

# FIELD NOTES

FOR MEMBERS OF THE NATURE CONSERVANCY IN ARIZONA

FALL 2021

INSIDE

*Talking About  
Climate Change*

*Mysteries of a Pine Forest*

The Nature  
Conservancy



Protecting nature. Preserving life.





## FIELD NOTES

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and friends.

Field Notes welcomes  
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### From the Director

Dear Friends,



I hope you're enjoying this exquisite fall weather in our wonderful state. I recently traveled to Southern Arizona where I visited the Arizona chapter's first land protected with a conservation easement (in the Altar Valley) and our first preserve in Patagonia. While the trip's purpose was to explore some significant conservation projects, it was also a great opportunity to connect with our history. I came home to Phoenix more inspired than ever about the unique role TNC can play in conserving large landscapes, and with gratitude to our supporters, staff and partners who have brought 55 years of conservation success to Arizona.

I also came back with renewed determination to address the looming environmental challenges we face in Arizona: drought, water shortages, our forests in need of restoration and our cities in need of equitable natural solutions to rising heat. There's so much urgent work to be done, to preserve our health and the health of the lands and waters on which we all depend.

The Nature Conservancy in Arizona and our forest colleagues in the West continue seeking ways to make our pine forests more resilient in the face of destructive wildfire (See Forest, pg. 6). Mature trees in healthy forests around the world are critical for sequestering carbon, greenhouse gas, and providing us — and the wildlife of the forest — with the oxygen we need to live.

One of the Conservancy's worldwide goals is to protect 30 percent of the lands on Earth by 2030, which reflects the need for natural corridors for plants and wildlife to move and adapt to climate change. To that end, we've contributed to a complicated project that adds to land protection near Aravaipa Canyon and protects an important source of water for Aravaipa Creek. (See Aravaipa, pg. 19)

While our challenges to address a warming planet are considerable, I'm heartened by the activism of our young people to speak out for conservation. Here in Arizona, we've introduced many youth to conservation via the AmeriCorps program (See AmeriCorps, pg. 14). While some of these young people continue as TNC staff, others are bringing their skills and enthusiasm to emerging careers in the natural resources field.

After a complicated couple of years dealing with the COVID pandemic, I'm hopeful we can soon open our preserves and offices. We're looking to plan some fun and informative events in the new year and I am exciting about the chance to meet you and celebrate our conservation wins together.

I hope you have a wonderful holiday season. Thank you for all you do for nature.

*Daniel S. Stellar*

Yours, Dan Stellar  
State Director

### THE NATURE CONSERVANCY AROUND THE WORLD

76 Countries and Territories: 37 by direct conservation impact 39 through partners



## Here in Arizona Building a Pollinator Garden

In honor of our late colleague Celeste Andresen, staff and volunteers from the Conservancy and the Sky Island Alliance met in September to plant milkweed and pollinators at the Tucson Conservancy campus at 1510 Fort Lowell St. Celeste passed away September 18, 2020, after a driver struck her while jogging in a New Jersey neighborhood during a family visit.



THIS PAGE TOP CLOCKWISE Where TNC works around the world map © TNC; Healthy coral gardens on Lord Howe Island © Jordan Robins/TNC Photo Contest 2019; A Japanese macaque, Nagano, Japan © Fernando Navarro Partar/TNC Photo Contest 2018; Kangaroo and baby in pouch in Australia © Lisa Roper/TNC Photo Contest 2019; Portrait of Samburu women at West Gate Conservancy in Kenya © Ami Vitale; Macaw in flight, Brazil © Paulo Behar/TNC Photo Contest 2019; BOTTOM Staff and volunteers planted milkweed and pollinator plants at the TNC campus in Tucson. © Mark Ryan/TNC





# TALKIN 'BOUT CLIMATE CHANGE

By Tana Kappel



During my summer visit to southern Montana, thick gray smoke from fires in the Northwest blanketed the valleys.

“Bad air quality, stay indoors,” the news people advised.

All summer long, the stories kept coming: firestorms threatening California’s ancient sequoia trees, flooding around the globe, and of course, states facing water cutbacks because of the over-worked Colorado River.

We talk about these storms and fires, but how many of us are talking about the underlying cause — climate change?

Katharine Hayhoe, an atmospheric science professor and The Nature Conservancy’s chief scientist, has studied attitudes about climate change. Around 70 percent of people agree that our climate is changing, she says. Further, about 60 percent of those people believe climate change will affect people in the U.S. But if you dig a little deeper and ask them if they “talk” about climate change, two-thirds of them say “never.”

I get it. It’s a divisive topic.

Given how divided this country is politically, and how conversations can easily escalate into name-calling, my response has typically been to clam up, a silent acknowledgement that it’s not worth the angst.

To encourage conversations about “global weirdness,” as she calls it, Hayhoe has identified key elements of constructive discussions. The first is **respect**. “If we do not respect the person we’re talking to, they’re going to pick up on that immediately. And if they don’t respect us back, then we’re not going to be able to have a constructive conversation.”

When talking with some groups, instead of using the term “climate change,” she uses “climate variability” and “long-term trends” as a way to connect with what the person or group may be seeing in their area. She also doesn’t like to label people as “climate deniers.” The goal, she says, is to encourage discussion rather than discourage it.”

“So much of this is not about the facts. It’s about trusting the person the facts come from and finding out what makes them tick.”

The second key is finding a point of mutual agreement or **understanding**.

As a journalist, I’ve used this technique when interviewing ranchers. In an effort to find common ground, I mention that I grew up on a ranch, implying that I have a basic understanding of what ranching is about. That has been helpful in getting them to feel comfortable opening up to me.

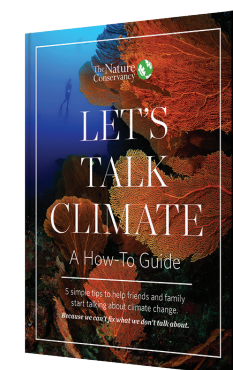
Hayhoe uses a similar approach when speaking with ranchers and farmers. She asks what they are seeing or feeling about their land, which helps them connect the realities of their lives to the abstraction of climate change. “Start with the heart, then pivot to the relevant facts,” she advises.

She believes we need to not only understand climate change on an intellectual level. To make changes, people need to *feel* its threats and express those feelings.

Listening to Hayhoe reminds me of the responsibility we all have. If we care about our planet, we’ve got to speak up. And to do that we need to meet people where they are. What are they feeling and how can we help them connect the dots?

By connecting the dots, we can enter the realm of **hope**, the third ingredient of a successful conversation. In action we can find hope, says Hayhoe.

Hope is finding ways for people of different backgrounds to become engaged in the solutions. For a farmer, hope could come from learning about the benefits of carbon-smart farming and using soil as a carbon sink. For business leaders, think of the advantages of investing in an electric vehicle fleet.



Climate change isn't just an environmental issue – it's an everything issue.

**Katharine Hayhoe**  
Chief Scientist,  
The Nature Conservancy

The EV world is advancing, making EVs a more realistic purchase.

Science reminds us that nature is a key part of our climate solution. For example, healthy mangroves that protect coastal communities from rising seas, wetlands that absorb floodwaters, healthy forests that store carbon and technologies that harness the sun to power our homes.

As I look out my Tucson window, I’m reminded of the resilience of nature

and the delicate, robust dance of life. Masses of yellow, black and orange butterflies are flitting about the bright orange flowers of the bird of paradise. A flash of yellow, a Wilson’s warbler in the palo verde tree is taking a break as it migrates south to its wintering grounds.

Hayhoe, an evangelical Christian, believes this beauty is God’s hand at work. But, she believes being a Christian shouldn’t mean throwing up our hands and doing nothing – under the notion that the warming climate is “God’s will.”

She believes being a Christian implies taking responsibility for caring for the Earth.

“It’s a common perception that science and religion are mutually exclusive. But there are many scientists who consider themselves to be spiritual people. Not only that, but in the case of climate change — a scientific issue with strong moral implications and difficult decisions to be made — it’s essential to connect the science to our values. And for many of us, our values come from our faith.”

Hayhoe believes her values lead her to the actions we must take to “not only save the planet, but to save us.”

“Our carbon emissions have to eventually go to zero. We have to. Otherwise, we’re never going to have a stable climate and that’s what our goal is for human civilization to thrive, a stable climate. We don’t want one that’s hotter, we don’t want one that’s colder, we want one that’s stable.”



Katharine Hayhoe is the author of *Saving Us: A Climate Scientist’s Case for Hope and Healing in a Divided World*, released in September 2021.





## OUR BURNING CHALLENGE: Restore Our Forests

**It's been a bad year  
for smoke and fire  
across the West,  
another symptom  
of a warming world.**

By late summer of 2021, huge, hot-burning fires had charred more than 4 million acres of forest across 12 western states. In Arizona, as of mid-August, 1,100 fires had burned nearly 550,600 acres.

With 95 percent of the West in serious drought, and forests overly dense with trees after a century of suppressing fire, the forests — and nearby communities — remain vulnerable to dangerous firestorms.

“Our forests will burn. The question is when and how,” said Travis Woolley, the interim lead for The Nature Conservancy’s forest program in Arizona.

Precisely when a forest burns is hard to predict, except to say that Arizona’s pine forests — and others in the West — are in an almost perfect storm of conditions that can intensify fires into firestorms that threaten communities and water supplies. The combination of a warming climate and overly dense trees is so severe that once burned, these forests may not soon recover.

“It’s urgent that we get ahead of this and really push hard for what science is telling us we need to do: restore our forests to a more resilient condition that will allow for safe, regular, low-level fire to return,” says Woolley.

The Conservancy is working with forest professionals across the West to map out how to achieve cost-effective restoration at a scale large enough to make a difference. (See Oregon research, pg. 9)

In Arizona, Woolley and other Conservancy staff are working with the U.S. Forest Service on its Four Forest Restoration Initiative, instituted in 2010 to thin and restore about 1 million acres across Arizona’s 2.4 million acres of ponderosa pine forest.

Unfortunately, that thinning work has been limited due to high costs and few markets for the low-value, small diameter wood.

The Forest Service set an annual goal of restoring 50,000 acres per year, but only in the last year, when 22,000 acres were thinned, has it even gotten close, says Woolley.



That’s “way better than we’ve ever done, but the scale of the problem requires more urgency,” said Woolley. “If we’re only going to do 22,000 acres per year, we’re going to have to be smarter about where we put treatments on the landscape.”

The Conservancy has supported 4FRI by developing technologies designed to reduce the high costs of planning, mapping and thinning. As part of its Future Forest Project, the Conservancy contracted with Campbell-Global to demonstrate this technology platform while thinning 4,000 acres in the Coconino National Forest.

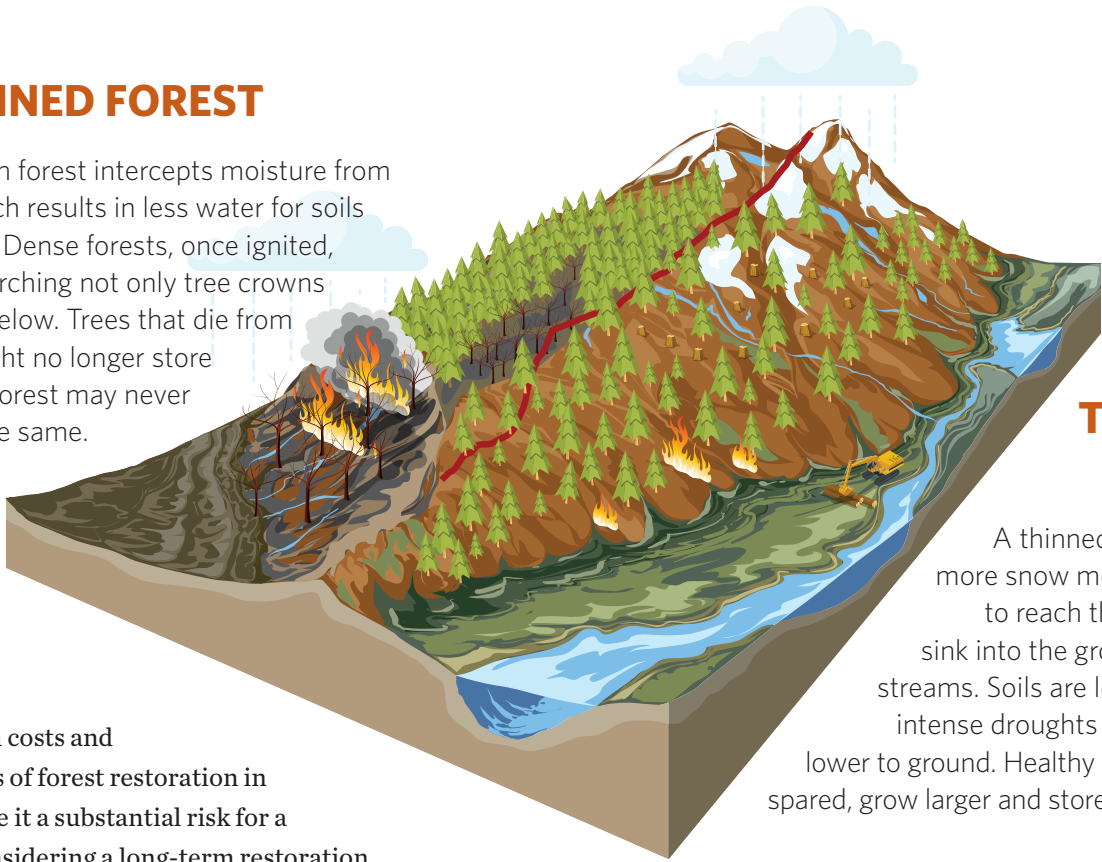
The Forest Service has adopted this new technology platform, which replaces the labor-intensive paint-marking method with digital parameters for thinning. Over time, use of this technology could result in a four-fold decrease in time spent on site preparation and harvesting.

THIS PAGE TOP TO BOTTOM A ponderosa pine continues to burn after the fire front has passed.  
© John Marshall; Michelle Ly, an Arizona AmeriCorps alum, on a controlled burn as a conservation staffer for TNC’s Southeast Coastal Plain © Courtesy of Michelle Ly



# UNTHINNED FOREST

An overgrown forest intercepts moisture from snowfall which results in less water for soils and streams. Dense forests, once ignited, burn hot, scorching not only tree crowns but the soil below. Trees that die from fires or drought no longer store carbon. The forest may never grow back the same.



# THINNED FOREST

A thinned forest allows more snow melt and rainfall to reach the forest floor, sink into the ground and feed streams. Soils are less dry during intense droughts and fires burn lower to ground. Healthy older trees are spared, grow larger and store more carbon.

Still, the high costs and uncertainties of forest restoration in Arizona make it a substantial risk for a company considering a long-term restoration proposal. Included in that calculation is what happens if the forest, and the wood product, goes up in flames?

Just this fall, the Forest Service cancelled its request for restoration proposals, saying it needs time to thoroughly re-assess the requirements for meeting the restoration objectives, which it says are currently “not reasonably aligned to industry needs.”

The wood-harvesting industry in Arizona has declined since the ‘90s. Also, small diameter wood has low value, which creates challenges for private contractors to profitably scale up and sustain business. And, transporting low-value wood to a mill can be costly where long distances are involved.

There are more options for thinned wood in eastern Arizona’s White Mountains than the western part of the state. Novo Power in Snowflake processes thinned wood to generate electricity which it sells to Arizona Public Service and Salt River Project, Arizona’s two largest electric utilities. Since its beginnings, Novo Power claims to have accepted biomass from 15,000 acres of restored forest lands.

On the west side, the options are more limited. This is where we need a solution,” said Woolley.

The urgent need for forest restoration raises the thorny question of who pays? In recent years, federal dollars intended for restoration have been diverted to putting out fires. The Biden administration has included funding in its infrastructure bill to increase the pace and scale of forest restoration in the West.

Healthy forests provide many ecosystem services: clean air, clean water, wildlife habitat and recreation opportunities.

Trees sequester carbon dioxide, a greenhouse gas that is warming the planet. Research published by Nature Conservancy scientists in Arizona shows large-scale thinning and prescribed fire as planned for 4FRI would significantly increase tree growth and stabilize carbon storage over the long term. Initially, when the trees are cut, carbon is lost, but after 10 to 20 years, when remaining trees have less competition for water and sun, they will grow and store more carbon.

If we substantially increase public and private investments in forest restoration, then we can envision a future where forests sequester carbon, cleanse our air and water, and remain vibrant for future generations of humans and wildlife.

— Tana Kappel

# From Unmanageable to Manageable

## WHEN AN APPROACHING MEGA-FIRE DROPPED TO THE FOREST FLOOR

In southeastern Oregon this July, the Bootleg Fire scorched more than 400,000 acres, making it the fifth largest fire in that state’s history. But, an interesting thing happened when the massive fire approached The Nature Conservancy’s 30,000-acre Sycan Marsh Preserve. It stormed into lands on the western edge of the preserve that had been treated with different types of restoration, including mechanical thinning only, thinning and prescribed fire together, and prescribed fire only.

“Our staff witnessed this approaching wildfire running through the treetops, and at one point creating a fire tornado. But when the fire reached the thinned and prescribed-fire-treated areas, it dropped down to the forest floor,” said the Conservancy’s Ryan Haugo, the director of conservation science in Oregon. “It was a very heartening observation.”

Each year, as ever-more damaging fires burn across the West, evidence is accumulating about how to reduce their impacts on the landscape.

The Oregon Conservancy staff began setting up the restoration plots about 15 years ago. The plots were designed to inform how to make forests in Oregon and around the world healthier and more resilient in the face of increasing wildfire threats.

The staff and collaborators conducted prescribed (controlled) burns in the research plots, burning them about every five years, similar to a historical burn cycle.

The Bootleg Fire’s extreme behavior provided the Conservancy an opportunity to learn, through post-fire monitoring, which of the pre-fire forest treatments worked best to help the area withstand a hot burning fire, said Craig Bienz, the Sycan Marsh program director for the Conservancy in Oregon.

Their conclusion: Mechanical thinning followed by regular prescribed fire is the best strategy for helping the forest be resilient in the face of extreme wildfire.

“Our findings are revealing that in addition to reducing the risk of severe fire by getting rid of all that fuel, treating forests with prescribed fire makes trees healthier and helps them survive periods of drought,” he added.

In Arizona, pro-active thinning helped prevent the small eastern Arizona town of Alpine from being engulfed by the flames of the Wallow Fire in 2011. That fire, which scorched half a million acres, also dropped to the ground when it reached the area thinned as part of the White Mountains Stewardship program.



# THE MICRO MYSTERIES OF A Ponderosa Pine

**Stick your nose into the bark of a tall, old ponderosa pine, and you'll get a distinctive whiff of vanilla or butterscotch. Or maybe a nose full of sap.**

The smell and the sap represent just the tip of the iceberg of ecological relationships at work in a ponderosa pine forest. Like an unruly family, the chemicals, plants, insects and birds do their thing, unwittingly helping the trees and the forest.

## Birds, Insects and “Terpenes”

Back to the butterscotch. The smell is from chemicals in pine bark called terpenes. These chemicals play a vital role in plants. In some plants, terpenes attract pollinators, while in other plants, they repel predators, such as insects or foraging animals.

In ponderosa pines, these terpenes benefit the tree’s “immune system.”

When tiny pigmy nuthatches, mountain chickadees or yellow-rumped warblers stop by to snack on ants or aphids on the tree bark, they alter the chemical composition of these terpenes to benefit the tree, according to University of Colorado research published in the August issue of *Ecology*.



The birds act as tree protectors, helping to keep insects in check. By altering the terpenes, they increase the tree’s resistance to parasites and plant-eating insects, according to the study’s lead author Kailen Mooney. That in turn enhances the tree’s vigor and growth.

This finding has implications for dry pine forests across the West, which have been ravaged by damaging insects like bark beetles. The alteration of terpene “flavor” can have wide effects, since terpenes influence how creatures like bark beetles, porcupines and squirrels decide which trees to feed on.

## A Sappy Solution to Bark Beetles?

Other studies show that ponderosa pines killed by bark beetles had fewer and smaller resin ducts than trees that survived bark beetles. This suggests that more, larger resin ducts confer some resistance to bark beetles. The research, by University of Montana scientists, also shows that low-severity fire induces resin-duct production and can trigger a long-lasting defense that may increase tree survival.

## Flying Squirrels and Moisturizing Mushrooms

Large stands of ponderosa pine are also part of a mutually dependent relationship involving Abert’s squirrels and mushrooms.

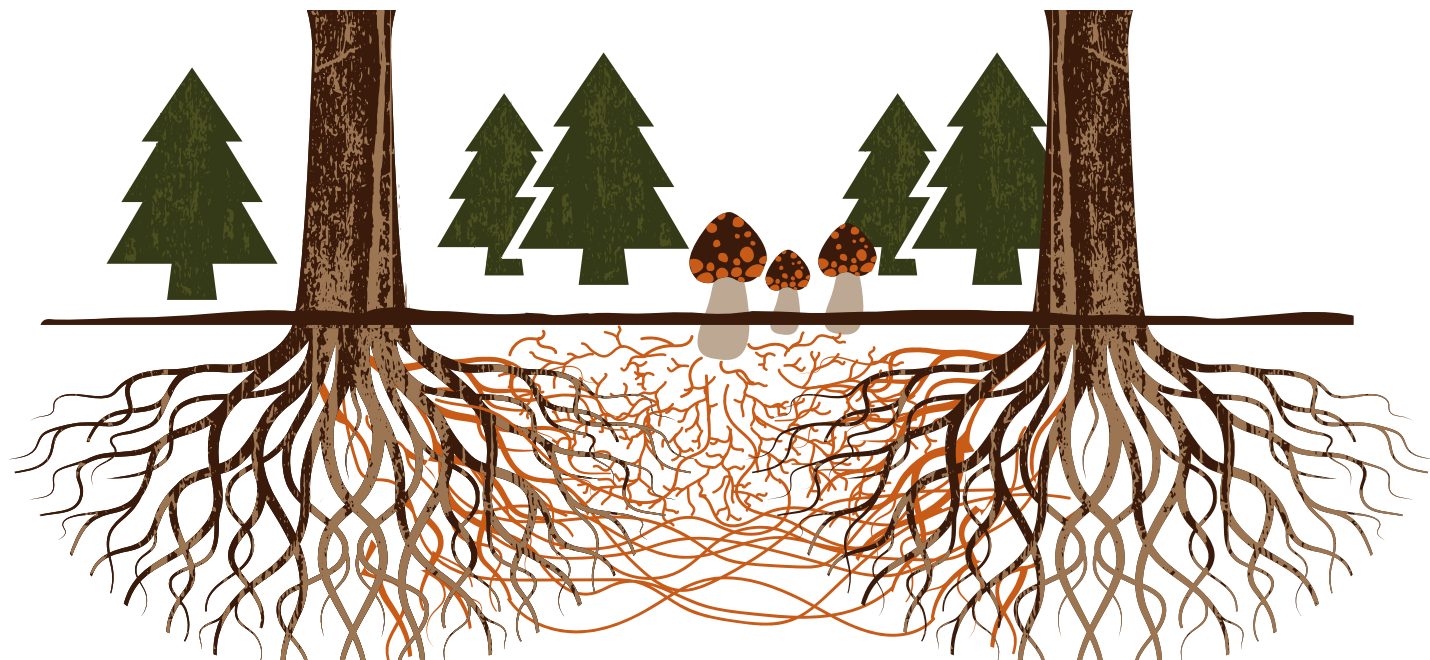
Look high in the forest canopy to find the squirrels, known by their tufted ears and ability to “fly” through the air from tree to tree. Ponderosa pines provide the squirrels with just about everything they need for food and shelter. They eat the inner bark of twigs in the winter and seed from pine cones in the summer.

From late spring to early fall, the squirrels also eat mushrooms, which are the above-ground part of mycorrhizal fungi found in soil. The fungi extend the reach of the tree’s roots, helping them get to more water, phosphate, nitrogen and other nutrients, while the tree provides the fungi with carbohydrates.

When the squirrels eat the mushrooms, the spores survive in the squirrel’s digestive tract and come out in its scat, that is spread throughout the forest.

THIS PAGE CLOCKWISE A recently fledged great gray owl works up the courage to ascend this ponderosa pine. © Scott Carpenter/TNC Photo Contest 2021; Thinned forest in the White Mountains that survived the San Juan Fire in 2014 © Sue Sitko/TNC; Ponderosa pine cone and needles © Lee Trivette; OPPOSITE PAGE Yellow-rumped warbler © Norman Rowsey





It's a mutually beneficial arrangement. The fungi grow around the tree roots and help to maintain moisture in an arid environment. Scientists also speculate that trees of different species can communicate and support one another via their mutual mycorrhizae.

## Terpenes, Goshawks & More

Northern goshawks are a top predator of the forest. Stealthy hunters, goshawks rely on a healthy prey base, which includes grouse, squirrels, rabbits, crows and other birds. They hunt and train their young along forest edges, streamside areas and shrub habitat.

Goshawks usually prefer the largest trees for nest sites. Male and female pairs may build several nests, which they maintain by adding fresh conifer needles. Those needles contain terpenes – there's that word again — which may act as a natural insecticide and fungicide, according to Cornell University's Lab of Ornithology.

## Are Pine Trees Super-Heros?

A tree has the ability to provide an essential of life for all living things: oxygen. Trees also have the power to store carbon dioxide, making the air we breathe healthier.

Through photosynthesis, a pine tree's needles pull in carbon dioxide and water, and use the energy of the sun to convert this into food for the tree. A by-product of that chemical reaction, oxygen, is released by the tree. Older pine trees produce more oxygen than younger trees, and because pines don't lose their needles in winter, they produce oxygen all winter long.

Trees also store carbon dioxide in their fibers helping to clean the air and reduce the amount of CO<sub>2</sub> released into the environment. According to the Arbor Day Foundation, in one year a mature tree will absorb more than 48 pounds of carbon dioxide from the atmosphere.

## A Web of Mysteries

Arizona's ponderosa pine forests are home to a complex web of creatures and interactions. But due to almost a century of fire suppression, these forests have become overgrown, unhealthy and susceptible to catastrophic fire that can kill even the tallest ponderosa pines, and the species that make up the forest's ecology.

To restore pine forests to good health, managers must take care to understand their needs for sunlight, open spaces and frequent low-level fire. Healthy pine forests are critical for their plant and animal residents and the many mysterious life forms that depend on the trees.

— Tana Kappel

THIS PAGE Scientists speculate that trees of different species can communicate and support one another via their mutual mycorrhizae. Fungi grow around the tree roots and help to maintain moisture. © iStock



## Pygmy Nuthatches

Weighing in at about one-third of an ounce, these nuthatches are tiny bundles of hyperactive energy that climb up and down ponderosa pines giving rubber-ducky calls to their flockmates. These nuthatches breed in large extended-family groups. You'll often see a half-dozen at a time. Look for them in open forests of older ponderosa pines. © Christine Haines

## Mountain Chickadees

Mountain chickadees love insects. When western mountain forests suffer massive outbreaks of tree-killing insects such as bark beetles and needle miners, it's an all-you-can-eat buffet for mountain chickadees. During a lodgepole needle miner outbreak in Arizona, one chickadee was found with 275 of the tiny caterpillars in its stomach at one time. © Tila Zimmerman/TNC Photo Contest 2019



## Yellow-Rumped Warblers

They're often perched on the outer limbs of trees and are conspicuous as they fly out after insects, often making long, acrobatic pursuits and flashing their yellow rumps and white patches in the tail. © Sujata Roy



## Northern Goshawks

One of the top predators of a pine forest, northern goshawks require a healthy prey base of rabbits, squirrels, rodents and birds. © Bruce D Taubert



## Abert's Squirrels

Gray and white with long hair tufts on their ears, Abert's squirrels leap through the air with the greatest of ease. They are completely dependent on ponderosa pines for nesting, food and shelter. © Chad Loberger /AZ Game & Fish





# Conservationists of the Future

Tackling the environmental challenges of the future will require innovative leadership from today's young people. Over the last decade, The Nature Conservancy has employed a cadre of conservation-minded young people as part of the AmeriCorps program.

Sixty-three AmeriCorps members started their careers with TNC in Arizona. Six of them subsequently moved into positions with the Arizona chapter, three of whom are still with us. Others are taking their Conservancy stewardship experiences out into the world.

Their successes are inspiring. We share a few of them here.



### VIVIAN NGUYEN (2014-15)

**Current Position:** Project Liaison, Partnerships Incubator, Kaizen Company in Washington D.C.

"It was always perplexing to my environmental friends that I was conserving the forest by cutting down trees or starting fires in the Coconino National Forest. Conservation was not always a simple answer. It took many experts and stakeholders working together to test workable solutions for people, animals and the environment."

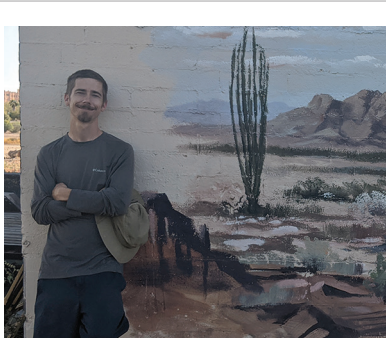
Here she is in Dhaka, Bangladesh, February 2020, where she was temporarily stationed at the U.S. Embassy, working with USAID staff to launch a partnerships initiative with Kaizen Company. © *Courtesy of Vivian Nguyen*



### SAMUEL MORRIS (2013-14)

**Current Endeavor:** Studying for a Master of Global Affairs at the University of Notre Dame with a concentration on sustainable development.

"My AmeriCorps work as a youth-education outreach coordinator for TNC sparked in me a passion for education that eventually led me to becoming a Peace Corps volunteer in Armenia. There I worked as an educator, teaching English alongside Armenian faculty members." © *Courtesy of Sam Morris*



### CAMERON BECKER (2012-13)

**Current Position:** Land Protection and Stewardship Manager at the Arizona Land and Water Trust, Tucson, AZ

"In my time working on TNC preserves we got the chance to protect and preserve nature on a daily basis. Whether that was collecting data from monitoring wells, fixing fences or eradicating invasive species, all of the work was interconnected. This experience gave me a leg up when applying for my current job."

Cameron continues to contribute to the Conservancy's wet-dry mapping of the San Pedro River. © *Courtesy of Cameron Becker*



### ALEX MARINELLO (2017-18)

**Current Position:** U.S. Forest Service, Biological Science Technician, Bend, OR

"TNC provided an introduction to the world of forest health and fire ecology, and the projects on which I have recently worked with the Forest Service are related — genetic studies and breeding to develop more disease-resistant conifers, growing native plants for restoration, and now processing for restoration, including post-fire restoration."

Here is Alex at the summit of South Sister (Oregon's 3rd highest peak) outside her current home in Bend, OR. © *Courtesy of Alex Marinello*



### MICHELLE LY (2016-17)

**Current Position:** Conservation Coordinator in the Southeast Coastal Plain office, The Nature Conservancy

Michelle's work involves controlled burning on TNC and partner lands, writing burn plans, coordinating fire crews and land monitoring. As part of her community engagement work, she helped launch an environmental education festival called Fire in the Pines. "I've taken the role of launching this festival virtually this year. It is one of the area's most successful festivals, raising awareness of the importance of controlled burning in longleaf pine ecosystems." © *Courtesy of Michelle Ly*

## 2010-2020 IMPACTS

**16,689 acres** restored in Arizona's Graham, Pima, Cochise, Coconino, Santa Cruz and Yavapai counties

**395 miles** of stream and trail restored in SE Arizona preserves and along the San Pedro and Verde rivers

**55 conservations plans** have been developed leading to improved stream flow

**749 stream-flow** measurements providing data that informs conservation decisions

**2,724 Arizona teachers** have received training on water conservation curriculum

**73,628 young students** received STEM training addressing water conservation

**37 million gallons** of water have been saved annually in greater Phoenix by students executing water conservation lessons and passing this information along to their families and community

**2,797 TNC volunteers** have been supervised by AmeriCorps members to achieve the above results

**20,856 volunteer hours** were logged on these important conservation projects



### J. LUKE REESE (2012-13)

**Current Position:** Director/Naturalist for the Jay C. Hormel Nature Center in Minnesota.

As an AmeriCorps, Luke was a preserve assistant for the Conservancy's southeast Arizona preserves. That experience led to his becoming the manager of the Conservancy's Patagonia-Sonoita Creek Preserve.

"A nature preserve does not end at a property boundary. Relationships across those boundaries, with neighbors and community members, impact the larger environmental landscape." © *Courtesy of Luke Reese*



### CHRIS CHAPPEL (2014-16)

**Current Position:** Washington Wild, a conservation advocacy, non-profit based in Seattle, WA

"My time as an AmeriCorps member, and later as a TNC staff member focused on the Verde River, helped me establish the niche around which I have built my career — the intersection of conservation and craft beer. Part of my job at Washington Wild is to manage the Washington Brewshed Alliance, a statewide program that highlights the overlapping interests of the conservation and brewing communities. © *Courtesy of Chris Chappel*



## PHOTO CONTEST

# Adventures in Nature: Students and their Award-Winning Photos

Ten high school students from across Arizona impressed professional photographers in the 8th “Adventures in Nature” Photo Contest.

What started as a Tucson competition has expanded across the state. This year, more than 3,742 photos were entered by 500 Arizonans – ages 13-18 – engaged in the creative contest! In 2019, there were 1,665 entries.

All 10 contest winners were recognized during an online awards event in May and received cash prizes totaling \$10,000. Contest sponsors include The Nature Conservancy in Arizona, *Arizona Highways* magazine and Cox Communications.

The judges were Phoenix-based photographers Suzanne Mathia and Mark Skalny, former UA president and acclaimed photographer John Schaefer, *Arizona Highways* magazine photo editor Jeff Kida, *Arizona Daily Star* photo editor Rick Wiley, and former UA music professor and TNC photo volunteer Bob Billups.

## HONORABLE MENTION WINNERS



Levi Plummer, Glendale



Levi Plummer, Glendale



Trenton Gullikson, Prescott



Grant Olson, Phoenix



Weston Thomas, Chandler



Henry Davis, Tucson



Alexa Hartman, Flagstaff

**CHENYU LI**, a Beijing, China native who graduated from The Gregory School in Tucson, took home **top honors** for his dramatic photo of the 2020 Bighorn Fire in the Catalina Mountains. During the awards event he said he loves Arizona landscapes. Judges called his photo remarkable with brilliant composition.



**KARISSA MORALES**, of Tucson won **2nd place** for *Boy Kissing Chicken*. “I wanted to take a different approach and focus on a human and nature interaction rather than a beautiful nature photo,” she said. “When I saw my nephew pick up the chicken and kiss it, I knew I captured something special!”



**ARNAV VED** of Chandler won **3rd place** for *Three Avocets*, a photo that required some patience. He took the photo at a local nature preserve while on assignment for his photography class. For a moment three avocets paused, enabling him to seize a beautiful scene.



## ENCOUNTERING NATURE

By Jeffrey Marshall

It's hard to pinpoint my first experiences with nature. Looking back, it's a tableau of memories starting more than 60 years ago in suburban Connecticut. My twin brother and I roamed the fields behind our house, rife with Joe-Pye weed and butterfly weed in the summer. In the orchard in the property behind us, we'd marvel at the small apples – not really edible – that would fall and collect yellow jackets hungry for a meal.

In late March, when winter receded and the days lengthened, we'd wander back to a vernal pond that came to life with tadpoles and water striders. Cattails bent under the weight of redwing blackbirds singing out the arrival of spring. Frogs fleeing from footsteps and hurling themselves into the water.

More than anything, though, birds became our focus. We took turns memorizing plates in a huge book on birds of North America, and we tested each other on sightings. Robins were everywhere, digging up worms in the lawn, and we came to know the year-round birds that we'd see at the feeder in winter: tufted titmice, juncos, grosbeaks, cedar waxwings, sparrows of various types. Crows and blue jays were always present, and ring-necked pheasants could sometimes be heard calling in the tall grass. Our prized sightings were male scarlet tanagers, bursts of brilliant red flitting in tall trees.

We came to understand the rhythm of the seasons, the dull gray skies of November foreshadowing the arrival of winter, with snow burying the fields in white, then transforming them into a dazzling expanse of sparkle when the cold winds from the north ushered in bright sunshine. Spring enchanted us with the emergence of bright green leaves, first appearing in April. The dog days of August, with their oppressive humidity, made us appreciate the morning dew.

We learned about different trees, enough to recognize them by their shape and especially their leaves and the colors they would assume in fall. A sugar maple in our yard turned a lovely yellow; oaks, more dull and brown, were the last to relinquish their leaves, when the harsh winds of winter pulled them from their perch.

I've been a Nature Conservancy member for many years, a Legacy Club member for about 10. I hold a great deal of admiration for the group's professional approach to conservation and its worldwide reach — its ability to target projects in Africa or South America, not just Virginia or Montana. Climate change is endangering the natural world everywhere, and extinction looms for too many species. My wife and I want to do what little we can, through TNC, to stem the tide. It's an enormous challenge, and one that dedicated conservation organizations, buttressed by private funding, are in the best position to tackle.



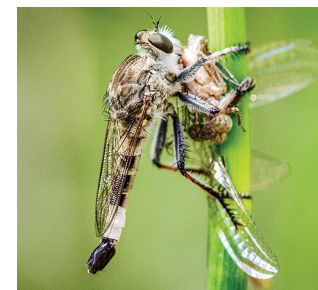
Jeffrey Marshall is a writer, novelist and retired journalist who has lived in Scottsdale since 2008. He has included The Nature Conservancy in his estate plans.

We invite you to share your story about your first experiences with nature, and why you decided to include TNC in your estate plans. Send your story to Mark Ryan at [mdryan@tnc.org](mailto:mdryan@tnc.org).



## BREAKING NEWS

### Iconic Aravaipa Lands Receive Added Protection



One of Arizona's treasured wild landscapes — Aravaipa Canyon and the million acres of wild and working lands surrounding it — has just received added protection through a complicated conservation deal in which The Nature Conservancy played an important role.

The deal will protect an important private ranch in the Aravaipa region – the 22,300-acre Cross F Ranch — and allow for public access to the area. The ranch connects the Conservancy's Aravaipa Canyon Preserve and the Santa Teresa Wilderness, and includes most of the Stowe Gulch drainage. Stowe Gulch provides about half of the water in Aravaipa Creek, a tributary of the San Pedro River.

The Trust for Public Land purchased the ranch using Land and Water Conservation funds, and conveyed 2,831 of the acres to the Bureau of Land Management and 323 acres to the Forest Service. These lands will be managed as part of the Aravaipa Ecosystem Management Plan, in which TNC played a key role. Around 40 acres of private lands that were protected with BLM-held

conservation agreements were sold along with associated grazing leases to a neighboring rancher and TNC partner.

The uncertain future of the Cross F, its history of mining and poor grazing management, and previous plans to develop the property for commercial use had been perennial threats to conservation of the area, said Damian Rawoot, the Conservancy's protection manager, who worked with all the partners to secure the deal over the last several years.

"This is a key victory in TNC's long-term commitment to protecting Aravaipa. It also represents important progress towards our 2030 goals and implementation of our San Pedro plan," he said.





CLOCKWISE Bee on flower in Aravaipa Canyon © *Martha Stampfer*; Pronghorn antelope stand in deep snow in northern Arizona. © *Heather Spencer/TNC Photo Contest 2021*; Red-naped sapsucker eating pyracantha berries in Madera Canyon © *Leslie Leathers*; Sunburst at Canyon de Chelly, on Navajo land © *James Gordon Patterson/TNC Photo Contest 2021*

# GIFTS — OF — NATURE

Your support has helped us to ensure people and nature prosper and thrive, together. Because of you, Arizona and our world will be better for generations to come.

