help of the Arizona Sportsmen for Wildlife

Conservation grant funding. Our work includes raising public awareness about this issue, collecting reports of open pipes and actively working to close them permanently.

A recent project highlight includes a partnership with the Desert Fence Busters (DFB) Collaborative. DFB includes partner



organizations from Arizona Game and Fish, Arizona Wildlife Federation, BKW, Bureau of Reclamation, City of Tucson, Coalition for Sonoran Desert Protection, Friends of Buenos Aires National Wildlife Refuge, Friends of Ironwood Forest, Mule Deer Foundation, Pima County, Saguaro National Park, and Tucson Audubon.

Members of the collaborative share a common goal of improving landscape connectivity for wildlife through old fence removals. After barbed wire is taken down, TA staff and volunteers cap remaining anchor pipes to prevent any future deaths.

An endoscope survey of open pipes at one such site revealed layers of dead wildlife

within. What could be identified showed woodpecker feathers, lizard tails, rodent and bird skulls.

Within the last year (Spring 2023 – Spring 2024) Tucson Audubon capped 500 open pipes in Arizona. We plan to continue this work with the help of grants and private donations.

Interested in getting involved? You can help by reporting open pipes and capping the ones on your property!

Open pipes serve a variety of purposes, from functioning as fence posts and gate anchors to signposts or markers for boundaries and mining claims. Even vent and irrigation pipes, when left uncovered, pose a threat. Once you know what to look for, you can spot death pipes everywhere.

As outdoors enthusiasts, we often venture into wilderness areas, making us valuable allies in locating and reporting these hazards. By increasing our vigilance, we can help protect the animals around us.

If you encounter an open vertical pipe, please report it through the TA website using our online form: tucsonaudubon.org/deathpipes.

All we need are a few details about the pipe's location, purpose, and dimensions. If you have a photo, please include it. We also kindly ask that you temporarily cap the pipe with readily available objects to ensure animal safety while we contact the landowner for permission to cap them permanently.

Several methods exist to cap open pipes that do not serve ventilation or irrigation functions. If you come across one and wish to temporarily cap it, you can place a large rock or branch snugly inside the pipe.

For those addressing the issue on their property and seeking a more permanent solution, options include using aluminum caps, cement, or complete removal of the pipe.

The possibilities are endless, but ensure the cap is secure, durable and not easily movable by wind or animals. For necessary

ventilation or irrigations, specialized screens and caps are available on the market.

Death pipes are an easily overlooked but important threat to tackle. By increasing awareness, actively locating and capping death pipes, we can prevent these unnecessary deaths for years to come. With the support of organizations like Arizona Sportsmen for Wildlife Conservation and individuals like you, we can make a difference!

More information can be found here:
<https://tucsonaudubon.org/deathpipes>

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FIF Partners

Alliance of Arizona Nonprofits
Archaeology Southwest
Arizona Desert Big Horn Sheep Society
Arizona Game and Fish Department
Arizona Native Plant Society
Arizona Wildlife Federation
Bureau of Land Management
Center for Biological Diversity
City of Tucson
Coalition for Sonoran Desert Protection
Conservation Lands Foundation
Dove Mountain Hiking Club
Friends of Buenos Aires Nat. Wildlife Refuge
Historic Y
MET Foundation
Mule Deer Foundation
National Park Service, Saguaro NP
National Parks Conservation Assn.
Old Pueblo Archaeology Center
Pima County
Public Lands Foundation
Sierra Club
Sky Island Alliance
The Rock Band
The Wilderness Society
Tohono O'odham Community College
Tohono O'odham Nation
Tortolita Alliance
Town of Marana
Town of Marana Chamber of Commerce
Tucson Audubon Society
Tucson Cactus and Succulent Society
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The Ironwood Gallery

Send us your favorite photographs of IFNM.



*Gila Monster
Photo by Mike Cardwell*