



Shape the Future

Canyon Chatter

Friends of Madera Canyon

November 2024



Links to Contents

- 3 From the President, The Many Sizes of Biodiversity
- 4 Communications
- 9 Helping Hikers at Higher Altitudes
- 11 The Birding Report, The Lower Canyon – Early Fall
- 15 Local Opinion, The Fallacy of Mining Permits
- 17 Education, Sahuarita High School Student Volunteer Cleanup
- 20 Hunting Predators, Invasive Species, and Trophic Cascades

On the Cover. Loggerhead Shrikes are predatory song birds that stab and shake larger prey until they are dead. The prey is then impaled on sticks so they can be eaten later. The loggerhead shrike’s gory habit of impaling its victim on sharp thorns, twigs, and barbed wire is the reason it is referred to as the “butcherbird.” The primary food source is invertebrates, although it also consumes small vertebrates, such as birds, amphibians, reptiles, and bats. Hunting shrikes wait patiently on high perches, sometimes utilizing telephone lines.

When it sees a prey, it leaps down and kills it by repeatedly biting the back of its neck, paralyzing it with its raptor-like hooked beak. According to a 2018 study, loggerhead shrikes will grasp their larger prey by the neck and shake them with the force of a human being in a slow rear-end collision.

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From the President



Above is a box of insects used by Friends of Madera Canyon at the Arizona Insect Festival. Every one of the specimens in the box is found in Madera Canyon, and they are but a fraction of the variety of species there. Photography Judy White. The article with this photo starts on the next page.



The Many Sizes of Biodiversity

Last month, I was a sweep one Thursday for Doug Moore's Fourth Grade program. Our dry and hot fall has produced in the Canyon vistas of dryness punctuated by a Turpentine Bush here and a Desert Broom there with enough blooms still to attract, by my amateurish count, well over 30 species of butterflies, beetles and other insects flitting about. They were enough to catch the attention of our group of five on their quest to become "naturalists," as Doug encourages them to be.

I have been an accidental bug person for a long while though my actual knowledge could fit in a decent size gall on a Mexican Blue Oak. My brother-in-law, David Hawks, is a professional entomologist, the kind who identifies species using DNA, collects specimens from around the western Hemisphere, has published numerous articles in juried academic journals, named many species of *Chrysina* (scarab beetles), and can pick out various cicada species by the variations in the noises they make. Just being around him has enlightened me to a world of living things around me that I might not otherwise notice.

The photo is of a box David prepared for use at the Friends of Madera Canyon table at the Arizona Insect Festival. Every one of the specimens in the box is found in Madera Canyon, and they are but a fraction of the variety of species there. The box was a hit with the kids at the Festival and their parents, too. They were especially impressed when we told them that the top row of small beetles (lower right) are examples of a new *Chrysina* species currently being described by David, to carry the name of Madera Canyon in its scientific designation.

In addition to demonstrating the wide variety of species in the Canyon, the display in the box includes examples of mimicry and shows variations between sexes of some species. Some of the species are colorful, others less so, each having evolved the appearance that optimizes its chances for survival. The collection includes pollinators, food sources, and so on. In short, the critters illustrate one tiny sliver of the diversity of life that abounds in Madera Canyon. And what small fraction of the Earth's life does our Canyon represent?

The same day I was with the fourth graders, I heard a report about how the chemical compounds in the saliva of a Gila Monster have the needed qualities to facilitate the identification of malfunctions in the human pancreas. Who would have guessed? What other yet unknown remedies for human conditions are available in species with whom we share the planet?

Scientists know that populations of species rise and fall with the resources available to sustain them. Deprive an area of food plants for this beetle or that and the number of those beetles will fall. Lower bug populations would matter to bird species for whom the bugs are food.

Humans don't especially like to think about the long-term impact on necessary resources when considering economic activities. Arizona, for example, has been water-conscious for obvious reasons yet Hudbay proposes a mine nearby that cannot help but affect the water supply. The American Dream includes home ownership but is there a limit to the number of houses the land can sustain? When we disturb the land and threaten species, even the smallest, what potential remedies are we sacrificing? Why is it so hard for some to see the value of biodiversity?

The wonder of the children at the Insect Festival as they looked wide-eyed at the box was rewarding to see. So was the amazement of the adults that such beauty was walking and flying around in Madera Canyon. My hope is that the wonder and the beauty become a part of any conversation about messing with Nature.

Dan White



Announcements

Call for Event & VIS Volunteers!

Do you like talking about Madera Canyon?

Join us working in our booth at an event....

Do you like being in the Canyon and telling others “where to go?”

The Visitor Information Station (VIS) is staffed by our volunteers on Fridays, Saturdays and Sundays for four hours each day. Our volunteers work in pairs for two hour shifts, and while they can work the same time every month, the schedule is flexible enough to accommodate our busy lives.

Visitors ask questions about hiking, birding, picnicking, parking and sometimes other more unusual things. We have maps and brochures that we give out, and help make the visitors feel welcome and comfortable in the Canyon. Our volunteers often say how much fun they have with this assignment, and let’s face it, what could be better than being in the Canyon?!

If you are an FOMC member and this sounds interesting to you, please contact us at info@friendsofmaderacanyon.org for more information and we will be in touch with you.

At various times of the year, Friends of Madera Canyon sets up booths at events where we can let people know about Madera Canyon and the Friends. These are opportunities for FOMC to talk about what the Friends do to help to preserve and protect Madera Canyon and encourage more people to become members to support our activities as well as become volunteers. We always need volunteers to help to staff the booth and talk with attendees about Madera Canyon and what the Friends do.

In 2024, we exhibited at events such as the Tucson Festival of Books (March 15 & 16, 2025) which draws 130,000 attendees over one weekend on the UA campus. Over 300 authors were on presenting author panels as well as exhibitors from other non-profits, bookstores and all sorts of literacy related activities. The Western National Parks Association has a large tent and stage area along with Tucson Audubon and other related organizations.

Other examples of events where we exhibit include:

- Insect Festival on October 6, 2024 on the UA Campus
- Spooktacular on October 26, 2024 in Sahuarita
- Fiesta on December 7 & 8 at Tumacacori National Historical Park
- Tubac Festival of Arts on February 5-9, 2025 in Tubac
- Hawk Watch on March 15, 2025 in Tubac

We also exhibit at Tucson Audubon Birding Festival which takes place in August. If you are a FOMC member and interested in volunteering on occasion at an event, please contact us at: info@friendsofmaderacanyon.org

4th Grade Education Docents

Docents help 4th grade students learn about the natural, physical and cultural attributes of Madera Canyon through field trips along the Proctor Nature Loop Trail in Madera Canyon. Walks are on Thursday mornings during 4-6 weeks in late March to early May and mid-October to late November. Training provided. FoMC membership required. Contact the FOMC Volunteer Coordinator at FOMCEducation@gmail.com for details.



FoMC Refinishes Picnic Tables at Whitehouse

Led by Board Member Colleen Verge, FoMC members worked with Forest Service personnel to detach and then re-attach picnic table tops and benches at Whitehouse Picnic Area for them to be powder-coated. FS folks commented that the work had been waiting to be done for years! Thanks to Vulcan Materials for a \$10,000 grant to make the project possible. The tables do look nice and will for several years to come!





Communications

Audubon Society Talks in Green Valley: Save the Dates

Audubon talks are at the GVR East Center and open to all.

Tuesday, November 12, 11am

Stewards for our Saguaros with Tony Figueroa

The Sonoran Desert and Sky Island region of southern Arizona is a biodiversity hotspot because of the incredible plant communities, with the Saguaro standing out among them all. Unfortunately, these communities, and the wildlife that depend on them, are threatened by many non-native invasive species which outcompete native plants and also introduce the potential for catastrophic wildfires that our desert plants have not evolved with. This presentation will discuss some of the region's high-priority species, best management practices, and ways to get involved with Tucson Audubon.

Tuesday, December 10, 11am

Tips on Identifying Birds with Luke Safford

Have you ever spotted an interesting bird only to become frustrated because you can't figure out what kind of species it is? We've all been there! Let's move from frustration to enjoyment in the process of identification. We'll hit on some of the major characteristics to pay attention to as well as discuss some finer details for particular bird families and then finish up with some photos of harder to identify birds and work through the process together.

A Thank You to Friends Volunteers who Hauled Water to Mt Wrightson's Summit

Hi all,

I wanted to share the blog from our last hitch on Mt. Wrightson, brushing the Old Baldy Trail from the switchbacks below Bellows Spring to Baldy Saddle, and the entire summit trail, as well as some short sections of tread repair/realignment where it had been slipping downhill.

Thanks very much to Zach for coordinating with local volunteers, and to those volunteers themselves, for carrying up 25 gallons of water to support our efforts and minimize the need for ourselves to spend time each day descending to the spring to get water. It was very helpful and much appreciated.

Johnathan Pratt
Wild Arizona



Above to the right: The crew hiking up from Baldy Saddle to the summit of Mt. Wrightson. Photo by Jonathan Pratt.



Helping Hikers at Higher Altitudes

In mid-October, a field crew from Wild Arizona spent a week camping near Baldy Saddle to work at “brushing” the Mt. Wrightson summit trail. “Brushing” focused on removing plants and small trees—mainly Oak and Mexican Locust—that had overgrown the trail. The crew also did some tread repair on sections where the trail had slumped downslope.

The crew completely cleared the upper 1.9 miles from the summit to the switchbacks below Bellows Springs.

Chloe Ondracek, the Wild Stew (Wilderness Stewardship) Field Crew Leader, and others took several before-and-after photos of their work, and Chloe shared blog posts to record their work in words. She also commented on the “breathtaking, 360-degree views from the summit of Wrightson,” noting that, to earn those views required hiking over 4000 feet up in elevation.

Chloe then wrote: “The amount of work we were able to get done was helped immensely by multiple volunteers who generously gave their time and effort to bring us water from the aforementioned Bellows Springs—which was more than a mile and a half round trip from our camp and 700 feet of elevation loss/gain each trip to get water. In total we were brought over 25 gallons of water and only had to fetch water ourselves the first couple of days of the hitch.”

In the membership of the Friends of Madera Canyon are many who have hiked to the Baldy Saddle and beyond, to breathtaking 360-degree views from the top of Wrightson. They and others like them will be the beneficiaries of the work done by the Wild Arizona field crew.

Many more of us might consider the days when we might go to that mountaintop behind us. Aging out of activities seems to be an increasing phenomenon for my friends and me.

We also have in our midst people who aspire to the summit. Some of those were among the volunteers to whom Chloe referred; hikers willing to carry the water up the 700-foot elevation gain to enable the field crew to focus on their work.

That foursome—Jackie Smith, Tom Bailey, Stan Egbert and Abel Pereira—includes two who are not currently FoMC members. But as Tom said, “some of us may not be officially FoMC, but our contributions make us all friends of the canyon.”

“Carrying the water” for someone is a common idiom in English: “to do work, often menial tasks, on behalf of someone else.” For the brushing project, carrying the water was literal, of course, but it was also idiomatic. Hauling containers of water up the trail could be seen as a menial task. Yet it is important to see its significance in the larger scheme of things.



More was accomplished by the crew because there were people willing to carry the water. I like to think that a significant purpose of the Friends of Madera Canyon, on behalf of visitors of today and those in the future, is to carry the water by taking care of the Canyon.

Dan White



Crosscut sawing on Carrie Nation Trail 10-22-2024. Photography by Jim Beck.



Trail maintenance 10-16-2024. Photography by Jackie Smith.



Water hauled to Baldy Saddle 10-11-24. Photography by Tom Bailey.





The Birding Report

The Lower Canyon – Early Fall

Part I

My car tells me it's 7:23 and 77° as I come past the Friends' Visitor Information Station – still closed so early – and up to Proctor Road parking. On the Fee Required sign sit a pair of Canyon Towhees. A good sign.

A raven croaks in the distance as I start down the Proctor Trail. There's a cool breeze, though we're in another late heat spell. The birds will know the afternoon's going to be a hot one: maybe they'll be up and active as early as this. So I think, even though the sun hasn't quite cleared the east ridge of the Canyon and I'm still in shadow. Birds hunt by sight; they need good light to find bugs and seeds.

I see ants are out, though. One often sees columns of them along the trail, but this morning they seem more numerous and even busier than usual. Grasshoppers are not in evidence.

There's been water in the creek at the Proctor Road crossing almost all this year, but with monsoon all over there's none now. Most plants in the Canyon are still green and thriving, however; only the grass is mostly brown. Grass clearly made the most of growing season, though; it has encroached on the trail in many places. It's invasive in that sense – and almost certainly in another sense too, for most grass in the lower Canyon is non-native Love Grass, imported more than a century ago.

There are a few flowers, a composite I think is one of the Goldeneyes, and what I believe to be the Sparse-flowered Goldenrod, a pretty plant showing more color than its name predicts. And what may or may not be Camphor-weed, its flowers on long slim stems. All these



are yellow, and I see no other flowers during the morning, though those few are spread liberally along several stretches of trail.

More birds appear: a Ladder-backed Woodpecker tapping, and another calling in the distance; a Plumbeous Vireo, surely a migrant at this elevation, though they're summer breeders higher up in the Canyon; and a small flock of Chipping Sparrows, also, perhaps, come here from farther north.

The upper part of Proctor Trail is quiet; the wind has died, and it's getting hot in the sun. I take the spur trail that connects to the Whitehouse Loop and go on up to the staircase bridge. That's often a good spot for birds, but not now, even though there's a short stretch of water in the creekbed there, with a slow current through it before the stream goes underground again.

Back on the main trail, I hear other birds, and see some of them. None is actually singing so late in the season, but calls are often as identifiable. A single Acorn Woodpecker on a telephone pole and groups of Mexican Jays – together the two most typical of Madera's bird species. Nearing the north end of the trail again, here are a couple of Hepatic Tanagers in the oaks, neither of them a red male, but pleasant to see.

At the Proctor Road crossing, there are now more birds, a couple of Hermit Thrushes, the Canyon's winter *guttatus* subspecies; a single Ruby-crowned Kinglet; a pair of Arizona Cardinals; and a Western Flycatcher on its way to Mexico. Standing in Proctor Road itself is a White-tailed Deer staring at me, with a partner off to the side. They amble off, tails raised.

Back at the parking lot, there's Doug Moore, Canyon Naturalist, with a high-school biology class from Sahuarita dragooned by their teacher to pull invasive goose-



Ladder-back Woodpeckers.



Ruby-crowned Kinglet



foot for the morning. Seems like a bargain for all involved, 'cept the plants.

And as I pull out of the parking lot, there's a single Say's Phoebe, near where I saw the Canyon Towhees to begin the morning.

Part II

I'm not ready to quit yet, however. It's not that hot – only 88° -- and I'm only a day back from the California coast: I need more of a Madera Canyon fix.

It's off up the road to the next parking place, and to the Whitehouse section of the Trail. This part of the walk is greener yet; there's running water in the creek most of the way. The vegetation is lush near the water, new leaves and fresh grass. I see little sign of fall color all morning. A few of the more exposed Soapberry trees are yellowing, and a some Poison Ivy leaves are already brightening to red – really a very attractive plant, at a safe distance. But no sign of yellow yet in the Sycamores, and new foliage in some of them.

Where the trail passes through mesquites, broken bits of pod cover the way. It's said a coyote's diet at some seasons is almost entirely mesquite beans, and other creatures eat them too. Berries are scarce this morning, though I see one or two red ones on a Squaw Bush.

It's after 9:00 now; more bugs in evidence – flies of various sorts, butterflies both large and showy and small ones in some number -- and even grasshoppers. There's a particular kind of fly in the Canyon whose buzzing sounds just like distance voices.... I see one Arizona Gray Squirrel, and a few lizards, small ones I believe to be Ornate Tree Lizards, and another that's one of the Whiptails. And a yappy dog, another invasive.



Poison Ivy, *Toxicodendron radicans*



Ornate Treelizard, *Urosaurus ornatus*



There are a few more birds along the creek now: a Broad-tailed Hummingbird, a young one apparently, and unusually late. A pair of Cassin's Kingbirds fly overhead, as does a Sharp-shinned Hawk. I see another Sharp-shin a bit later, a juvenile perched in ambush in an oak. With more oaks, there are more Acorn Woodpeckers and Mexican Jays, and there's a Northern Flicker that's either an elevational migrant from up the Canyon or flown in from farther north.

From one of the two bridges on this part of the Trail, I watch a flock of small birds coming to drink and bathe in the stream. They're mostly Chipping Sparrows, perhaps a dozen of them, but at least a couple of Brewer's Sparrows are mixed in. Around the edges of that group are four Yellow-rumped Warblers – so, whatever the temperature, it is in fact fall! I see other warblers here and there as well, two Painted Redstarts, posing as they do, and, much quieter, two Black-throated Grays. A Western Pewee and a Western Tanager round out the birds I see. Almost back to the car, I'm scolded by a Bewick's Wren that I never see. It's 92° in the shade. Now it is time to quit.

I'm struck by the selection of birds I've seen this morning. Practically all of them, apart from the Acorn Woodpeckers and the Jays, could be migrants only passing through the Canyon on their way south. On the other hand, some may well be first-year birds hatched right here in Madera that will stay here for the winter. Most of the others I've seen may also stay in the Canyon for the colder months, though certainly not the Pewee, Hummingbird, or Western Flycatcher. It's fascinating to think there may be nearly a complete change in Madera's bird population in both spring and fall, as far as the *individual* representatives of most of even the commonest species are concerned.



*Bewick's Wren, **Thryomanes bewickii**
a small bird popular with the public.*



GREEN VALLEY OPINION

Local opinion: The fallacy of mining permits

Stanley Hart Special to the Arizona Daily Star Oct 19, 2024

The following is the opinion and analysis of the writer:



Stanley Hart

The Arizona Department of Environmental Quality (ADEQ) website states that its mission is “To protect and enhance public health and the environment in Arizona”.

In Arizona, mining is regulated by state and federal permits. When ADEQ grants a state aquifer protection permit, or an air quality permit, they are asserting that the mining company has met the regulatory requirements for the permit. When ADEQ is challenged by the populace about a permit, they are told, and the mining company issues a press release saying, that all regulatory aspects of the permit have been satisfactorily met. And this is the answer in public meetings when opposition is voiced. Nowhere do they say that their mission has been satisfied! In fact, if comments are made that fall outside the permit scope, ADEQ tells us we can only comment on the particulars that are in the permit!

In fact, the ADEQ aquifer and air quality permits are assessed under regulatory guidelines that are fashioned, in the past, by inputs and discussion from state and federal regulators and legislators, the citizenry, and negotiations with the mining companies (how’s that for letting the fox into the henhouse! No conflict of interest here).



There is, however, a huge gap between what is “regulated” by the permits and what the public needs for health and environmental protection. In practical terms the name “ADEQ” is a classic oxymoron.

Take the recent draft Air Quality Permit for Copper World that was just released by ADEQ. First, it was for a Class II, not a Class I permit. Interesting that Hudbay claims Copper World will be the second-largest copper mine in the U.S., but this doesn’t require a Class I permit! And then, from the citizens’ point of view, the biggest air problem around mines comes from toxic dust being blown off the tailings piles. This doesn’t mean there aren’t less visible air quality issues on the mining property. These are mostly covered by the permit.

So, how is the dust from the tailings piles regulated? The draft permit says that “The permittee shall not cause, suffer, allow or permit operations or activities likely to result in excessive amounts of airborne dust ... from becoming airborne”. But there is an exception if the wind blows more than 25 mph! And “Compliance with the approved dust control plan and approved tailings dust management plan shall constitute compliance with this requirement.” But this draft permit does not contain an “approved tailings dust management plan”!! Many pages later, this permit states that “Prior to beginning actual construction of the Copper World Project, the permittee shall submit to the Director for approval a tailings dust management plan for the control of fugitive dust emissions from the tailings storage facilities associated with the Copper World Project.”

So, the citizenry has been encouraged to submit comments on this draft permit and to attend two public meetings where comments and criticisms can be made. However, the single largest air quality issue is not covered in the permit but will be decided between the Director and Hudbay before the start of mining. And the public is not given advance notice of this plan, nor given any opportunity to challenge it.

This, in itself, is the single biggest failing of this draft Air Quality Permit. This permit must be denied until a tailings dust management plan is included in the permit and available for public scrutiny.

Stanley Hart is a PhD geochemist retired from a career in academia.





Education

Sahuarita High School Student Volunteer Cleanup

Doug Moore, Education Director
Photography by Gavin Lehr

Fourteen students from the Sahuarita High School Bio Tech class and their teacher, Gavin Lehr, joined Jackie Smith and me for a morning of weeding and tidying up of the Proctor Pollinator Landscape around the picnic ramada on a warm Oct. 4 morning.

Originally planted in 2016 around the new Picnic Ramadas, the Native Plant/Pollinator Landscape provides a variety native flowering plants to support seasonal pollinating insects, while providing an accessible venue for Proctor visitors to easily observe insects and highlight their importance to the ecosystem.

Twice in past years following monsoon season, the landscape has been overtaken by “weedy” species of plants needing to be removed and controlled. In 2019 a group of FoMC volunteers pulled a “bumper crop” of Camphorweed, a smelly native daisy that can proliferate in disturbed soil. This year it was Goosefoot, a native plant in the amaranth family that has increased significantly around the Proctor Recreation Area for several years now.

The student volunteers went at the weeds with effort and gusto! In two solid hours of pulling and bagging, they managed to clear



Morning welcome & introduction to Proctor



the entire Pollinator Landscape and made significant additional progress clearing Goosefoot up towards the Bud Gode Interpretive Ramada. They filled 10 extra-large garbage bags for USFS staff to haul to the dumpster!

After their labors, the students went up to White House Ramada for a picnic lunch, then took a nature walk around the White House Loop. Each participant will receive community service credit at school for their participation. The FoMC wishes to thank Gavin and his students for their cheerful, helpful assistance and an excellent job done! We are very much looking forward to seeing them all again for their nature field trip in the canyon this spring.

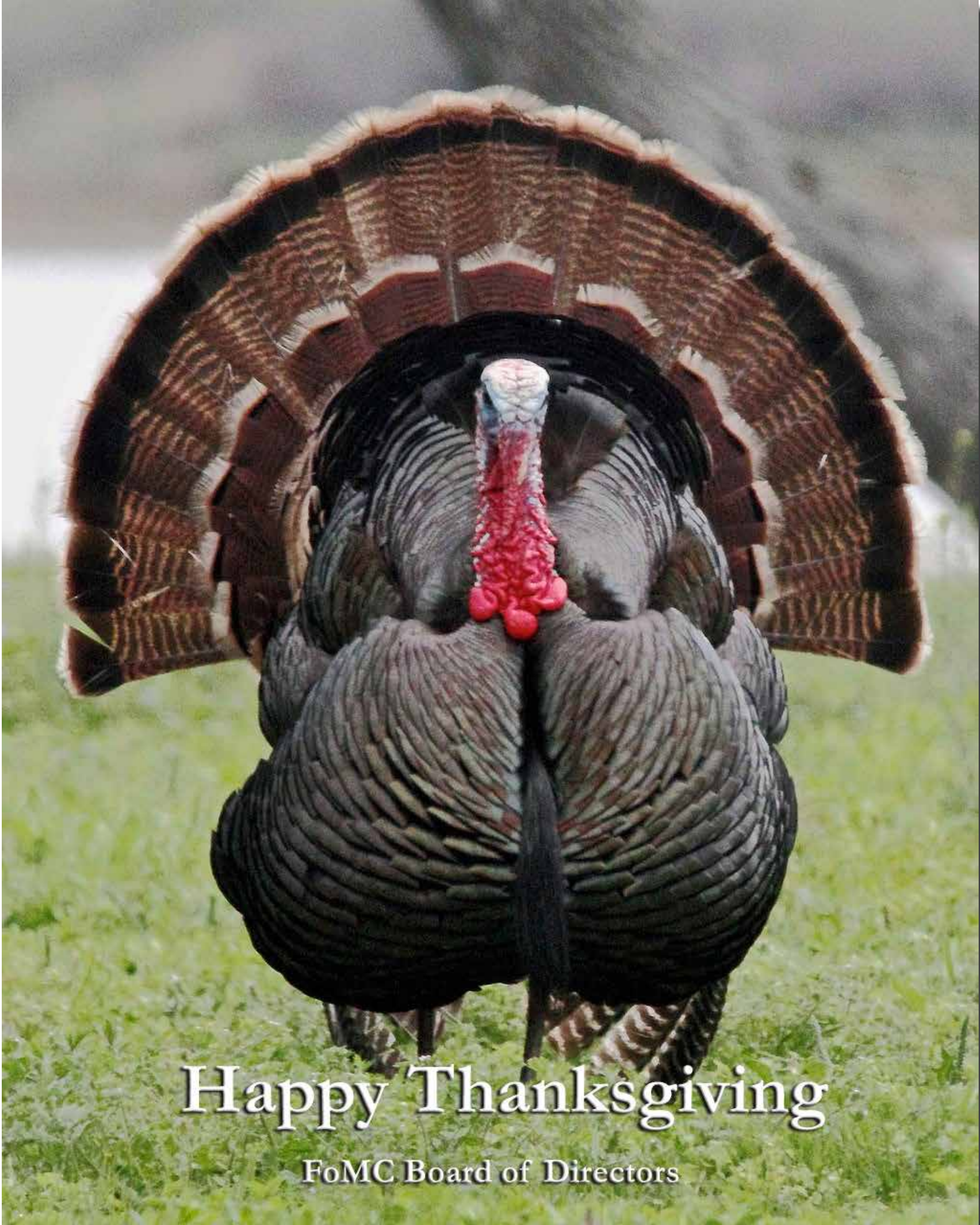


Volunteers & results.



The Sahuarita High School Bio Tech volunteer crew.





Happy Thanksgiving

FoMC Board of Directors



The Editors' Desk

Hunting Predators, Invasive Species, and Trophic Cascades

Between the late 19th and early 21st centuries, much of the Western attitudes underwent a significant shift toward hunting predators and the nature of nature. People long considered nature an oppressive force that must be tamed, and brought under human control. Humans tried three major methods to control nature – magic, religion, and science.

Many of us now realize that nature is our life support system and that we can change it in subtle or dramatic ways. With many people not realizing environmental change is occurring, we need to spread knowledge.

Removing apex predators and large carnivores dramatically impacts the ecosystem. It is the first thing many cultures do when colonizing new landscapes. It's often done under the guise of keeping the landscape safe for humans and livestock, but it hurts the ecosystem. Large carnivores usually feed on large herbivores that in turn feed on certain species of plants. When the carnivores are removed, the increasing herbivore populations overgrazed the ecosystem.

Overgrazing vegetation alters plant species composition and potentially impacts other species that rely on the same food sources, creating a phenomenon known as a trophic cascade. Essentially, removing apex predators can ripple through the entire food web with far-reaching consequences.

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Hunters may cite reducing competition as a basic reason to hunt big predators. However, on today's over-populated planet, large predators aren't a significant threat to human survival, but if they kill livestock some consider it an incentive to hunt them.

Trophic cascades can create problems primarily when there is an imbalance in the food web, often due to the removal or decline of key species, such as top predators or primary producers. Here are some ways in which trophic cascades can lead to ecological and environmental issues.

Overpopulation of Herbivores: When predators are removed or diminished, herbivore populations (like deer or certain fish) can grow unchecked. This can lead to overgrazing or overbrowsing, which damages plant communities, reduces biodiversity, and alters ecosystem dynamics.

Loss of Vegetation: As herbivore populations increase, they deplete plant resources, leading to soil erosion, loss of habitat for other species, and a decline in the overall health of the ecosystem. This can affect everything from nutrient cycling to water retention in the environment.

Biodiversity Decline: Changes in the abundance of one species can lead to a domino effect, resulting in declines of species that rely on those affected by the cascade (either directly or indirectly), reducing biodiversity and disrupting ecological relationships.

Altered Ecosystem Functions: When species interact in unexpected ways due to trophic cascades, ecosystem functions such as pollination, seed dispersal, and nutrient cycling may be compromised, affecting the overall productivity and sustainability of the ecosystem.

Economic Impact: Some trophic cascades can affect industries that depend on certain species, such as fisheries and tourism. For example, the decline of predatory fish can lead to overfishing of prey species, impacting livelihoods and local economies.



Invasive Species: Trophic cascades can also inadvertently facilitate the spread of invasive species. For instance, if native herbivores are overpopulated, they may create conditions that benefit invasive plant or animal species that are less palatable or hardier.

These problems highlight the importance of maintaining healthy ecosystems, as disruptions to any part of the food web can have far-reaching and sometimes unexpected consequences. Understanding and mitigating these issues are essential for conservation and ecological management.

Introduced large herbivores have partly filled ecological gaps formed in the late Pleistocene, when many of the Earth's megafauna were driven extinct. However, extant predators are generally considered incapable of exerting top-down influences on introduced megafauna, leading to unusually strong disturbance and herbivory relative to native herbivores.

Lundgren et al. (2022) report on the first documented predation of juvenile feral Donkeys *Equus*

africanus asinus by Mountain Lions *Puma concolor* in the Mojave and Sonoran Deserts of North America. They investigated how Lion predation corresponds with changes in feral donkey behavior and associated effects on desert wetlands. The Lundgren team focused on a population of feral donkeys in the Death Valley National Park, using camera traps



Severed heads of 11 Mountain Lions among 24 killed by Animal Damage Control on December 1988-May 1989 in the Coronado National Forest, Galiuro Mountains, Arizona. These Lions were killed to protect livestock grazing on public, not private land. From Pavlik 2010.

and vegetation surveys to compare donkey activity patterns and impacts between wetlands with and without cougar predation.

They found Donkeys were primarily diurnal at wetlands with cougar predation, thereby avoiding Lions. However, donkeys were active throughout the day and night at sites without predation. Donkeys were about 87% less active (measured as hours of activity a day) at wetlands with predation. Sites with predation had reduced donkey disturbance and herbivory, including about 46% fewer access trails, 43% less trampled bare ground and 192% more canopy cover.

Lundgren's study is the first to reveal a trophic cascade involving cougars, feral equids and vegetation. Lion predation appears to rewire an ancient food web, with diverse implications for modern ecosystems. Their results suggest that protecting apex predators could have important implications for the ecological effects of introduced megafauna.



First photographic evidence of cougar predation on feral donkeys, captured with camera traps. (a, b not shown). (c, d). Predation of a foal in the Death Valley National Park, in the Mojave Desert of California. Donkey ages were determined from tooth eruption sequences of carcasses. Images (a) and (c) were tonally adjusted for visibility. From Lundgren et al. 2022.

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The Last Page



Isola Blue butterfly on Turpentine Bush; Proctor Nature Loop Trail.
Photography Doug Moore.

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