GRAND CANYON TRUST *COLORADO PLATEAU*

Advocate

FALL/WINTER 2025

The 40th Anniversary Issue

The Hidden World of the Grand Canyon's Groundwater

PLUS

- Four Court Cases that Changed the Colorado Plateau
- Why Working With Native America Just Makes Sense
- A History of the Grand Canyon Trust

TIM PETERSON

Letter from the EXECUTIVE DIRECTOR

ETHAN AUMACK

CELEBRATING 40 YEARS GRAND CANYON TRUST

Four decades. It can seem like an eternity and feel like a blink of an eye. For the Grand Canyon Trust, four decades has been just long enough to forge an arc of accomplishment that is at once vital to the Grand Canyon and the Colorado Plateau, and, by its very nature, poignantly incomplete.

Four decades ago, the Grand Canyon Trust was born as an organization dedicated to protecting, stewarding, cherishing, and celebrating the singular landscape that we know as the Grand Canyon. Lifetimes of cumulative work later, we see more than 8 million acres surrounding the Grand Canyon and much farther afield designated as national monuments or as priority areas for restoration. As fragile as these efforts might seem, especially in these times, we have made real progress.

Pausing to celebrate accomplishments is critical. Then, we look forward, always. And the path ahead is not a smooth one. Existentially important pressures, including climate change, threaten the places we love at a level we couldn't have imagined 40 years ago. Political division has made third-path solutions to complex problems that much more difficult to construct. Attempts to push through anti-environment policy and law — much of which could undo our hard-won victories and those of so many others — are relentless.

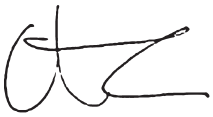
What, then, might our work look like over the coming decades?

Our intent and commitment are to stay the course. Our mission — to safeguard the wonders of the Grand Canyon and the Colorado Plateau, while supporting the rights of its Native peoples — is right. We are grounded in places and in communities. The tools we bring — law, policy expertise, science, organizing, advocacy, and collaboration — are the right tools. We will continue to build common ground across lines of difference, and, when necessary, draw lines that cannot be crossed.

Nothing about the Trust's work in these times feels easy or unimportant. Everything we have learned and achieved since 1985 will be put to the test over the coming years. And we are without a doubt up to the challenge.

Celebration? Yes, absolutely. Let's pause for just a moment to recognize the achievements of the past four decades. Now let's get back to work.

On behalf of the Trust team past and present,



Ethan Aumack
Executive Director

OUR MISSION

To safeguard the wonders of the Grand Canyon and the Colorado Plateau, while supporting the rights of its Native peoples.

ON THE COVER

A researcher adds scale to one of the many cave-held springs associated with the Redwall-Muav Aquifer in the Grand Canyon. STEPHEN EGINOIRE

EDITOR'S NOTE

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contents

Sticking With It

A History of the Grand Canyon Trust

By Ruxandra Guidi

Arches National Park.
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

As a kid growing up in the 1960s and '70s, Jim Enote remembers visiting the Grand Canyon with his family.

"It was hazy back in those days, so you couldn't really see the North Rim," recalled Enote, a Zuni tribal member, CEO of the Colorado Plateau Foundation, and board chair of the Grand Canyon Trust. "I remember hearing lots of airplanes and helicopters buzzing around."

Enote's vistas were obscured by smoke from coal-fired power plants. Tourism was booming and so were threats to the Grand Canyon, including proposed hydroelectric dams along the Colorado River.

At the same time, a slew of federal laws had begun to change the rules of the game. First came the Clean Air Act in 1963, then, the following year, the Wilderness Act. The National Environmental Policy Act was signed into law in 1970, the Clean Water Act in 1972, and the Endangered Species Act the year after that. The American Indian Movement was driving Indigenous protest of U.S. government policies and fostering a growing number of intertribal alliances.

This unique mix of hope and possibility, of existential threats and potential solutions, would catalyze the creation of the Grand Canyon Trust. Like many other environmental groups, it would initially set out to preserve and protect, focusing on the canyon's natural beauty. As Arizona Governor Bruce Babbitt, one of the Trust's first board members, said in a 1985 press release, "The Grand Canyon Trust is being established to help assure that this magnificent natural wonder is protected."

Originally focused narrowly on the Grand Canyon, the Trust would soon expand its mission to include the entire Colorado Plateau, recognizing that the organization would have to take on issues outside the canyon if it truly wanted to protect it.

With time, its mission also evolved well beyond the limited scope of environmental advocacy to include the needs of the peoples of the Colorado Plateau and supporting their lifeways and enterprises.

***

The Grand Canyon Trust traces its origins back to 1981, when conservationist Sally Ranney organized the first annual Grand Canyon invitational river trip for members of Congress around the time that U.S. Interior Secretary James Watt had publicly expressed interest in damming the Colorado River. The river trip included boatman and environmentalist Martin Litton and former California Secretary of Natural Resources Huey Johnson, as well as the journalist Bill Moyers.

Edaakie Dance Group from Zuni Pueblo at the 2016 Bears Ears Summer Gathering. TIM PETERSON

Delicate Arch, Arches National Park. TOM GAINOR, UNSPLASH

Bighorn sheep. ED MOSS

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AMY S. MARTIN

AMY S. MARTIN

RECOMMENDED READ

The Grand Canyon Trust: The Beginning
By Bert Fingerhut

Published in the summer 2013 issue

Available at
grandcanyontrust.org/beginning

It was Johnson who suggested including "trust" — a word that connoted integrity and permanence — in the name of what would be a new organization dedicated to protecting the Grand Canyon.

Alongside his colleague Harriet Burgess, Johnson enlisted Jim Trees of Harvard Business School, who trademarked the Grand Canyon Trust's name and drafted its bylaws. Next, Johnson recruited Arizona Governor Bruce Babbitt to the fledgling organization. Soon after the official launch in New York City in 1985, the board enlisted Ed Norton, a former federal prosecutor, as the Trust's first president. Norton opened the Trust's first office in Washington D.C. and recalls Babbitt laying out maps of the canyon and the surrounding Colorado Plateau. "I remember him pointing to the geologic and geographic features and saying, 'Look, there are certain unities. They are hydrological, they are geological, they are cultural. What we need to do

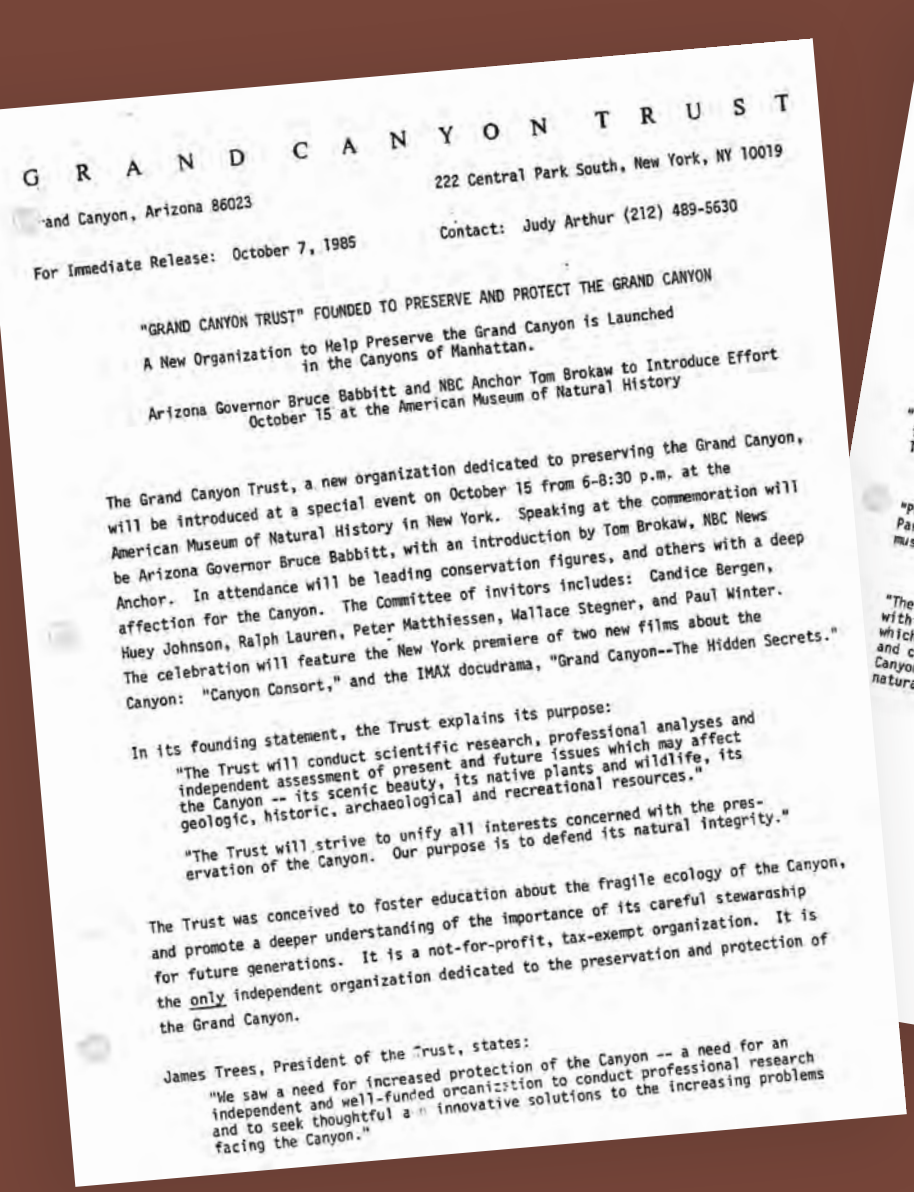
is try to create the political unities necessary to protect these places,'" Norton said.

At a time of great political division in America, this inclusive vision struck a chord. As the Grand Canyon Trust's first employee, Norton immediately set out to identify all the major issues affecting the Grand Canyon. On the list were Grand Canyon overflights, coal-fired power plants, the operation of Glen Canyon Dam, and uranium mining on the North Rim. At the time, the organization didn't think any of these would directly involve the region's tribal nations.

It wasn't long before the young organization began to get results. In 1987, the Trust helped pass the National Parks Overflights Act, reining in air traffic over the Grand Canyon. Four years later, in 1991, the Trust negotiated sulfur dioxide controls at Navajo Generating Station, a coal-fired power plant that was a major source of air pollution in the Grand Canyon region. This helped clear the smoke that had obscured Enote's childhood views of the canyon.

In 1992, the Trust helped pass the Grand Canyon Protection Act, which changed the operation of Glen Canyon Dam to better protect natural and cultural resources downstream.

By 1996, the Trust was helping lead a successful campaign to create Grand Staircase-Escalante National Monument. And, two years later, it helped draft the Arches National Park Expansion Act, which added over 3,000 acres to the beloved park.



G R A N D C A N Y O N T R U S T

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222 Central Park South, New York, NY 10019

For Immediate Release: October 7, 1985

Contact: Judy Arthur (212) 489-5630

"GRAND CANYON TRUST" FOUNDED TO PRESERVE AND PROTECT THE GRAND CANYON

A New Organization to Help Preserve the Grand Canyon is Launched in the Canyons of Manhattan.

Arizona Governor Bruce Babbitt and NBC Anchor Tom Brokaw to Introduce Effort October 15 at the American Museum of Natural History

The Grand Canyon Trust, a new organization dedicated to preserving the Grand Canyon, will be introduced at a special event on October 15 from 6-8:30 p.m. at the American Museum of Natural History in New York. Speaking at the commemoration will be Arizona Governor Bruce Babbitt, with an introduction by Tom Brokaw, NBC News Anchor. In attendance will be leading conservation figures, and others with a deep affection for the Canyon. The Committee of invitors includes: Candice Bergen, Huey Johnson, Ralph Lauren, Peter Matthiessen, Wallace Stegner, and Paul Winter. The celebration will feature the New York premiere of two new films about the Canyon: "Canyon Consort," and the IMAX docudrama, "Grand Canyon--The Hidden Secrets."

In its founding statement, the Trust explains its purpose:

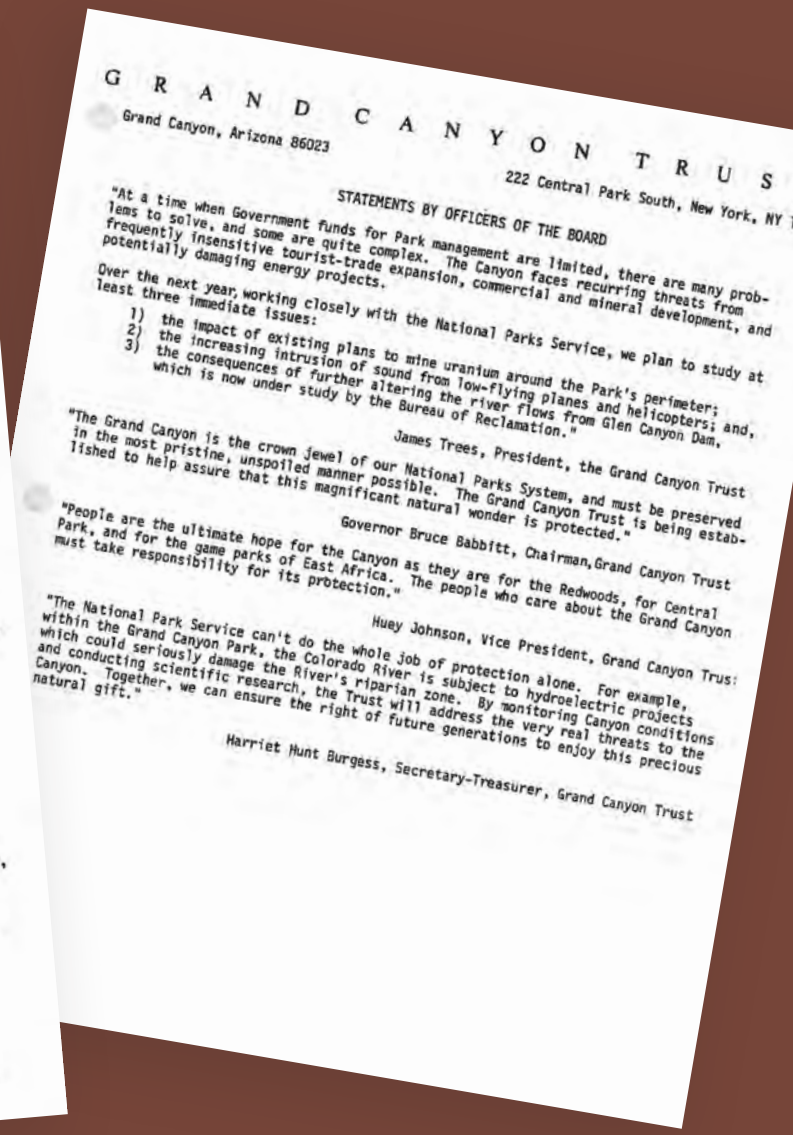
"The Trust will conduct scientific research, professional analyses and independent assessment of present and future issues which may affect the Canyon -- its scenic beauty, its native plants and wildlife, its geologic, historic, archaeological and recreational resources."

"The Trust will strive to unify all interests concerned with the preservation of the Canyon. Our purpose is to defend its natural integrity."

The Trust was conceived to foster education about the fragile ecology of the Canyon, and promote a deeper understanding of the importance of its careful stewardship for future generations. It is a not-for-profit, tax-exempt organization. It is the only independent organization dedicated to the preservation and protection of the Grand Canyon.

James Trees, President of the Trust, states:

"We saw a need for increased protection of the Canyon -- a need for an independent and well-funded organization to conduct professional research and to seek thoughtful and innovative solutions to the increasing problems facing the Canyon."



G R A N D C A N Y O N T R U S

Grand Canyon, Arizona 86023

222 Central Park South, New York, NY

STATEMENTS BY OFFICERS OF THE BOARD

"At a time when Government funds for Park management are limited, there are many problems to solve, and some are quite complex. The Canyon faces recurring threats from frequently insensitive tourist-trade expansion, commercial and mineral development, and potentially damaging energy projects.

Over the next year, working closely with the National Parks Service, we plan to study at least three immediate issues:

1) the impact of existing plans to mine uranium around the Park's perimeter;
2) the increasing intrusion of sound from low-flying planes and helicopters; and,
3) the consequences of further altering the river flows from Glen Canyon Dam, which is now under study by the Bureau of Reclamation."

James Trees, President, the Grand Canyon Trust

"The Grand Canyon is the crown jewel of our National Parks System, and must be preserved in the most pristine, unspoiled manner possible. The Grand Canyon Trust is being established to help assure that this magnificant natural wonder is protected."

Governor Bruce Babbitt, Chairman, Grand Canyon Trust

"People are the ultimate hope for the Canyon as they are for the Redwoods, for Central Park, and for the game parks of East Africa. The people who care about the Grand Canyon must take responsibility for its protection."

Huey Johnson, Vice President, Grand Canyon Trust

"The National Park Service can't do the whole job of protection alone. For example, within the Grand Canyon Park, the Colorado River is subject to hydroelectric projects which could seriously damage the River's riparian zone. By monitoring Canyon conditions and conducting scientific research, the Trust will address the very real threats to the Canyon. Together, we can ensure the right of future generations to enjoy this precious natural gift."

Harriet Hunt Burgess, Secretary-Treasurer, Grand Canyon Trust

Press release announcing the launch of the Grand Canyon Trust in 1985.

Bill Hedden, former executive director of the Grand Canyon Trust, testifies in front of a congressional subcommittee about environmental challenges facing the Grand Canyon, as staffers Taylor McKinnon and Roger Clark look on. AMANDA VOISARD

"We got uranium mill tailings moved off the bank of the Colorado River. We shut down power plants. We bought out the biggest private inholdings in Grand Staircase-Escalante and got the biggest oil and gas leaseholder in the new monument to donate their leases to us so we could give them back to the federal government," recalled former executive director, Bill Hedden. "That was why people began talking about us as the Swiss Army knife of environmental groups."

> "The Grand Canyon Trust takes a balanced approach to conservation. The Trust's measured, strategic, and commonsense approach has resulted in better protections for the Grand Canyon, the Colorado River, and the Colorado Plateau. It's one of the very best groups around."
>
> — ***Mark Udall,*** *Former U.S. Senator for Colorado*

Early on, the Trust developed a reputation for being balanced, sensible, and ready to negotiate commonsense solutions, though it reserved the right to litigate.

Former associate director, Rick Moore, recalled: "I had many conversations with agencies and politicians, and they would complain, 'We don't ever know what the heck the Trust is gonna do. They'll sit down and talk to us at the table today, and tomorrow, they'll drag us into court.'"

"We hope that we can resolve issues through collaboration," Moore said, "but at the end of the day, the job is to protect the Colorado Plateau. If we need to, we're going to sue you."

Moore, who joined the Trust in 1992 and spent 27 years with the organization, believes collaboration is what makes the Trust effective. "That ability to find common goals across differences has been the winning formula," he said.

Moore also points to the Trust's track record of working at both the local and national levels, on the ground at the Grand Canyon while also testifying on Capitol Hill to push for policy change. "The Trust has worked on air quality, water, grazing, tribal issues, renewable energy … The breadth of these programs makes the Trust unusual," Moore observed.

As its scope has grown, so has the staff. The Trust opened its first Flagstaff office in 1989 in the quirky McMillan Homestead — which boasted a resident packrat — with just two employees (a grand total of six people worked for the Trust at the time). Today, the Trust is headquartered in the Lockett Homestead in Flagstaff,

with 40 staff members spread across Arizona, Colorado, Utah, and the Navajo Nation, living closer to the lands they work to safeguard and the communities they support.

In the summer of 1991, the Trust hosted a gathering of tribal leaders to discuss economic and environmental issues facing their communities and in 1994 helped organize a tribal tourism conference. That same year, Vernon Masayesva, former chairman of the Hopi Tribe, current director of the Black Mesa Trust, and an out-spoken defender of Native self-governance, joined the board. At the urging of board members and staff, starting in the early 2000s, the Trust began to work in a more organized way to better understand and support the goals of tribes and Native communities.

Current board chair Enote remembers then-Grand Canyon Trust president Geoff Barnard inviting him to join the board in 2000 at a time when there were only three other Indigenous members. The Trust, Barnard explained, needed a better understanding of governance across tribal nations, of where there might be unions of ideas about lands and waters across the Colorado Plateau.

> "The Trust does a great job helping to protect the Grand Canyon area and supporting all of the Native American Tribes who have been here since time immemorial to maintain their way of life."
>
> — ***John Echohawk**, Executive Director, Native American Rights Fund*

The Trust began convening regular intertribal gatherings in 2009, recognizing the deep connections Native peoples maintain to the Grand Canyon and the Colorado Plateau and the importance of listening to and supporting tribal priorities.

"It was a space that was dedicated for cultural leaders from these different tribes to share their conceptions of place," recalled law professor Rebecca Tsosie, who has served on the Grand Canyon Trust's board since 2016. "It wasn't driven by the Trust agenda. It was very organic and coming from the communities themselves. It also enabled the community to see the Trust not like a non-Native environmental organization, but as an organization that was devoted to the people and the places of the Colorado Plateau."

"The Trust really recognizes the significance of these lands to Native American tribes," said John Echohawk, cofounder of the Native American Rights Fund, who has served on the Trust's board since 2012. Echohawk traces this awareness back to Trust board members David Getches and Charles Wilkinson, who, alongside Echohawk, helped secure landmark victories in tribal treaty-rights litigation.

Wilkinson saw public land law and Indian law as closely interrelated.

Diné horse riders show their support for Bears Ears National Monument at a public listening session held in Bluff, Utah on July 16, 2016. BLAKE MCCORD

"He had that idea about collaborative management and multiple forms of sovereignty embedded in place, and that became part of public land law," explained Tsosie.

By 2012, the Trust had helped secure a 20-year ban on new uranium mines around the Grand Canyon, supporting the efforts of the Havasupai Tribe and other Native peoples who oppose uranium mining on their ancestral lands.

Its commitment to listening to tribes opened the door to opportunities to support other tribally led work, including the campaign for Bears Ears National Monument, led by the five tribes of the Bears Ears Inter-Tribal Coalition: the Hopi Tribe, Navajo Nation, Ute Indian Tribe, Ute Mountain Ute Tribe, and Zuni Tribe.

Signed in 2016, the Bears Ears National Monument proclamation included a landmark collaborative management model in which tribal nations work alongside federal agencies to manage their ancestral lands, incorporating Indigenous traditional knowledge and science.

At the request of Save the Confluence — a group of Navajo families who live near the rim of the Grand Canyon above the confluence of the Colorado and Little Colorado rivers — the Trust worked to support their efforts to fend off the Escalade tramway resort. The resort proposed shuttling up to 10,000 people a day down to the sacred confluence and was finally defeated in 2017. The Trust also provided key support to the Grand Canyon Tribal Leaders Coalition in its successful campaign to protect nearly 1 million acres of their ancestral lands around the Grand Canyon as Baaj Nwaavjo I'tah Kukveni – Ancestral Footprints of the Grand Canyon National Monument.

Supporting tribal communities and nations is now a cornerstone of the Trust's work, extending far beyond landscape conservation to include market-based initiatives that strengthen Native-owned businesses and farming

Federal and tribal leaders at the unveiling of the first sign for Bears Ears National Monument on June 18, 2022. TIM PETERSON

The Colorado River in the Grand Canyon. BRIAN SKEET

"The Grand Canyon Trust is the most effective organization of its kind that I know. The deft way it deploys its passion for protecting the spectacular landscapes of the Colorado Plateau with its ardor for supporting the Native Americans who have long called the region home has enabled it to compile an amazing record of influence on public policy."

— ***John Leshy,*** *Former Solicitor of the U.S. Department of the Interior*

networks. "I think the Trus has been extremely valuable in demonstrating how non-Native organizations should proceed in working to support tribes," said John Leshy, legal scholar, Grand Canyon Trust board member, and former solicitor of the U.S. Department of the Interior.

At times, the Trust has taken an unconventional approach to conservation, working with ranchers, loggers, and government agencies. In 2005, the Trust purchased the Kane and Two-Mile ranches on the north rim of the Grand Canyon and set out to restore over 800,000 acres of chronically overgrazed lands. And in 2009, the Trust helped launch the Four Forests Restoration Initiative, "4FRI" for short, a collaborative group that includes logging companies, government agencies, and environmentalists working together to restore and protect 2.4 million acres of national forests across northern Arizona from catastrophic wildfire.

Over the last 40 years, the Trust and the region have witnessed seismic shifts, including two successful Native-led campaigns to designate tribal ancestral lands as national monuments, at Bears Ears in 2016 and at Baaj Nwaavjo I'tah Kukveni in 2023. At the same time, the country has also experienced a culture change in terms of how Indigenous self-determination is acknowledged, how cultural resources are managed, and how public lands are valued.

The Grand Canyon Trust's 40th anniversary is a testament to its mission to balance the needs of a region of great cultural, historic, and ecological importance with economic and human pressures, while supporting the rights of the region's Native peoples. This positions the Trust to continue this vital work at a time when public lands are at great risk under a new federal administration.

"The Trust is fortunate to have a lot of people standing with us," said Ethan Aumack, who has served as the organization's executive director since 2018. "We have thousands of dedicated members, many of whom have supported our work for decades. Knowing we can count on them makes it a lot easier to keep our eye on the ball and keep pushing toward our goals," he acknowledged. "And we have an incredible community of volunteers who roll up their sleeves and do the good work of conservation on the ground, and of young, rising leaders who will become the conservation voices of tomorrow," said Aumack, who himself started out as a Trust volunteer.

"A lot of our work is trying to cut through the inertia of large bureaucracies toward something better," he explained. Political divisiveness isn't new. But Aumack believes in establishing relationships and collaborations that pay off over time.

"There are going to be issues that will come up that we cannot even imagine," Norton said during a recent interview. "That's the way life is. Way back in the 1980s, the leadership and the board really did think about creating an organization that would have the capacity to deal with the second Trump administration. The Trust, from the very beginning, had that kind of foresight and stuck to it," Norton said.

Now in its fourth decade, the work goes on, from defending national monuments, to advocating for the protection of the Grand Canyon and the Colorado River, to supporting Native priorities for the plateau for generations to come.

Ruxandra Guidi is a freelance journalist and columnist for High Country News. Her reporting has appeared in The Atlantic, The New York Times, and other publications.

Impactful Lawsuits Through the Years

By Michael Toll

BLAKE MCCORD

The Grand Canyon Trust has never been a sue-first organization. Geoff Barnard, the Trust's president more than two decades ago, summed up the Trust's approach by noting that we will "respectfully talk with anyone, anytime, about anything." That credo helps explain part of why the Trust has been so effective for so many years on so many thorny issues: We're open to reasonable compromise. But, when talks break down, going to court can be the only way to accomplish our mission.

Over the past 40 years, we've litigated issues on the Colorado Plateau as varied as coal-fired power plants, uranium mining near the Grand Canyon, and destruction of pristine alpine habitat by a herd of invasive mountain goats imported by helicopter. We've sued federal and state governments and multinational corporations for breaking the law. Other times, we've gone to court to defend the federal government's decisions — like creating a national monument — from lawsuits by states, counties, and industries.

Sometimes we lose. Sometimes we win. And those hard-won victories can result in lasting, meaningful conservation gains for the Colorado Plateau and its peoples. Here are just a few of the issues the Trust has litigated over the past four decades.

Glen Canyon Dam Operations

One of the first lawsuits the Trust ever filed involved Glen Canyon Dam. In 1988, we joined other conservation groups to sue the Western Area Power Administration, a federal agency that manages the electric transmission system at the dam and sells the hydroelectric power to customers across the Southwest.

When Glen Canyon Dam was completed in 1966, trapping the Colorado River behind it, it severely damaged the Grand Canyon's downstream habitat, devastating the many plants and animals that depend on the river. The damage occurs primarily for two reasons.

First, the water released by the dam into the canyon is much colder and clearer than the river water flowing into Lake Powell upstream of the dam. Many of the native fish in the Grand Canyon evolved to live only in the warmer and siltier water that flowed into the canyon for millions of years. And the river's thick load of silt was essential to replenishing the canyon's beaches and sandbars — critical habitat for flora and fauna.

Second, for decades after the dam's construction, the Western Area Power Administration would quickly ramp up or down the amount of water flowing through the dam's turbines to match fluctuating power demand. That meant the water released downstream into the Grand Canyon would fluctuate too, often wildly. Quick surges of water eroded the canyon's beaches and sandbars.

In the Trust's lawsuit, we argued that new criteria proposed by the Western Area Power Administration to sell power from the dam would create even greater water fluctuation in the Grand Canyon, and that the resulting environmental impacts must be analyzed under the National Environmental Policy Act. The Trust prevailed, winning an injunction that limited the fluctuation of releases from the dam until the government prepared an environmental impact statement. Not stopping there, the Trust helped turn the debate over river flows through the canyon into lasting protection by working to develop and secure passage of the Grand Canyon Protection Act of 1992.

GARY YOST, UNSPLASH

Atlas Mill site. U.S. DEPARTMENT OF ENERGY

Removal of Atlas Mill Waste from the Banks of the Colorado River

Does it sound like a bad idea to build a massive uranium mill in a floodplain on the banks of the Colorado River just upstream of Canyonlands National Park and just outside Moab, Utah, directly across from the largest wetland on the upper Colorado River? The answer is no, if you were seeking a fortune processing uranium in 1956, when the Atlas Mill was built in that precarious location. After nearly 30 years of milling uranium ore from more than 300 mines across the Southwest, the mill shut down in 1983. It left behind an exceptionally toxic 12-million-ton, 100-foot-tall, 130-acre waste pile. The base of the pile was saturated in Colorado River water. During some spring runoffs, the river would lap against the foot of the mound. Every day, arsenic, barium, cadmium, cyanide, lead, mercury, selenium, uranium, nitrates, sulfates, and many other contaminants leached into the river and into groundwater. As much as 28,000 gallons of water polluted by the waste pile flowed into the river daily. Tests showed groundwater contained contaminants from the waste pile up to 1,700 times greater than the U.S. Environmental Protection Agency's drinking water standards.

The safest way to deal with this environmental and public health disaster was to move the hazardous waste away from the river and clean up the site. But that would be expensive. The mill's owner, Atlas, wanted to leave the waste pile in place and cap it, the far cheaper option. The Nuclear Regulatory Commission agreed. But after significant pushback, including by the Trust, the agency agreed to at least analyze an alternative option of moving the waste away from the river. Unfortunately, the promised in-depth analysis was anything but. And even though it found that moving the waste would better protect human health and the environment, the Nuclear Regulatory Commission decided Atlas could leave the polluted pile in the floodplain. So, in 1998, the Trust filed a pair of lawsuits. The first was against Atlas under the Clean Water Act. The second was against the Nuclear Regulatory Commission and the U.S. Fish and Wildlife Service, arguing that leaving the waste in place would violate the Endangered Species Act by jeopardizing endangered Colorado River fish species.

As the lawsuits moved forward, unsurprisingly, Atlas filed for bankruptcy, leaving the federal government (that is, taxpayers) responsible for dealing with the mess. The site was then transferred to the U.S. Department of Energy. With the Trust's lawsuit threatening the leave-it-in-place plan, Trust staff led a coalition to pressure the agency to move the pile. Eventually, the U.S. Geological Survey, the U.S. Environmental Protection Agency, and Utah's congressional delegation got on board and pressured the Department of Energy to move the pile. In 2005, the Department of Energy finally agreed.

The first tailings were moved in 2009 to a disposal site 30 miles away. Some days, more than 100 containers of waste from the pile are hauled away from the site by train. Given the cost — likely around $1 billion — and limited federal funding, it could take until the 2030s to fully move the pile and clean up the site.

Few things can more quickly sully the wonder and awe inspired by the Grand Canyon than the incessant womp-womp of a helicopter or the buzz of a propeller plane. While it's undoubtedly magnificent to see the canyon from above, 40 years ago, the noise from tourist overflights was destroying the canyon's natural quiet. So, one of the first orders of business when the Trust opened its doors in 1985 was to quiet the skies.

By 1987, the Trust had successfully lobbied Congress to pass the National Parks Overflights Act, which required the "substantial restoration of natural quiet" within parks most impacted by sightseeing flights, including Grand Canyon National Park. The act also required the Federal Aviation Administration (FAA) to issue a final plan to manage air traffic above the Grand Canyon.

Unfortunately, even after the law passed, air tours over the Grand Canyon spiked. In response to the Overflights Act, the FAA enacted regulations in 1996 that somewhat limited flight paths in the park, created some flight-free zones, and set a cap on the number of aircraft (though not on the number of flights) that could fly over the park. But those measures were woefully inadequate. The regulations also included a definition of "substantial restoration of natural quiet" that allowed an unreasonable amount of aircraft noise. So, in 1997, the Trust filed suit against the FAA, arguing that the agency's rules did not go far enough. The air tour industry also sued, arguing that the FAA's rules were too stringent. Eventually, the D.C. Circuit Court of Appeals rejected all the air tour industry's arguments. And although it agreed the FAA was "slow and faltering" in achieving the statute's goals, the court held that the agency's regulations were not unreasonable in aiming to achieve the natural-quiet goal by 2008. To do so, the FAA said it would issue additional regulations, and the court explained that the Trust could raise its claim again if the agency dragged its feet.

In 2000, the FAA issued two additional rules governing Grand Canyon overflights. In one of them, the FAA, along with the U.S. National Park Service, used a flawed methodology to quantify noise levels in the park and to measure progress toward achieving natural quiet. The Trust sued again, challenging the FAA's methodology. In 2002, the D.C. Circuit ruled in favor of the Trust, forcing the FAA back to the drawing board.

After many more years of delays and ever-increasing aircraft noise in the park, the FAA and the park service were finally beginning to make some progress. In 2011, the park service released a draft environmental impact statement in preparation for issuing new special flight rules over the park. Unfortunately, as the agency was on the cusp of releasing a final version of its environmental review, Congress stepped in. After lobbying from the air tour industry and others, Congress inserted a rider into a must-pass spending bill, which amended the 1987 Overflights Act by degrading the definition of "substantial restoration of natural quiet" to allow much more noise in the park. The statutory amendment also specified that a more permissive methodology must be used to determine when natural quiet is substantially restored.

More than 40 years later, aircraft noise continues to plague the park, showing the limits of litigation when Congress takes an interest in an issue.

BLAKE MCCORD

Northern Arizona Mineral Withdrawal

Uranium was first discovered near Grand Canyon National Park in 1947. In the 1950s, government demand for uranium to fuel the Cold War nuclear arms race unleashed a flood of prospectors rushing to the Southwest to dig uranium mines. More than 1,000 were dug on the Navajo Nation alone. But a decade or so later, with uranium reserves flush, the federal government turned off the subsidy tap, and the government-sponsored uranium boom went bust. Unprofitable mining companies often simply walked away, abandoning thousands of mines. More than 500 uranium mines remain abandoned and in need of cleanup on the Navajo Nation alone. Radioactive and toxic contaminants from abandoned uranium mines leach into water and soil. Exposure to uranium is linked to lung and bone cancer, autoimmune disorders, kidney disease, reproductive problems, and other ailments.

Over the next several decades, the boom-and-bust cycle of uranium mining kept repeating itself, along with the attendant human health and environmental impacts. In 2007, a spike in uranium prices led to thousands of new mining claims around the Grand Canyon. The U.S. Forest Service later that year authorized a mining company to drill uranium exploration holes at nearly 40 different sites around the canyon. A few months later, the Trust sued the Forest Service to stop the exploratory work, arguing that the agency violated the National Environmental Policy Act by failing to analyze the impacts of the project. The federal district court in Arizona agreed with the Trust and issued a preliminary injunction, preventing any mining activity until the Forest Service complied with the law.

At the same time, the Trust helped lead a coalition of conservation organizations in support of regional tribes advocating for the lands around the Grand Canyon to be "withdrawn" from mineral location and entry under the 1872 Mining Law. Such a "withdrawal" — essentially a mining ban — prevents the staking of new mining claims and limits the development of new mines.

RECOMMENDED READ

Uranium Mining in the Grand Canyon Region

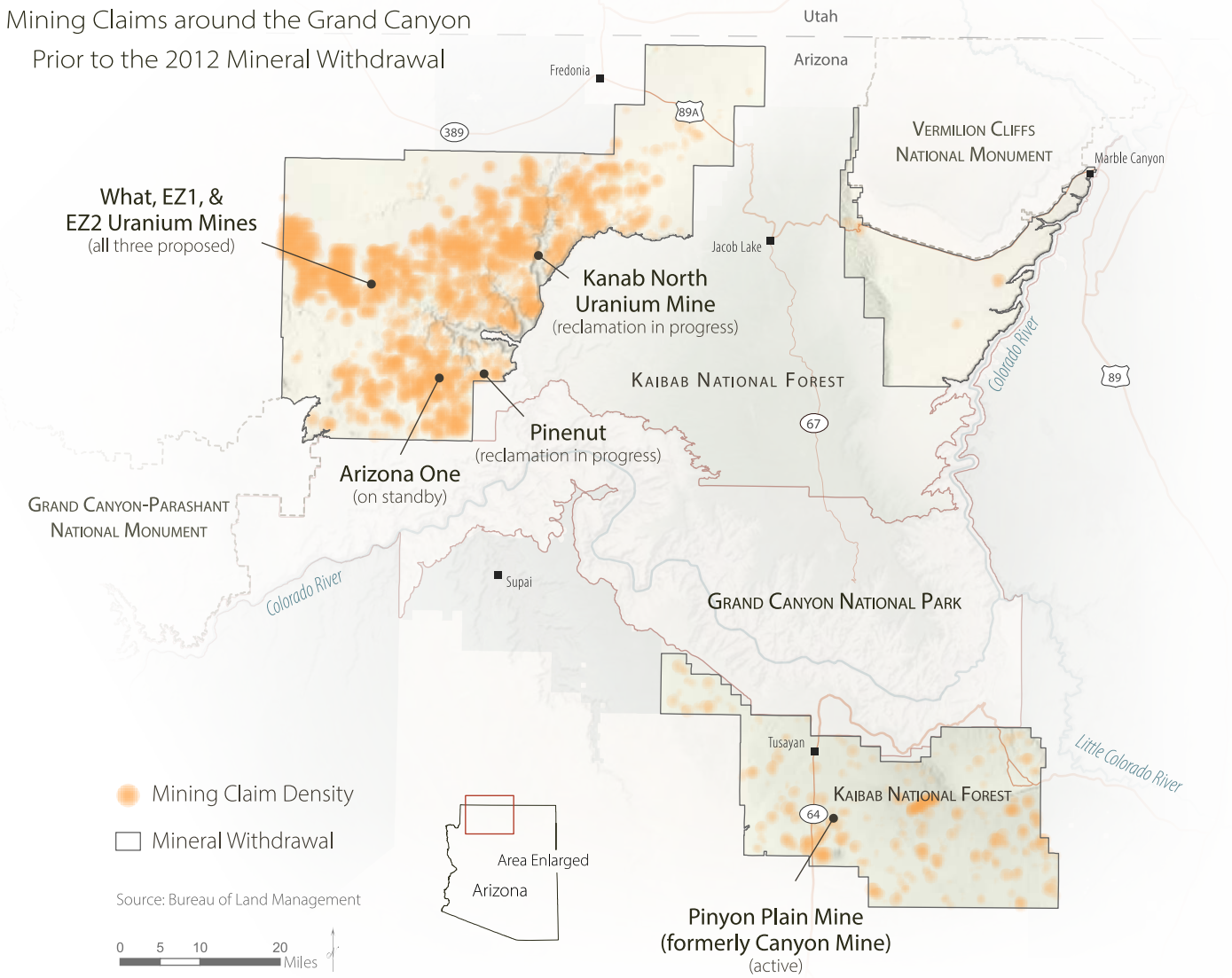
A Grand Canyon Trust report

Learn about the history and risks of mining uranium on public lands near Grand Canyon National Park.

Available at **grandcanyontrust.org/uranium-report**

A sunbaked sign warns hikers to stay away from an old mine on Horseshoe Mesa in Grand Canyon National Park. CERISSA HOGLANDER


CAUTION
Radiation Area
Keep Out



By 2009, over 10,000 mining claims had been staked on public lands adjacent to Grand Canyon National Park. STEPHANIE SMITH

> "This moratorium on new mining claims was the culmination of years of advocacy by Native American tribes, the Trust, and many others."

In 2009, U.S. Secretary of the Interior Ken Salazar announced a proposal to withdraw about 1 million acres around the Grand Canyon from mineral entry for 20 years to protect the Grand Canyon watershed from mining. The proposal also immediately withdrew the land from new mining claims for two years while the government conducted a thorough environmental review.

Three years later, in 2012, after an exhaustive environmental analysis determined that uranium mining poses unacceptable threats to the Grand Canyon and the Colorado River, the Obama administration issued a 20-year mineral withdrawal of nearly 1.1 million acres of land in northern Arizona. This moratorium on new mining claims was the culmination of years of advocacy by Native American tribes, the Trust, and many others.

Shortly afterward, groups representing mining companies and local governments filed lawsuits in federal district court in Arizona, arguing that the withdrawal was illegal. The Trust, along with the Havasupai Tribe and other conservation groups, intervened in the case in defense of the government's withdrawal. The lawsuits were dismissed in the lower courts and the U.S. Supreme Court, when petitioned, declined to take up the case, keeping in place a vital tool to protect the Grand Canyon and the Colorado River.

Michael Toll has served as a staff attorney for the Grand Canyon Trust since 2018.

Secretary of the Interior Ken Salazar stands on the South Rim on June 20, 2011 to announce intentions of placing a 20-year mining ban on about 1 million acres around Grand Canyon National Park. MICHAEL QUINN, NATIONAL PARK SERVICE

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Turquoise Circle members are cornerstone partners in the Grand Canyon Trust's efforts.

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ED MOSS

Working with Native America just makes sense

By Jim Enote

DEIDRA PEACHES

As a Zuni tribal member, I find the Colorado Plateau uniquely sacred. From the canyonlands of southeast Utah to Mesa Verde, Chaco Canyon, and the Grand Canyon, where I see pottery shards, petroglyphs, and ancient dwellings, I know my ancestors lived here, and the blood that ran in their veins runs in mine. I am of this place.

I came to the board of the Grand Canyon Trust 25 years ago, knowing I wanted to help magnify Native American involvement in the Trust's good work. The young organization had quickly established itself as a leading conservation organization in the Southwest, racking up an impressive list of conservation wins by wielding the tools of the day — conservation science and powerful environmental lawyering — to clean up air pollution around the Grand Canyon, keep water flowing through the Colorado River, and protect sublime canyon country in southern Utah.

But something was missing from the Trust's conservation agenda in its early years: a strong Native America strategy. To do top-notch conservation work on the Colorado Plateau, where tribes control a third of the lands and tribal nations have interests in all of this region, the Trust needed to involve tribes. For the Trust to succeed long-term, we needed to expand its conservation vision to include the communities and cultures that have called the plateau home for thousands of years.

Several Native American voices joined the board of trustees in the early 1990s, and there has been continuous representation on the board ever since. Early Native American board members included N. Scott Momaday, Pulitzer-Prize winning novelist and poet; Claudeen Bates-Arthur, former Navajo Nation attorney general and the first Navajo woman to be licensed as an attorney in the United States; and Vernon Masayesva, community water advocate and former chairman of the Hopi Tribe. Tony Skrelunas came on staff in 1991, bringing his business expertise to work on economic development and tourism planning with the Navajo Nation, and other Arizona tribes.

However, building mutual understanding and appreciation among tribes and conservation organizations would be difficult. It required humility, education, and substantial time.

JAMIE ARVISO

Mae Franklin speaks at an intertribal economic conference co-hosted by the Trust at Grand Canyon National Park in 2022. JAMIE ARVISO

When I joined the board in 2000, I began to raise my hand, mainly to ask how the Grand Canyon Trust would include Native American perspectives and involvement while considering the political sovereignty of affected tribal nations.

Eventually, there was a collective epiphany, with many board members and staff raising their hands pressing for more Native American collaboration and alliance building. In 2002, the Trust formally launched its Native America Program, bringing together capable new Native staff and board members to advance collaborative work with tribes. The program was a huge step and investment, yet I kept raising my hand, because I didn't want to see the Native America Program exist as a silo within the organization; I wanted to see it infused into everything the Trust did.

Around that same time, the Trust started taking on the biggest coal-fired power plants in the West, suing them under the Clean Air Act. Its lawsuits resulted in big cleanups at the Springerville power plant in Arizona. Litigation also placed pressure on the Mohave Generating Station in Nevada, one of the dirtiest coal-fired power plants in the Southwest. The successful lawsuit filed by the Trust required the plant's owners to install modern pollution controls, but rather than install the controls and clean up the air, the owners of the plant decided to shut it down.

These victories for air quality around the Grand Canyon also highlighted a harsh truth of the American conservation movement: Fragile and relatively short-term carbon-based economies often conclude with human and economic hardships. The closure of the Mohave power plant caused the Navajo Nation and Hopi Tribe, whose economies depended on coal royalties and mining jobs, to lose millions of dollars a year.

In the years following Mohave's closure, the Trust stepped up its investment in renewable energy projects across tribal lands and supported

JAMIE ARVISO

Amber Benally (left) and Sonwai Wakayuta (right) roast marshmallows after a day of workshops and panel discussions at Grand Canyon National Park. JAMIE ARVISO

Apache crown dancers perform at the Colorado Plateau Intertribal Conversations gathering in Isleta, New Mexico. BRIAN SKEET

community-led economic development initiatives. Through this work, the Trust's Native America Program laid the foundation for its continued support of Native entrepreneurs and innovators building strong, resilient economies across the Colorado Plateau today.

Around 2009, the Native America Program began hosting annual intertribal gatherings to listen to tribal members' priorities and determine how the Trust could provide support. More than 15 years later, these annual gatherings have become central to developing lasting relationships with Native communities. Much of the Trust's work in Bears Ears National Monument and the Grand Canyon region over the last decade has grown from intertribal gatherings.

The Trust incorporated its commitment to supporting the rights of Native peoples into its mission in 2019. Elevating, dignifying, and respecting tribal perspectives is an essential distinction of how the Trust works differently than many conservation organizations, and many are watching. The Grand Canyon Trust's approach to environmental protection in collaboration with tribes is the envy of many conservation organizations globally.

The Grand Canyon Trust's mission is to safeguard the wonders of the Grand Canyon and the Colorado Plateau, while supporting the rights of its Native peoples.

Today, the Trust continues to stand behind Native communities in their efforts to build equitable and sustainable economies, protect sacred landscapes, elevate Native voices, and reclaim authority to manage their ancestral lands.

I am proud that the Grand Canyon Trust applied a Native America strategy decades ago. Because we knew, as we know now, that working with tribes just makes sense.

Jim Enote serves as chair of the Grand Canyon Trust's board and CEO of the Colorado Plateau Foundation. He lives in Zuni, New Mexico.

Artisans and community groups share their work at a Colorado Plateau Intertribal Conversations gathering. JAMIE ARVISO

JAMIE ARVISO

Native America Program Spotlights

Intertribal Gatherings

The Trust's Native America Program is built on relationships with our tribal partners. From the very beginning, it has been about being a listener, being invited into communities, being respectful of tribal sovereignty, and being there when we are called on as a supporter and an ally.

We started hosting intertribal gatherings in 2009 as a space for Southwest tribes to rekindle cultural connections, share songs and prayers, and increase tribal voices in local conservation. Over 15 years later, the intertribal gatherings have grown into a living being, where tribes can come together to support each other, collaborate on Native-led initiatives, and talk about challenges and opportunities in their communities.

Looking ahead, I see the Trust continuing to hold space for tribes to convene, to provide capacity support, and to be an incubator for some of the work that's developing in Indian Country that we will continue to support.

– ***Deon Ben***, *Native America Director*

JAMIE ARVISO

JAMIE ARVISO

Gathering members and attendees share ideas, build connections, and collaborate at the December 2024 Colorado Plateau Intertribal Conversations gathering in Isleta, New Mexico. TOP: Evelyn Blanchard (left) and Beverly Billie (right). MIDDLE: Rose Marie Williams (left) and Ruby Chimerica (right). BOTTOM: Dianna Sue White Dove Uqualla (left). JAMIE ARVISO

JAMIE ARVISO

JAMIE ARVISO

The Emergence intertribal economic summits in 2022 and 2023 brought together Native entrepreneurs, artists, community leaders, and National Park Service employees from across northern Arizona to build a more equitable Grand Canyon economy that centers, advances, and respects Native cultural values. JAMIE ARVISO

Economic Initiatives

There aren't words for "entrepreneurship" in our Indigenous languages on the Colorado Plateau. And yet, our tribal communities are full of people who cut hair in their homes, provide roadside car repair services, make and sell jewelry, and so much more.

Supporting Native entrepreneurs is part of a larger body of the Trust's work around economic initiatives in Native America that spans decades. Since the 1990s, the Trust has been a partner to tribal communities in their economic transitions away from extractive industries, which forced tribes to sell their natural resources without knowing the impacts it would have today.

The mining industry has caused so much pain and division in our communities, and we've never been given the freedom to create our own economies that care for our people. Many communities still need basic utilities, plumbing, water lines, and adequate housing.

The Trust understands how mining has impacted tribal lands and economies across the Southwest and that community-driven economic development in Native America is long overdue. This is where conservation, environmental justice, economies, and tribal communities converge — it's a shared history, and it's ultimately a shared goal to live in balance with the natural environment, so that all of us, including future generations, have the opportunity to do so.

–Jessica Stago,
Native America Economic Initiatives Director

River trip participant Christopher Becenti (left) and knowledge holder Danzel Edaakie (right) on the banks of the Colorado River. DANYA GOREL

From left to right: Grand Canyon Trust interns Nizhoni Tallas and Meranden Numkena with Grand Canyon Manager Jack Pongyesva. RAYMOND CHEE

Althea Etsitty (left) and Erin Preston (right) shear a sheep during a workshop at Hubbell Trading Post. DANYA GOREL

Indigenous Changemakers

Bringing young Native people into conservation early — and most importantly, putting them in front of people who look like them and are doing conservation work — is the only way to create a long-lasting, sustainable movement.

The Trust's Rising Leaders Program connects Indigenous youth with Indigenous changemakers through leadership trainings, place-based learning opportunities, and well-paid internships. Students meet farmers who are feeding their communities; they learn cultural teachings from traditional knowledge holders; they build connections with their ancestral homelands and each other.

Through the Trust's Rising Leaders Program, more and more young Native people are seeing themselves as future farmers, river guides, park rangers, community advocates, business owners, and more.

Creating space for Indigenous, localized knowledge in the conservation field sets rising leaders up to build movements that are rooted in their home communities and radiate across Native America and beyond, reaching everyone who cares about these landscapes. Look at Bears Ears and Baaj Nwaavjo I'tah Kukveni national monuments as examples of what Indigenous-led conservation can do.

There's change happening, and it's exciting to know the Trust's Rising Leaders Program is a part of that shift.

*– **Amber Benally,** Just Transition Manager*
(Rising Leaders Manager 2019-2023)

Volunteers Lisa Nerio and Jim Grajek build a fence in Fish Lake, Utah to protect wetland habitat. BLAKE MCCORD

An Incomplete History of the

Volunteer Program

By Lena Bain

In 1998, Ethan Aumack, a Grand Canyon Trust volunteer working on issues affecting the San Francisco Peaks, identified a need for road surveys in the area. The next year, he partnered with the U.S. Forest Service to equip volunteers with Global Positioning System (GPS) units to map the web of dirt roads through the forests outside of Flagstaff, Arizona. The GPS units were housed in eight-by-four-inch metal boxes with a large magnet on the outside. Volunteers stuck these state-of-the-art trackers to the tops of their vehicles and drove. With this citizen science project, the Grand Canyon Trust's Volunteer Program was officially born.

But volunteers had been part of the Trust's work from the very beginning, well before the formal program took shape. Many staff members started out as volunteers, including Aumack himself, who became the organization's executive director in 2018.

After the road mapping, our earliest structured volunteer projects included prairie dog surveys and pronghorn fence modification near Flagstaff, fish and crayfish trapping in Fossil Creek, and springs restoration in the Dry Lake Hills. To support our fledgling program in the early 2000s, we split resources and staff with Grand Canyon National Park. In 2005, Kari Malen brought Trust volunteers into the park to do projects with Kate Watters, an accomplished botanist. A few years later, in 2007, Watters was hired to run the Trust's Volunteer Program.

Watters pursued rigorous on-the-ground science and built strong relationships with public land managers. "We were the leverage on the ground for the Trust mission," Watters recalls. During one pronghorn fence modification trip she organized in House Rock Valley, over 40 people from the neighboring communities of Fredonia and Kanab showed up to help. After a long workday pulling barbed wire, they cooked a gigantic pot of chili at Kane Ranch headquarters. Together, they ate, drank, and sang country songs on the porch. Watters describes these moments as bridge-building between communities. "Conservation is so much broader than we think," she says.

Member Trips Manager Emily Thompson, who began working in the Volunteer Program in 2010, also feels the program's greatest impact has been building trust in local communities by showing up and doing the work. During her tenure, the program had three coordinators and multiple interns, including Deon Ben, the Trust's current Native America director. These years were bustling with activity. We were running beaver-related projects under the guidance of Mary O'Brien in Utah, partnering with Northern Arizona University and Museum of Northern Arizona scientists on botany research and spring surveys, and backpacking along the Paria River to remove tamarisk.

Thompson and her colleagues, including Misha Chizhov, who now

Volunteer Emma Healy helps return a closed trail to its natural condition outside of Flagstaff, Arizona. BILL FERRIS

Volunteers build a fence around springs on the north rim of the Grand Canyon. BLAKE MCCORD

serves as the Trust's Salesforce administrator, saw a demand for more youth-focused volunteer opportunities. With the help of AmeriCorps members, they began young-adult programming grounded in environmental justice, which has blossomed into what is now our Rising Leaders Program.

Audrey Kruse joined the Volunteer Program in 2019, and I followed two years later. Today we're proud to offer multiday trips, day trips, community science projects, and independent volunteer opportunities with many volunteers returning year after year. Some of our longest-serving volunteers have been with us for almost 20 years, and we welcome newcomers each field season.

Of course, the real stars of the volunteer program are the volunteers themselves. Lisa Nerio, a Trust volunteer since 2007, participated in early springs restoration work in the Vermilion Cliffs. "Trips where I see results become my favorites," she says. A few months after a Trust trip, she saw a picture on our website of a mountain lion drinking from a watering hole she and other volunteers had built. Moments like these are what Nerio says she finds most fulfilling about her volunteer work with the Trust.

Vera Markgraf, who joined her first volunteer trip in 2008 and has contributed more than 1,000 hours of her time, finds the scientific work highly rewarding. "As a scientist, I am naturally interested in the scientific outcome," Markgraf says.

The Trust's current longest-serving volunteer, Denise Hudson, has clocked more than 980 volunteer hours on Trust trips. Hudson loves volunteer trips with an element of adventure. She remembers a trip when a storm rolled in suddenly and a wash flooded, trapping them opposite their vehicle. The road was destroyed, and when they were able to get back to the vehicle, they had no shovels. "We dug our way out with geology picks," Hudson recalls. This event and others like it led the team to create stringent risk-management protocols that are in place on trips today.

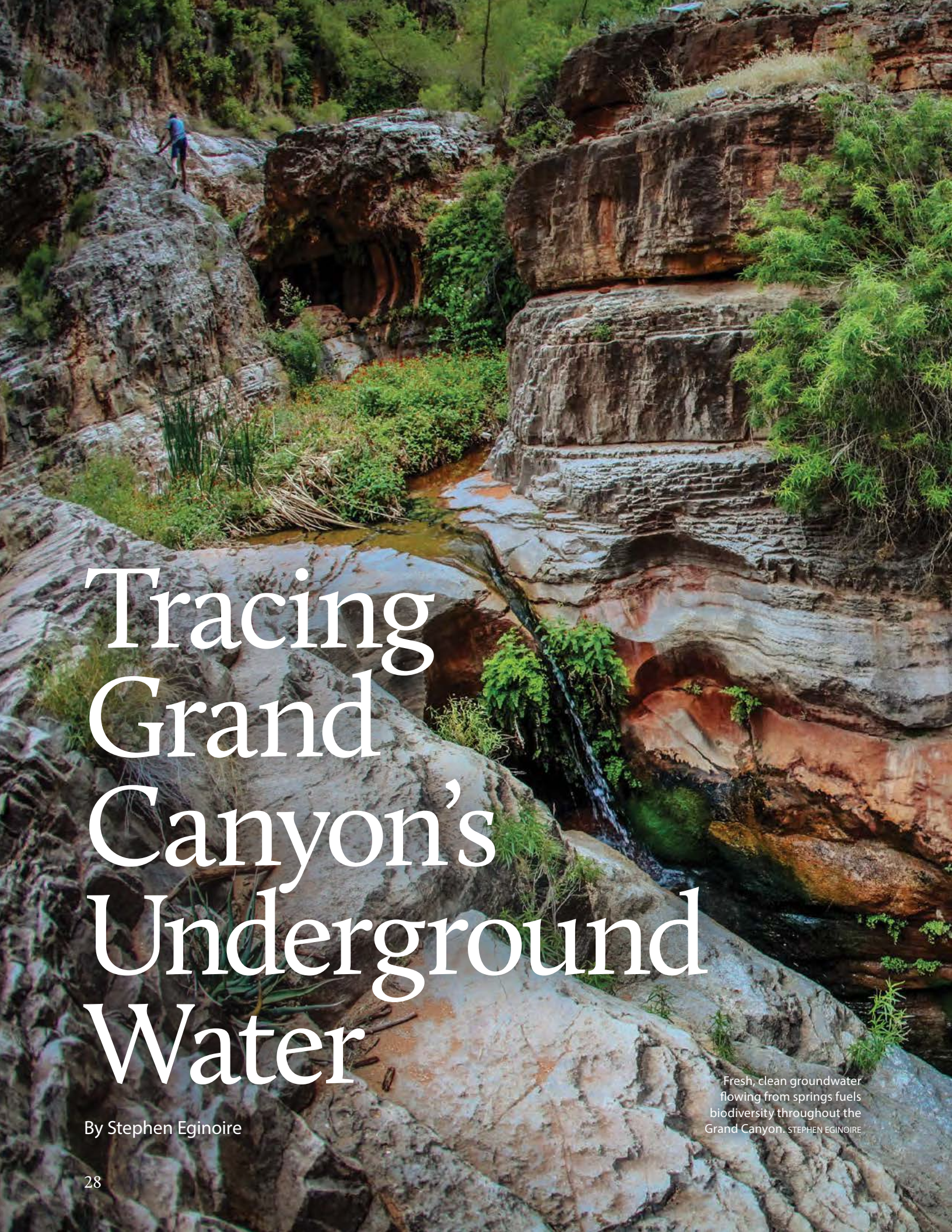
These kinds of experiences "help people connect more deeply with why it's important for these places to stay wild," Watters says.

At the heart of our program are moments that transcend the work we accomplish on the ground: dinners held in laps, shared stories, and time outside enjoying the views. These are the moments when people are deeply connected in place, working together to do a little good on this Earth. In Aumack's words: "We have introduced thousands of people to places they hadn't been and to a community of stewards doing good work on the land. I like to think that, for a good number of folks, the Volunteer Program has bent the trajectory of their lives toward conservation."

Lena Bain has managed volunteer trips at the Grand Canyon Trust since 2021.

Tracing Grand Canyon's Underground Water

By Stephen Eginoire



Fresh, clean groundwater flowing from springs fuels biodiversity throughout the Grand Canyon. STEPHEN EGINOIRE

It's dead summer, and the Grand Canyon simmers in hot, heavy air. Even the most heat-adapted creatures are in refuge. But today is a special day. Emerging from the shadowy depths of a cracked boulder, a collared lizard pokes its head out to lick the air — something's afoot. Just beyond the North Rim, over the Kaibab Plateau, rises a churning colossus of vapor and energy. Its dark, anvil-shaped crown stretches miles into the upper atmosphere, a 45,000-foot-tall billowing plume of rapidly cooled air hoisted from the canyon, raking the heavens. It's the onset of monsoon season, an annual weather pattern that synchronizes and sustains life here — and this cloud is about to reach its tipping point and unleash untold volumes of water onto the land.

Collared lizard. STEPHEN EGINOIRE

Plant life flourishes in a zone saturated by groundwater seeping from the Redwall-Muav Aquifer. STEPHEN EGINOIRE

Deer Creek, a prominent spring in the Grand Canyon, holds deep cultural and spiritual significance for many Indigenous communities. STEPHEN EGINOIRE

With its elevated topography, the Kaibab Plateau grabs hold of moisture streaming inland from the Sea of Cortez like a catcher's mitt. When the first veils of rain fall from the cloud's swollen belly, there is little time to rejoice before a full-on deluge ensues. Flash floods thunder down the plateau's flanks to the Colorado River. The water that doesn't immediately roar into the canyons, instead, is funneled underground through sinkholes perforating the plateau's forested exterior — inlets to a vast and complex karst aquifer, a natural wonder in and of itself, hidden inside the Kaibab. Hidden that is, until this same water reemerges in the Grand Canyon at one of the countless seeps or cave-held springs that gush into the open air dozens of miles from, and thousands of vertical feet below, where the water first entered the ground.

Groundwater from the Redwall-Muav Aquifer flows through Havasu Creek and feeds Havasu Falls. ED MOSS

The Redwall-Muav Aquifer,

as it is known, is perhaps the most important source of fresh water in the Grand Canyon, allowing for life to flourish with abundance in an otherwise arid climate. But it's more than just an underground reservoir. The aquifer is a source of spiritual and cultural significance for the Indigenous communities inextricably linked to its waters — a place of genesis and origin. And for the Western scientists and cave specialists who are working to unravel its secrets, and plumb its hidden depths, a rare picture is being painted of a vast and ancient aquifer system incised by the Colorado River — a system so complex that, for decades, it has puzzled and surprised, if not bewitched, those studying it.

Two days after the big rain event drenches the Kaibab, Garrison Loope, cave and climate specialist at Grand Canyon National Park, observes a significant increase in the flow rate and volume of water surging from the mouth of Roaring Springs Cave. This spring is a particularly relevant focal point as it is the park's sole source of water.

A team navigates up a creek fed entirely by groundwater from the Kaibab Plateau. STEPHEN EGINOIRE

Loope and his assistant huddle inside its large entrance chamber. Ambient daylight gently scatters along the walls, and cool, humid air flows like the water from deep underground — a welcome reprieve from the summer heat. The data they collect will help inform water management strategies and shed light on the subterranean mechanisms of the Kaibab's flows. Up-close monitoring keeps tabs on the aquifer and provides insight to the big questions: How long does it take for water to move through the system? What are its main flow paths? How does flow time vary from season to season? How old is this water? And, how vulnerable is the system to the impacts of a warming climate and other human-related activities such as mining?

Though its true mechanisms may seem impossible to track, in the last decade much has been learned about how water flows through the Kaibab's manifolds, largely due to foundational research conducted by Dr. Ben Tobin, former Grand Canyon National Park hydrologist and cave resource specialist. Throughout the Colorado River Basin, a place where regional water supplies are strained and every drop is accounted for, such a poorly understood watershed is a pressing matter. "We sure could stand to know a lot more about this water, especially if we're putting all of our eggs in one basket with Roaring Springs," Tobin says.

Loope's work in the park monitoring springs is a continuation of an ambitious project initiated by Tobin in 2014 to trace water from high on the Kaibab Plateau all the way to Roaring Springs. How? A simple technique called a dye trace. When Tobin and his team of assistants zeroed in on sinkholes funneling runoff from snowmelt underground, they injected the water in question with an inert neon dye. To their surprise, it reached Roaring Springs in just a few days — after flowing a mind-boggling straight-line distance of

Researchers stand in awe of a vast underground chamber connected to the complex karst aquifer system within the Kaibab Plateau. STEPHEN EGINOIRE

23 miles and descending over 6,000 feet vertically — the deepest successful dye trace ever completed in the United States — revealing just how quickly water moves through the system. Adding to the research team's bewilderment, dye from two separate tests crossed underground, and emerged at two different springs, in two different canyons, but did not mix.

In 2021, Loope picked up where Tobin left off in the effort to trace water through the system. Of course, he anticipated surprising results.

"Before I dove into this project, I heard firsthand from Tobin about how he was constantly amazed that they would inject dye into a single sinkhole, and it would be detectable in multiple springs located significant distances apart. Dye at Roaring Springs would reliably get there [from the Kaibab Plateau] in a few days, while springs right next door had nothing," Loope says.

"If we have confirmed anything about what goes on inside the Kaibab, it is that it's a wildly complicated system." Chuckling, Loope reflects on the past four years: "Our whole team is still struggling to interpret our latest data set."

Loope says that the biggest surprise so far this season occurred when they injected dye into one of the same sinkholes as Dr. Tobin had, with remarkably different results.

"We had dye coming out all over the place — everywhere except the spring Tobin had previously recorded."

"We're still interpreting what this exactly means," Loope continues, "But I surmise that the water table in the aquifer varies quite a bit from year to year and even throughout a single season. When the water table is higher, new possible flow paths are likely utilized by the water, and when the water table is low, it flows out of physically lower places within the aquifer."

Contemplating the water table from deep within the Kaibab Plateau's subterranean cave system. STEPHEN EGINOIRE

This fresh recharge isn't the only water present in the system. Primordial water upwells from unimaginable depths through faults and rifts, providing ballast and balance for new water flowing into the system — a confluence of the inner Earth and the upper atmosphere.

A challenge of managing underground resources is that they tend to fall into the out-of-sight, out-of-mind category. But one need not probe far to get a basic sense for the collective amount of water draining from the Redwall-Muav Aquifer. Removing the data from snow runoff, monsoon spikes, and dam releases, the Colorado River has 10-20% more volume as it leaves the Grand Canyon — a statistic that can only be attributed to the springs flowing from the aquifer.

Among the most well-acquainted with the Redwall-Muav Aquifer is the Havasupai Tribe, a name which translates to "People of the Blue-Green Water." Havasupai people reside in the lush and vibrant Havasu Canyon below the Grand Canyon's south rim, a community accessible only by foot, horseback, or helicopter. Carved by the life-giving waters of Havasu Creek, the canyon is a world apart, sheltering groves of cottonwood, willow, and mesquite, while cool, travertine-rich waters thunder over the iconic Havasu, Mooney, and Beaver falls. Beyond the walls of Havasu Canyon, the ancestral lands of the Havasupai traditionally extend into the forested valleys and canyon rims that lead to their sacred mountain, Red Butte, near where the Pinyon Plain Mine, formerly Canyon Mine, is currently extracting uranium ore perched above the precious Redwall-Muav Aquifer.

Humming away in an otherwise tranquil meadow not far from the foot of Red Butte, the mine operates in the Kaibab National Forest, within the boundaries of the recently established Baaj Nwaavjo I'tah Kukveni – Ancestral Footprints of the Grand Canyon National Monument — specifically designated to protect

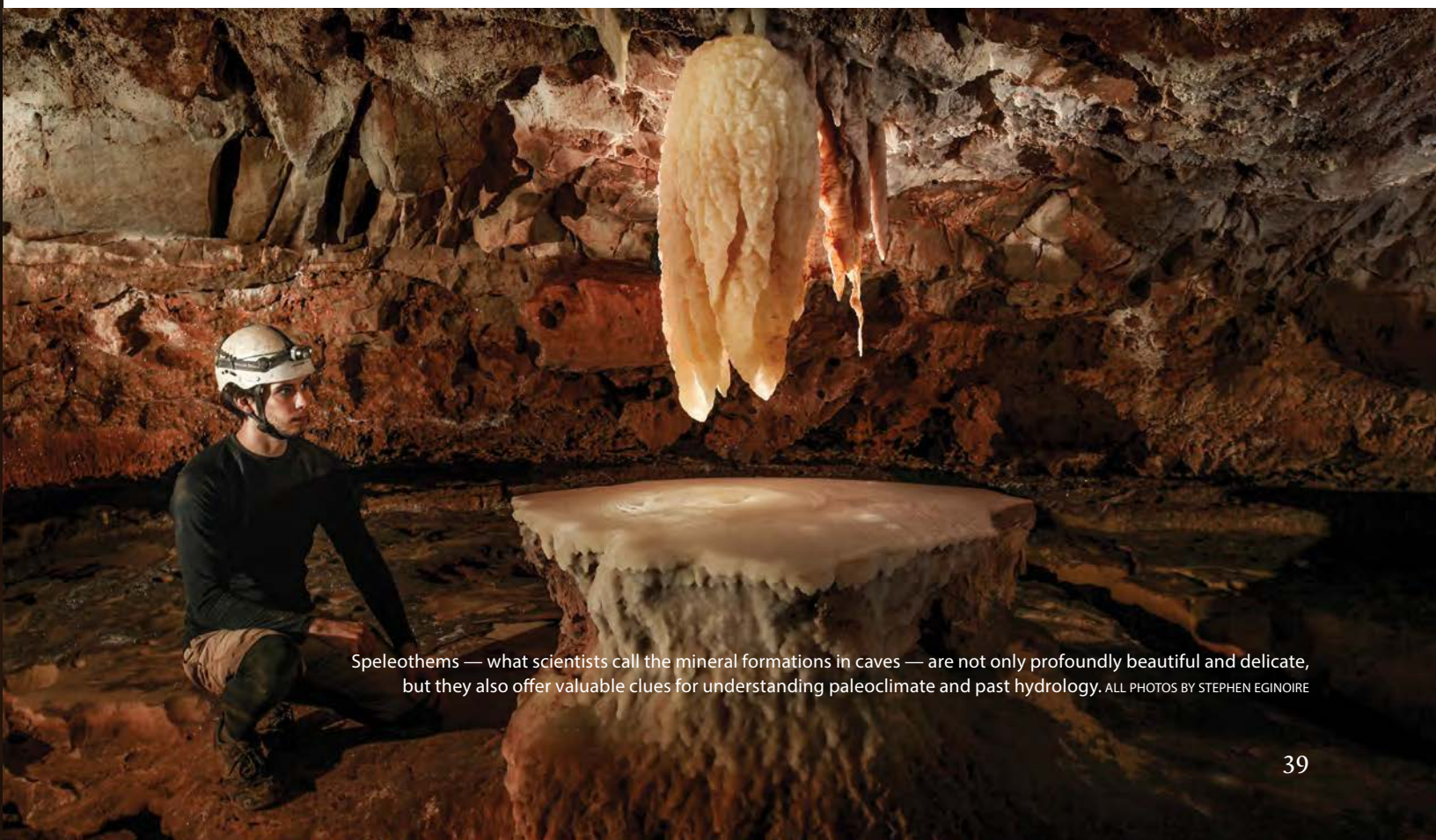
Pinyon Plain uranium mine (formerly called Canyon Mine) with the Havasupai Tribe's sacred mountain, Red Butte, in the background. ECOFLIGHT

"This water travels deep underground ... before it emerges to reach us. This is something our elders understood and taught us to respect, long before scientists confirmed what we already knew.

ED MOSS

A member of the survey team pauses for photographs while mapping a cave system that stretches for miles beneath the Kaibab Plateau. STEPHEN EGINOIRE

The highs and lows of navigating underground waterways in total darkness. ALL PHOTOS BY STEPHEN EGINOIRE



Speleothems — what scientists call the mineral formations in caves — are not only profoundly beautiful and delicate, but they also offer valuable clues for understanding paleoclimate and past hydrology. ALL PHOTOS BY STEPHEN EGINOIRE

ancestral homelands, including places of ceremony, life-sustaining water sources, hunting grounds, and other locations that figure prominently in Indigenous history. Despite the monument protections now in place, the mine continues to operate based on an outdated environmental impact statement (EIS) and the Havasupai Tribe fears the mine will contaminate groundwater.

In a 2024 letter to Nicole Branton, the Kaibab National Forest supervisor, Arizona Attorney General Kris Mayes stated that, "A supplemental EIS is now necessary because scientific advances in groundwater modeling unequivocally show that the 1986 EIS's claim that the Mine is not a threat to regional water supplies is wrong. Failure to supplement the EIS could result in devastating consequences for the region — especially for vulnerable communities like the Havasupai Tribe."

Although opposition from the Havasupai Tribe, and countless others, has been fierce, the operation continues to extract ore with risk of permanent contamination that will remain long after the mine closes — a toxic slurry of uranium ore and water, left to stew in a sealed shaft. What is the probability that this contaminated water will percolate into the Redwall-Muav Aquifer through faults and fractures that undoubtedly exist? Time will tell.

During testimony before the United States Senate, Havasupai Tribe Chairman Thomas Siyuja Sr. had this to say: "In our Canyon home, water is life. This water travels deep underground, through layers of rock, across many miles, before it emerges to reach us. This is something our elders understood and taught us to respect, long before scientists confirmed what we already knew. The springs that flow from the rock walls are sacred and must be protected. Uranium mining on the Canyon's rims, on our aboriginal lands, threatens to contaminate the aquifer that feeds Havasu Creek. We know the

Collecting data from the complex karst aquifer system within the Kaibab Plateau is often cold, wet, and muddy — sometimes requiring research teams to camp deep underground. ALL PHOTOS BY STEPHEN EGINOIRE

Little Navajo Falls, Havasu Creek, Havasupai Reservation. ED MOSS

irreparable damage uranium mining can do. For generations we have been at the forefront, working to permanently protect our homelands from uranium mining, which has disproportionately harmed and sickened Indigenous people across northern Arizona."

Thanks to the tireless work of researchers like Dr. Ben Tobin and Garrison Loope, as well as many others, a clearer — if still astonishingly complex — picture is beginning to emerge. Their dye-tracing studies have revealed just how quickly and unpredictably water can move through this subterranean network, linking seemingly unrelated sinkholes and springs across vast distances and vertical drops. Yet the more we learn, the more questions arise: How stable is this system in a changing climate? How resilient is it to human activities like mining? How long can we rely on Roaring Springs as a single point of supply in a park that hosts millions of visitors each year?

This fragile and dynamic aquifer doesn't exist in isolation. It is part of a broader hydrological tapestry that stretches across the Grand Canyon region, feeding into the Colorado River and supporting ecosystems, Indigenous communities, and downstream users who may never see the canyon's depths — but rely on its waters every day. The controversial uranium mining operation on the ancestral homelands of the Havasupai people is a stark reminder that what happens above ground can irrevocably alter what flows below, putting what is arguably Earth's most valuable resource — fresh water — at risk.

Ultimately, the Kaibab Plateau and the Redwall-Muav Aquifer are so much more than just a scientific puzzle or a source of water — they are a living system without boundary, physically connecting the deep earth with the upper atmosphere, weaving a thread through humanity, time, and space.

Stephen Eginoire is a photojournalist and writer based in southwest Colorado. Find more of his work at stepheneginoire.com

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AMY S. MARTIN

Map by Stephanie Smith

Adapted from: ESRI, U.S. Forest Service, National Park Service, Bureau of Land Management, Blake McCord, Adam Haydock, Marie Read, Deidra Peaches, Photohelgic via Unsplash

In Memory

David Bonderman

November 27, 1942 – December 11, 2024

TIM PETERSON

David joined the board of the Grand Canyon Trust in 1992, just seven years after the organization's founding. He would remain a strong voice on the board for the next 32 years.

David was a towering figure, held in high regard for his intellect and his commitment to the Trust's mission and organizational well-being. He was a masterful thinker, problem-solver, and advocate for the Grand Canyon and for singularly beautiful landscapes across the Colorado Plateau. David was a giant for and a friend of the Trust — giving of his time, wisdom, and good humor. He was and remains integral to the Trust's DNA and we would not be nearly the organization we are without his leadership, steadfast loyalty, strategic vision, and care over the last three decades. Our hearts go out to his family and many dear friends across the Colorado Plateau and far beyond.

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