

# JEFFREY PINE journal



BIANNUAL MAGAZINE, VOLUME XXI, ISSUE I • **SPRING/23**



## IN THIS ISSUE

*Solutions to environmental concerns: Equitably meeting renewable energy needs; Accurately measuring the winter snowpack; Relearning original land stewards' wisdom; Properly disposing of poop on the trails, and more.*

## STAFF

**Wendy Schneider**, Executive Director  
**Lindsay Butcher**, Stewardship Director  
**Louis Medina**, Communications and Philanthropy Director  
**Allison Weber**, Policy Associate, Water and Forest Campaign Manager  
**Kayla Browne**, Policy Associate, Desert Lands Campaign Manager  
**Jaime Lopez Wolters**, Desert Lands Organizer  
**Joseph Miller**, Indigenous Community Relations Coordinator

## BOARD OF DIRECTORS

**Chris I. Lizza**, President  
**Jeff Dozier**, Vice-President  
**Ellen Wehr**, Secretary  
Tom Boo, Kyle Hamada,  
Sidney Quinn, Sam Roberts,  
Marjorie Shock, Gregg Vane

## MAGAZINE DESIGN:

Alan Urquhart Design

## COVER PHOTO:

Cottonwood Creek meets  
Owens Lake, Inyo Mountains  
in the background.  
Mid-March 2023. Photo by  
Jaime Lopez Wolters.



*If you like the Jeffrey Pine Journal, please share it with others: After reading it, consider giving it to someone else to enjoy; or perhaps you can donate it to your local library, or leave it at your beauty salon or barber shop for someone else to pick up. Happy reading...Happy sharing!*

# NEW STAFF MEMBERS



## **Jaime Lopez Wolters**, Desert Lands Organizer

Born in Amsterdam, the Netherlands, and having grown up in the mountains of Guatemala, Jaime developed a love of nature at an early age. He studied Environmental Science at Wageningen University in the Netherlands and worked with subsistence farmers in the Guatemalan highlands, encouraging the adoption of agro-forestry techniques. In the early 2000s he moved to Los Angeles to be with his partner, Sarah, and started working with Metabolic Studio on environmental art projects. That work first brought him to the Eastern Sierra and exposed him to the area's majestic beauty as well as its environmental challenges. As Desert Lands Organizer at Friends of the Inyo, Jaime strives to protect the land and encourage people's connection to nature and the web of life.

## **Joseph Miller**, Indigenous Community Relations Coordinator

Joseph is a lifelong resident of Payahuunadü and a Tribal member of the Big Pine Paiute Tribe of the Owens Valley. Joseph developed a love of environmental service through his early work with the Big Pine Tribe, focusing on permaculture techniques, community agriculture initiatives and health initiatives. His fondness for maintaining the connection to water and land was further realized through working in water quality monitoring and data collection with his home Tribe. Most recently, Joseph has served in management roles for both Tribal enterprise and in environmental protection. Joseph enjoys quality time with his family, caring for plants, gardening, environmental stewardship, serving Tribal communities and exploring the high deserts of California and Nevada. In his role as Indigenous Community Relations Coordinator, Joseph hopes to foster meaningful dialogue and cultivate lasting relationships between Friends of the Inyo and the Native Tribes of the Eastern Sierra.





# LAND ACKNOWLEDGEMENT

---

At Friends of the Inyo, we work to protect and care for lands that have been, for over ten thousand years, and still very much are, inhabited by the Paiute (Nüümü), Shoshone (Newe) and Timbisha peoples. Many of these lands are now known by names recognizing people who never set foot here. These lands are called Payahuunadü or Panawe by the Nuumu and Newe peoples, respectively. This land acknowledgement is a recognition of the original inhabitants of the Eastern Sierra, and is intended as a show of respect for Native peoples and to surface the often-suppressed colonial history of our country.

## NEW BOARD MEMBERS

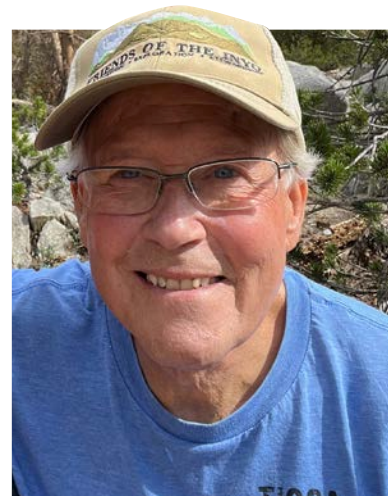


**Kyle Hamada,** Board Member

Born in the Los Angeles area, Kyle grew up visiting the Eastern Sierra every winter and summer. He studied Environmental Science and Policy at Cal State University Long Beach, with a focus on issues affecting the California Desert. During his time in school, Kyle grew a deep appreciation for the lands in and surrounding the Eastern Sierra. He worked as an intern with the Barstow and Ridgecrest BLM field offices as a wilderness surveyor and as a route surveyor in the western Mojave Desert. Meanwhile, his years of experience in photography, videography, and digital media led him to work as a Producer in the advertising industry. He later moved to Bishop where he held the position of Communications Director at Friends of the Inyo from 2018 to 2021. Kyle has since returned to the Los Angeles area where he works as a Producer. He aims to leverage his range of experience and knowledge to help FOI achieve its mission. Kyle and his wife often visit the Eastern Sierra to climb, hike, and enjoy their favorite places.

**Gregg Vane,** Board Member

I came to California in August 1971 to attend graduate school at the UCLA Institute of Geophysics and Planetary Physics. The first weekend at UCLA my new friends took me to the summit of Mt. Whitney. Later they took me cross-country skiing in the Lake Mary Basin. I was hooked by the Eastern Sierra and the Inyo National Forest in those first few months. I remain so today after having lived in Antarctica, Chile, and Argentina, and having traveled to mountainous regions in Asia and Europe. The time spent elsewhere has convinced me that there are many unique aspects of the Eastern Sierra region that make it worthy of our efforts to protect it. After UCLA I was hired by the Jet Propulsion Lab where I met my future wife. She was already a backpacker and cross-country skier in the Sierra. It was natural that when we started our family, the frequent summer backpacking trips into the Sierra continued even after we had twins three years after our son was born. No surprise that our adult kids are passionate about the Eastern Sierra region, too. We all helped build our home in Mammoth where most of us vote.





# KATHY JEFFERSON BANCROFT'S

PARTNER PROFILE

## Whispers of Wisdom

*By Louis Medina  
Communications and Philanthropy Director*

**K**athy Jefferson Bancroft, Tribal Historic Preservation Officer for the Lone Pine Paiute-Shoshone Tribe, does not talk about her education much, but the 67-year-old has an impressive curriculum.

Bancroft did her undergraduate work in chemistry and cellular and molecular biology at Fort Lewis College in Durango, Colorado.

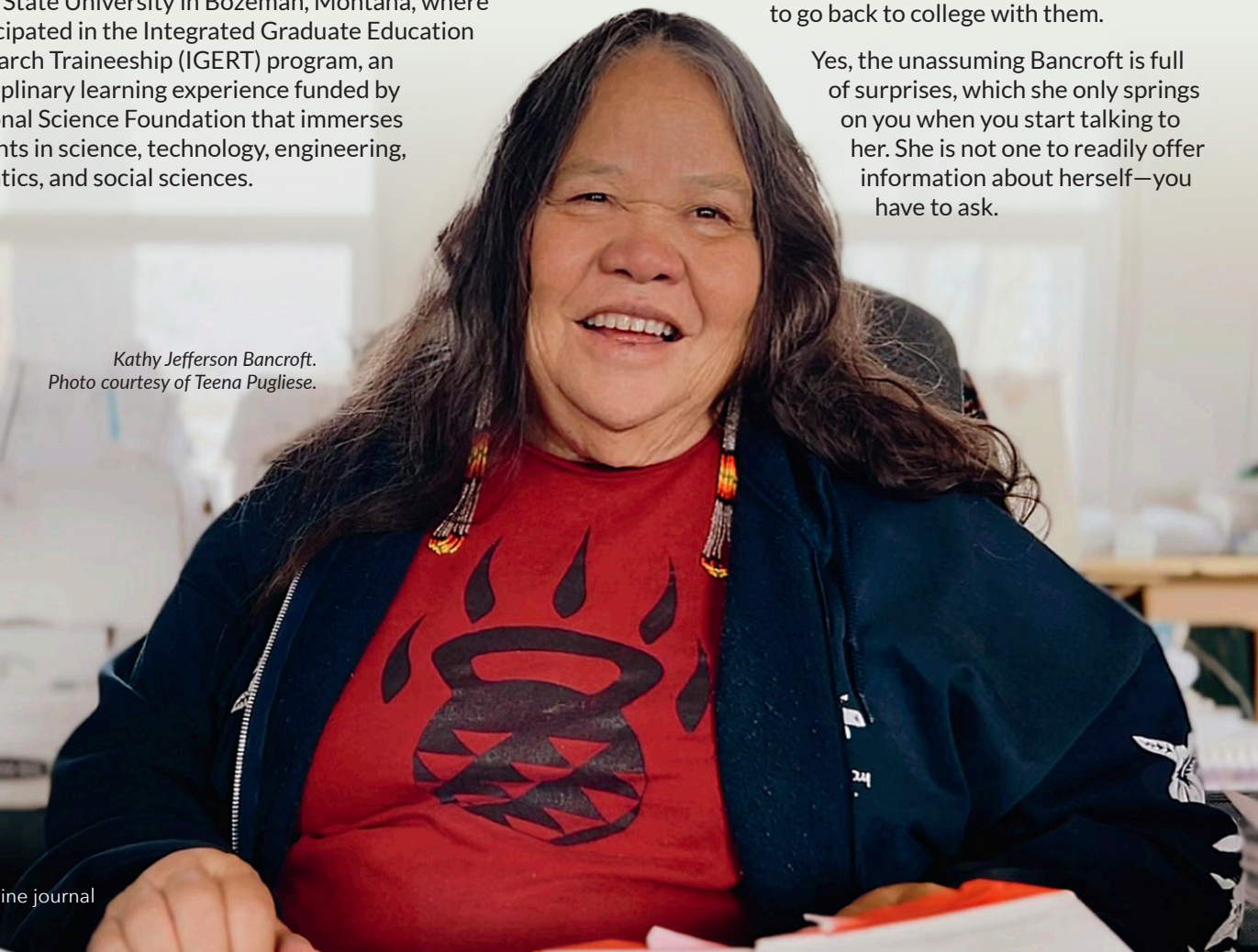
She earned her master's degree in organic chemistry from Montana State University in Bozeman, Montana, where she participated in the Integrated Graduate Education and Research Traineeship (IGERT) program, an interdisciplinary learning experience funded by the National Science Foundation that immerses participants in science, technology, engineering, mathematics, and social sciences.

Through IGERT, Bancroft had to work on projects focused on such diverse topics as predator-prey behavior, forest fire behavior, the math behind how a fish swims, and drug interactions with receptor sites on cells in the body to effectively block and counter disease.

All this, following a long hiatus after attending Stanford University for two years. "I didn't like it," she said. She came home, had two boys and picked up the books again after raising them, when they challenged her to go back to college with them.

Yes, the unassuming Bancroft is full of surprises, which she only springs on you when you start talking to her. She is not one to readily offer information about herself—you have to ask.

*Kathy Jefferson Bancroft.  
Photo courtesy of Teena Pugliese.*





But just as putting a shell to your ear allows you to hear the ocean, listening to her is like hearing whispers of wisdom.

## Beginnings

Bancroft is a Lone Pine native. Her father, Thomas Jefferson, was Mono, Shoshone and Paiute. Her mother, Barbara Morgan Jefferson, was not Native. Bancroft credits her with helping to shape her education and sense of curiosity.

Boarding school was part of her upbringing, Bancroft said—but unlike her father, who had been forced away to boarding school as a child together with his sisters, for Bancroft it was a voluntary experience. Lone Pine High School was not yet accredited when she was growing up, she said, and her mother, who was involved in the Episcopal church, encouraged her to go to Rowland Hall in Salt Lake City (at the time Rowland Hall - St. Mark's Episcopal School), the oldest school in Utah. Being away from family was tough, Bancroft said, and she cherished the times when she could come home during winter and spring breaks, and summer vacation. But the experience exposed her to a lot of “amazing” people, world religions, a subject she needed to graduate, and life skills in general.

She remembers a formative piece of advice her mother gave her then.

The Vietnam War was raging at the time, and anti-war rallies were taking place all over the country, including in Salt Lake City. She would have needed her parent's permission to attend a local protest, she said, but didn't want to bother them. “I didn't go,” Bancroft said, and when she told her parents about it afterwards, her mother said, “Why didn't you participate? When something like that comes up, let me know and I'll get you a note. When something like that comes up, take advantage of it. That's part of history. Go learn about it.”

A seed was planted in the mind of Bancroft, who was naturally shy as a young girl. Her mother had been shy when she was young, too, she said, but later learned to speak up on behalf of her Native family members. Watching her mother's example encouraged Bancroft to reject her own shyness. She found her voice: “I realized I was not speaking for myself, but also for my ancestors,” she said.

## Activism

In the Eastern Sierra, Bancroft's name is readily associated by local environmental leaders with activism around issues affecting her 700-member tribe. But she never thought of herself as an activist, she said. However, she did get inspired to become involved in tribal matters thanks to what she learned from her paternal grandmother. “She and I were very close. She's the one who told me most of the stories about what this valley used to be like. They were just entertainment when I was young, but as I got older, I realized how important those stories were.”

Also, looking at the examples of cousins and nephews who have been involved in not just local but also national and even international activism, she realized something: “We have a right to stand up. We have a right to say what we value. We are the original caretakers of this place.”

Bancroft fell into the position of Tribal Historic Preservation Officer (or THPO), when an interim THPO had to be designated as part of the first application the tribe submitted to the U.S. National Park Service for grant funding for the position more than a decade ago. She was a tribal monitor at the time, Bancroft said. Tribal monitors observe archaeological excavations or construction activity in culturally sensitive areas to ensure important cultural resources are protected. As THPO, she would get to do more of that plus coordinate a pool of some 30 to 40 tribal monitors with diverse skills needed for the various projects they oversee. She started as an interim and has been serving as THPO since.

And her scientific education has come in quite handy in her role, as she represents her tribe before the Bureau of Land Management, the Los Angeles Department of Water and Power, Caltrans, the Federal Highway Administration, the Great Basin Unified Air Pollution Control District and other agencies, on issues that range from desert land protection from mining, to dust abatement at Owens Lake and the Keeler Dunes, to surface and groundwater protection throughout *Payahuunadü* (the Paiute name for the Owens Valley, “the land of flowing water”), to flood prevention through upgrades to century-old earthen dams along the Owens River watershed, to the protection of cultural resources and the landscape from the proposed widening of US Highway 395 at Olancho-Cartago.

“All of my education has helped,” Bancroft says. She holds her own while talking to engineers about harmful chemicals to keep out of *Patsiata* (the Paiute name for Owens Lake), discussing algorithms that help understand how much dust comes up off a dirt road, or considering computer models of complex biological systems.

She would like agency scientists and engineers to understand the following about tribal monitors and THPOs: “We're actually out there to keep your project going. We can get things out of your way. We can make sure you're protected,” she said, because if cultural resources are disturbed or destroyed, work shutdowns and remediation activities can stall a project for a year or longer.

“People have to quit looking at Native Americans as people who lived in the past. We're here now,” she said, “and indigenous knowledge—we haven't forgotten all that. It has been passed down in all sorts of different ways. It's in Native people's DNA.”

She said government agencies should listen to the informed, common-sense solutions offered by Native Americans to problems that are not being solved “by someone in L.A. at a desk in a cubicle drawing lines that make no sense.” >>





Kathy Jefferson Bancroft at a 2020 local protest against mining on Conglomerate Mesa.

## Family, Hope, Youth and the Future

In her life of making a difference, Bancroft has experienced losses: of her parents and a brother; her husband, Frank Bancroft, a member of the Ute tribe who died 30 years ago; and a son, Harmey, named after Bancroft's paternal grandfather. Her other son, Franco, is named after his father's best friend, and is following in his mother's footsteps and working as a Lone Pine Paiute-Shoshone tribal monitor.

She has a grandson who is 16, a granddaughter in her twenties, and another one who is 9. She and her youngest granddaughter have an especially close bond. "She is my *hüütsi*, and I am her *hüütsi*," Bancroft said, referring to a Paiute word that represents the familial bond between a paternal grandmother and her granddaughter. In Paiute culture, she explained, a different word is used for grandparent-grandchild or aunt/uncle-niece/nephew relationships depending on whether the bond is through the maternal or paternal side of the family.

She has three "cousin-brothers," too, Bancroft said, referring to children who were brought into her immediate family through her father's second marriage after her mother died. "But in our way, all of our cousins are considered brothers and sisters also," she said.

Family is important to Bancroft. So are youth.

"My whole life has been dedicated to engaging youth. My first job was when I was 14, as a tutor in a reading program for kids." A lifetime later, she says, "Young people make you

feel young. I always learn from them. They have a fresh way of seeing the world. Every child, I feel, is a scientist. The questions they ask, they are always searching for answers. I encourage them to keep asking those questions, ask the tough questions. Young people are open to listening. They don't think they know everything yet, most of them."

According to Bancroft, youth are the most important part of the environmental movement. She tries to talk at schools, colleges, and youth groups every chance she gets, she said, "Because they are the ones that are going to make the difference."

Bancroft, her tribe, and other tribes also work in coalition with organizations like Friends of the Inyo, the Manzanar Committee, Alabama Hills Stewardship Group, and others on some of the environmental issues already mentioned, and on matters of social justice as well.

"Kathy is gently teaching us at Friends of the Inyo what true collaboration to achieve conservation goals looks like," FOI Executive Director Wendy Schneider said.

"Each one of us separately could make a lot of noise but it wouldn't be loud enough to be heard. Together we can make a difference," Bancroft said about intertribal cooperation. "We can make a strong voice for all the different aspects of an issue." That has become radically apparent in the successes local coalitions have had in stalling or redesigning environmentally harmful projects and getting people to think about their effects, she said. "We're standing together and becoming more active not just in this valley but throughout the state and nationally. And sometimes even globally." ■



*"Friends of the Inyo's mission to preserve and conserve these lands is truly a legacy that my wife and I are honored to contribute to." - Paul & Marjorie Shock*

# Make this your *Legacy*

You, too, can protect the Eastern Sierra through your will or trust and leave a legacy of conservation by becoming a Friends of the Inyo Legacy Gift Donor!

Our endowment honors legacy donors' wishes by investing contributions from their estate, including real estate or cash assets (like a portion of a 401k or IRA account), in the protection and care of the Eastern Sierra for generations.

Visit [Friendsoftheinyo.org/legacy](https://friendsoftheinyo.org/legacy)  
or write to [info@friendsoftheinyo.org](mailto:info@friendsoftheinyo.org)  
include "Legacy Giving Program" in the subject line,  
and let us help you set up your legacy gift today



**760.873.6500**

621 W. Line Street, Ste 201  
Bishop, CA 93514  
[Friendsoftheinyo.org](https://friendsoftheinyo.org)





# Oh, crap!

The problem of dog and human waste left behind in Wilderness

By Louis Medina  
Communications and Philanthropy Director

*Fifteen pounds of poop plus five pounds of trash. That is a lot of waste to be left behind in Wilderness. Photo courtesy of Cordero Chavez.*



Some of Friends of the Inyo's most viewed and talked about social media posts deal with an unpleasant topic that is considered—and rhymes with—taboo: poo.

More specifically, these posts (which you can find on Facebook and Instagram @FriendsoftheInyo, and on Twitter @FriendsofInyo) deal with dog and human poop left behind on Wilderness trails. And it is BAGGED poop we're talking about: left on the side of trails or right on the tails themselves, under rocks, on the snow, even hanging from tree branches.

Some past comments from our social media followers include:

"There's so much poop out there!"

"It's an epidemic!"

"God, people are disgusting!"

"If you can't carry the poop out, then don't bring your dog."

"Why even bag it if you're going to leave it? You're just adding plastic to your mess."

Exactly.

In the case of dog poop, perhaps the owners "intended" to take it to a trash receptacle at the trailhead on the way back from their hike, left it on the side of the trail "where no one would step on it," and "totally meant to pick it up later," but they "forgot."

Excuse! Excuse!! Excuse!!! Excuse!!!!

In the case of human poop in Waste Alleviation & Gelling (or WAG) bags, the leaving behind appears furtive when the bags are found tucked behind a bush or under a rock ("No one will see it here"), blatantly lazy and intentional when discovered at a former campsite ("Let a ranger pick it up"), and unintentional when found right on the trail—as people sometimes hang these bags from their backpack, rather than pack them inside, and may not notice when they fall off.

## Friends of the Inyo's Experience

Cordero Chavez was our Friends of the Inyo Trail Ambassador assigned to work on trail maintenance and community outreach at the Mt. Whitney Ranger District of the Inyo National Forest in the summer of 2022. He once picked up 21 WAG bags full of human waste weighing a robust dumbbell bicep curl weight of 15 lbs. Plus another 5 lbs. of trash! Chavez, who has since gone on to work for the U.S. Forest Service, got a lot of praise for his "Poop Angel" good deeds on our social media. The anonymous poopers after whom he cleaned up got a good tongue lashing.

For those not well versed in the proper ways of pooping in wilderness—and, especially since COVID, which drew a lot of people looking to avoid crowds out to the open spaces of the great outdoors, there are a great many such folks—the outdoor and camping information website and app, thedyrt.com, defines WAG bags as "basically dog bags for humans," with the difference being that while you use dog bags to pick up after your canine companion once it has pooped on the ground, with WAG bags, humans squat and poop right into the bag. Each bag is like a portable toilet kit that comes with hand sanitizer, toilet paper, and "poo powder" to help solidify bodily wastes and neutralize their odor. The bags are specifically designed to collect and carry human waste in the backcountry easily and safely until you can dispose of it in a dumpster at a trailhead.

Most of the bags Chavez found that day came from Mt. Whitney Trail Camp, he said. "But I found plenty of WAG bags left on the side of the trail."

The reality is that all of us at Friends of the Inyo, while visiting ranger districts throughout the Inyo and Humboldt-Toiyabe National Forests, have, on numerous occasions and in all seasons of the year, found and picked up bags containing human or dog poop out in nature. And it is really annoying.

Actually, it is beyond annoying: Poop left behind or improperly buried in nature is not just a nuisance, it is a matter of great environmental concern.

## Why you should pack it out

Dog poop bags are made to decompose. That means their contents eventually will be carried off by rain or melting snow into the watershed, ending up in local lakes and streams, and possibly sickening humans and



*A beam of light, as if from heaven, appears to shine on Former FOI Trail Ambassador Cordero Chavez, who became a "Poop Angel" on a hot July day in 2022, after he hauled out loads of human waste left behind on the Mt. Whitney Trail. Photo courtesy of Cordero Chavez.*

wildlife. And in years of extensive spring runoffs following extraordinary winter snowfalls like this year, the danger of contamination becomes even more troubling.

According to the U.S. Environmental Protection Agency (EPA), pet waste contains two types of pollutants: nutrients and pathogens. >>





While hiking out in nature with your dog, an empty jar of coffee, peanut butter, or dog or cat treats is ideal for storing bagged dog poop in your backpack without having to worry about smell or spillage, until you can get to a dumpster at the trailhead at the end of your hike. Decorate the jar with your favorite stickers and make it a regular part of your hiking gear. Photo by Louis Medina.

Pet food, while nutritious, causes waste that is high in nitrogen and phosphorus, the EPA says. When this waste gets carried off into bodies of water, it decomposes, releasing these and other nutrients into lakes and streams; this can upset their natural balance by causing excessive algae, weed and invasive species growth. The water can turn murky, green and smelly. The oxygen content in water can also become compromised, killing fish and other aquatic lifeforms.

Pet waste also contributes to the bacterial contamination of local bodies of water because it contains harmful bacteria such as E. Coli and fecal coliform—actually 23 million coliform bacteria per gram of pet waste, according to the EPA. Such bacteria can cause disease in humans and wildlife and turn lakes and streams unswimmable and unfishable in a worst-case scenario.

While it takes longer for human WAG bags to decompose, they should be

properly disposed of for the same reasons as dog bags. According to the Bureau of Land Management's website, blm.gov, "Properly disposing of human waste is important to avoid polluting water sources, minimizing the chances of spreading disease and maximizing the rate of decomposition."

And, while in forest locations burying human feces may be one correct way to dispose of it, the BLM advises that "desert and alpine areas [where poop breaks down slowly, or where the ground may be frozen] will require visitors to pack out human waste and toilet paper" in a WAG bag or portable toilet equipment for proper disposal later. The BLM also reminds the public that, "solid human waste must always be packed out from areas like narrow river canyons" because of the danger of water contamination.

According to The 7 Principles of Leave No Trace, which can be found at Int.org, to dispose of human waste properly by burying it where soil

conditions are appropriate, like in the deep, organic soil of a forest, you still have to dig a hole that is 6 to 8 inches deep, 4 to 6 inches in diameter, and 200 feet away from water, trails and camp. That's a lot to keep in mind. Applying the "Pack it in, pack it out" mantra to dog poop and WAG bags is practical, manageable and makes a lot of sense.

So why are people not packing out their waste?

We have a theory - and some suggested solutions!

At Friends of the Inyo, we believe that people are leaving behind poop because they are reluctant to pack it in their backpacks, where the bag could—in a real or imagined scenario—puncture, leak, or allow odor to seep through to other compartments where clothes and food are stowed. While this is a sensible concern, it does not excuse leaving bagged poop behind in Wilderness.



## Mt. Whitney and its mountain of poop

Because:


- Mt. Whitney is the most popular wilderness destination in the Sierra Nevada (and lots of visitors equals lots of poop); and
- Much of the terrain is solid granite with little or no soil; and
- The climate is cold and dry most of the year, which makes for slow decomposition of human waste;

Therefore:

- All visitors must pack out their human waste using WAG bags, “which are becoming a standard means of controlling human waste in public lands throughout the west.”

The U.S. Forest Service distributes waste kits with registrations and there are WAG bag dispensers at Whitney Portal, the Eastern Sierra start of the Mt. Whitney Trail.

In the Inyo National Forest’s web page, [fs.usda.gov/inyo](https://fs.usda.gov/inyo), under Visit Us > Recreation > Mt. Whitney Trail Quick Link, you can find restrictions related to human waste in the Whitney Zone. You will want to refer to the photo illustration of how to use a WAG bag, and heed the warning: “Never stash bag along trail - LEAVING BAG IS ILLEGAL AND SUBJECT TO CITATION/FINE.”



On a stinky summer day in July 2022, Friends of the Inyo Trail Ambassador Cordero Chavez took this photo of the bagged human waste he picked up in the Mt. Whitney Zone. He was everyone’s “Poop Angel” that day because...the Poop Fairy doesn’t exist!

So, if spillage and stink are the reasons for people to leave their or their pets’ bagged poop behind on our trails and Wilderness areas, perhaps they can do the following:

- For bagged dog poop, take an empty plastic jar of peanut butter, coffee, or dog or cat treats, store your dog’s poop in the jar, making sure to close the lid tightly, and put the jar in your backpack. That should provide peace of mind against spillage and stink. For an extra layer of protection, put a bit of kitty litter at the bottom of the jar, that way, if the dog poop bag should spill, the cat litter will absorb it. It will also help to neutralize any smell. Make this jar a standard part of your gear when you go out hiking with your beloved canine. Customize it with stickers that remind you of your love for nature.
- For human waste, our friends at the Mt. Whitney Ranger District

suggest using a dry bag to pack out your WAG bags. A dry bag is a soft, waterproof bag with a lip that seals, and is used by the river rafting community, kayakers and boaters to keep things dry. Well, you can buy one and designate it exclusively as your “WAG bag dry bag” when you go out in Wilderness. There is a wide range of styles and colors to choose from and prices start at around \$9.

### A word about horse manure

Unlike human and dog poop, horse manure is biodegradable and actually good for the soil. It has a high water content, which makes it easy for the ground to absorb, and because of a horse’s diet, it contains mostly vegetation that breaks down easily and quickly. But the U.S. Forest service encourages scattering manure piles on trails or campsites to aid decomposition and discourage flies. ■




# THE AIRBORNE SNOW

## Changing How We Measure Snow and the Water it Holds

By Allison Weber, Policy Associate,  
Water and Forest Campaign Manager

All photos by Grayson Dozier, Operations Scientist  
for Airborne Snow Laboratories, Inc.

A visit to Mammoth Lakes-based Airborne Snow Observatories' (ASO) website, [airbornesnowobservatories.com](http://airbornesnowobservatories.com), is a veritable vocabulary lesson on all things having to do with snow and how it is measured. From snow water equivalent (SWE), to snow pillows, to albedo, to LiDAR, all of which are defined below, we are exposed to a scientific word maze that, once understood, opens up as the smoothest route toward the accurate analysis and measurement of snow, the crystalline, solid form of water—a substance that, depending on its manifestation, can be either life-giving or deadly.



An ASO plane gets a unique view of the Yosemite Valley, as the crew measures snow depth over variable terrain, distinguishing melted out areas, like the lower, warmer valley floor and slopes, from their neighboring but still snowy high-elevation areas.



# OBSERVATORIES:

The Airborne Snow Observatories, Inc., was born out of a seven-year-long project at NASA's Jet Propulsion Laboratory (JPL) that has since moved into the operational, working world. Based in the Eastern Sierra and conducting flights out of Mammoth Yosemite Airport (MMH) >>



*Homebase with a view: One of the small, Vietnam War-era planes ASO flies parked at Mammoth Yosemite Airport, facing snow-covered Mt. Morrison.*





*Flying over Long Valley at sunrise in winter.*

and Bishop Airport (BIH), ASO staff are able to easily fly over water basins across the Sierra Nevada, recording and interpreting data from distinct watersheds to be used by local water managers. ASO flies over every basin in California, and, with another base in Boulder, Colorado, its team is able to cover even more of the west.

Picture ASO's operation scientists in small, four-seat, Vietnam War-era planes flying at 30,000 feet (with or without Wagner playing as in "Apocalypse Now"). The planes are equipped with some standard technologies, like GPS and inertial measurement units that track each aircraft's location, movement and angles, as well as lesser known but extremely important devices for measuring the volume of snow on a landscape: an **imaging spectrometer** and **LiDAR (which stands for Light Detection and Ranging)**. The goal of these cutting-edge scientific tools? To determine the **snow water equivalent** in a flyover area, i.e., the amount of water expected to be released from the snowpack as it melts.

To understand where the future of water management is going thanks to these devices, we have to first understand where it is coming from.

In the past, the snow water equivalent has been measured by a combination of methods: **snow courses** and **snow pillows**.

- **Snow courses** are transects of snowpack data acquired by hand at set locations using a cylindrical device called a **Mt. Rose snow sampler**.
- **Snow pillows**, which have been providing daily data to researchers since the late 1960s, are pad-like devices that are laid flat, for example, on the ground, to measure the pressure, and thus the weight, from the snow that falls on top of them.

While these methods are still a part of the analytics ASO carries out, they both have one glaring flaw: Neither accounts for the topographical variety beneath a snowed-over landscape, which, naturally, mountain ranges have a lot of. Snow pillows often lie on nearly flat terrain as a matter of practicality, and, as a result, may not accurately represent snow accumulation and melt rates on nearby slopes where there may be more snow or less depending on elevation, aspect, wind loading, and other variables. Take a walk outside during spring in the Eastern Sierra, and it is easy to see how these factors influence snowmelt: A stroll will reveal snow melting on certain slopes facing the sun, but remaining, sometimes even into summer, on the shady slopes.

This is where **LiDAR** comes in. LiDAR is a remote sensing method that uses light in the form of a pulsed laser to generate three-dimensional information on surface characteristics. More simply, ASO team members





*The backside of the Minarets at dawn, with Mammoth Mountain and Long Valley in the middleground and Glass Mountain ridge and the White Mountains in the distance, taken on one of ASO's snow-on aerial surveys.*

measure the time it takes a laser to travel from their plane to the surface of the Earth and back, which allows them to determine the elevation of the surface below. By subtracting the elevation of the snow-free surface, measured in the summer, from the elevation of the snowed-over surface in winter, they can then calculate the depth of the snowpack across the watershed, no matter the topographical variability.

Beyond this, the spectrometer measures the **albedo** of the snow: the sunlight or solar radiation reflected off of it. This shows how “dirty” the snow is, helping fill in the picture of the entire snowpack. If there is dirt or dust upon the snow, the albedo is lower, meaning the snow is reflecting less sunlight, absorbing more solar radiation, and therefore on its way to melting faster. Knowing the reflectivity of the snow across a watershed allows ASO to predict how or at what rate the snow might melt and release water come spring. This is especially useful as climate change has sparked a chain reaction of worsening wildfires in summer, which char vegetation and diminish tree cover for snow in winter, which in turn lowers snow’s albedo so snow melts faster; meanwhile, drought in the dry months worsens dust storms which can deposit sediment on snow up to hundreds or even thousands of miles away, also worsening a snow’s albedo. You get the picture of the feedback loop: less albedo means more snow melting faster, creating less efficient water release during the spring and summer, which creates drier conditions ideal for wildfires, and on and on.

ASO’s team of data scientists use exclusive algorithms to turn the data retrieved from the plane into calculations of snow depth, snow water equivalent, and snow reflectivity/albedo; from this information, they then create models to predict runoff. Predicting accurately when the snowpack will melt and how much water it will release, and at what rate, is critical every year, but especially in years of extremes, which are becoming our new normal due to climate change. In drought years, this information helps water managers predict how to conserve water. In heavy precipitation years, the data is critical for regulating reservoir and aqueduct flows to protect the water system’s infrastructure, and prevent flooding in surrounding communities.

The scientific data ASO gathers and shares with water managers of over 30 different watersheds is, year over year, becoming more and more critical to the budgeting of water use and anticipated energy generation through hydropower.

As California, and really the whole of the west, is pushed into more extreme and unpredictable weather patterns, this technology becomes even more important for seeing exactly how much water, in the form of snow, we have to work with. This can allow water managers to, hopefully, make better informed decisions related to the equitable distribution of water for the people, plants, animals and ecosystems that rely on it. ■



# The California Desert: Home, Playground, Renewable Energy Resource, or All of the Above?

By Kayla Browne, Policy Associate,  
Desert Lands Campaign Manager

**A**s the world turns away from fossil fuels, the need for producing renewable energy increases. The major sources of renewable energy are wind, solar, hydroelectric, and geothermal.

The California desert, which enjoys more than 300 days of energy-generating sunshine annually and is swept by great winds loaded with kinetic energy that can likewise be turned into electricity, presents a prime landscape for renewable wind and solar energy development.

But the desert is also rich in sensitive and unique flora and fauna that make it anything but a barren area just waiting for acres of solar panels and wind turbines to be put up.

There needs to be a balance between meeting energy needs and protecting the desert ecosystem and its inhabitants.

At times, conflicts have arisen between solar development and the surrounding communities about impacts on vegetation and sensitive animal species. In southern Inyo County, a solar farm was developed in an area where there is imperiled Mohave ground squirrel habitat. The residents in nearby homes were upset by the development and loss of habitat to the ground squirrel. One resident is an artist who created a sculpture of a green many-armed

monster eating a ground squirrel along Highway 395, opposite the solar farm, to depict her feelings in protest.

Friends of the Inyo supports the transition to green energy production with smart-from-the-start planning and development in what are classified as “low-conflict areas”: those most likely to avoid impact to important biological, ecological, cultural, or economic values that must be protected at all costs.

## A State/Federal/Public Renewable Energy Conservation Plan for Our State and Other States’ Desert Lands

The Desert Renewable Energy Conservation Plan (DRECP) is a landscape-level planning effort to meet state and federal energy goals while conserving unique and valuable desert ecosystems and providing outdoor recreation opportunities. The DRECP is a collaborative effort among the California Energy Commission, California Department of Fish and Wildlife, the U.S. Bureau of Land Management, and the U.S. Fish and Wildlife Service.

Approved in 2016, the DRECP streamlined renewable energy development across 10.8 million acres of public lands managed by the BLM in the desert regions of seven southern California counties: Inyo, Kern, Los Angeles, San Bernardino, Riverside, Imperial, and San Diego. The entire process took eight years to complete.

Stakeholders were engaged throughout the process, and included private citizens, local government representatives, environmental organizations, electric utility companies, renewable energy project developers and industry

associations, a coalition of Native American tribes, and recreational groups like off-highway vehicle (OHV) associations. Educational workshops about the DRECP were held in person and online.

The in-person workshops were held in different communities throughout the proposed affected areas; locally, in Inyo County, that included Independence and Lone Pine, and community members were encouraged to attend—because, who knows what is in the area better than the people who live there?

Formal consultations with county government representatives were also conducted, as well as meetings, workshops, and conferences with federally recognized tribes.

All these different stakeholder meetings were used to identify issues, concerns and interests, and to share information regarding any and all resources in the California desert area pertinent to renewable energy, natural and cultural resource conservation, and land use planning.

The results were productive, achieving both goals of renewable energy generation and public lands protection.

Along with establishing Development Focus Areas, the DRECP’s BLM component identified areas deserving of additional resource protection. These additional protections included land designations of:

- National Conservation Lands (NCLs) having outstanding ecological, cultural, and scientific values; and





- Areas of Critical Environmental Concern (ACEC), which require specialized management to protect important historic, cultural, and scenic value or ecological resources; among others.

These additional protected areas aimed to provide the long-term conservation and management of special-status species and desert vegetation communities, as well as other physical, cultural, scenic, and social resources. Some of the special status flora and fauna include the desert bighorn sheep, desert tortoise, Mohave ground squirrel, and Joshua tree, just to name a few.

## Replicating a Successful Model

The DRECP became a model for responsible green energy planning and development:

- It implemented a truly inclusionary level of engagement in the scoping and planning process.
- It used information gathered from Federal, State, and local governments as well as stakeholder groups, community workshops, and tribal engagement to determine where the least conflictive areas to develop renewable energy are in the southern California desert.
- It looked at the desert as a whole to identify areas for protection as well as areas where responsible development might be considered. Desert preservation is important in fighting climate change since the desert is efficient at

sequestering carbon and placing it down into the soil.

- It also sought to better protect areas that are critical habitats, migration corridors, cultural resource areas, and recreation destinations—of vital importance to human and non-human species.

As we continue to transition away from fossil fuels, we need to ensure that we are not placing a disproportionate burden on the desert to produce solar and wind energy.

Many environmental organizations have called on the BLM to continue to use the DRECP as a model for engaging diverse stakeholders in the planning process of renewable energy projects going forward, and for making conservation designations an important part of the process of its federal landscape-level solar plan known as the Solar Programmatic Environmental Impact Statement (Solar PEIS).

The purpose of the Solar PEIS, according to the website [solareis.anl.gov](http://solareis.anl.gov), is “to evaluate utility-scale solar energy development, to develop and implement Agency-specific programs or guidance that would establish environmental policies and mitigation strategies for solar energy projects, and to amend relevant BLM land use plans with the consideration of establishing a new BLM Solar Energy Program.”

The BLM launched the Solar PEIS in 2008 with a focus on the southwestern states of California, Arizona, New Mexico, Nevada, Utah and Colorado. It reached a Record of Decision in 2012 for spurring development of solar energy on public lands in those states. The BLM is aiming to complete the revision process in 2024.

In 2022, the agency began the process of reviewing and updating the Solar PEIS to include all 11 western states: the original six, plus Idaho, Montana, Wyoming, Oregon, and Washington.

Friends of the Inyo has been actively engaging in this revision, standing up for precious resources on public lands of the Eastern Sierra.

It appears that the BLM and the U.S. Department of Energy have realized, thanks to lessons learned from the DRECP, that there is value in landscape-level planning to develop utility-scale solar on federal lands while also protecting important areas throughout our nation.

For more information on FOI's engagement on renewable energy and to learn how you can get involved, please visit the Policy page of our website, [friendsoftheinyo.org](http://friendsoftheinyo.org). ■



*The Desert Renewable Energy Conservation Plan, approved in 2016, streamlined renewable energy development across 10.8 million acres of public lands managed by the Bureau of Land Management in the desert regions of seven southern California counties. Map courtesy of DRECP.org*



# Indigenous Roots

Rediscovering  
the Ways of our  
Ancestors

*All photos courtesy of the Big Pine  
Paiute Tribe of the Owens Valley.*

*By Joseph Miller  
Indigenous Community Relations Coordinator*



*Nawanaki-Ti Farmers Market*



In 2012, the Big Pine Paiute Tribe of the Owens Valley was thinking about ways to bring good health to their Tribal community. They had a growing curiosity about the prospect of food sovereignty and sustainable garden management. Tribe employees were about to embark on a journey to learn about permaculture practices, local indigenous food plants, soil health and irrigation management practices.

The first year of our endeavor with what we ended up calling the Big Pine Tribe Sustainable Food Program consisted of planting a small, 250-square-foot summer crop garden which sat on the very southern end of the project area; tending to this area; and assembling a small, plastic-framed greenhouse for nursery plant starts.

Our biggest accomplishments would come in the fall of that year through the next spring of 2013, with the building and planting of a water retention swale and the installation of new irrigation valves to deliver fresh, pristine water from Big Pine Creek throughout the growing season.

That fall, several employees and community members of the Big Pine Tribe wishing to reconnect to the land followed the direction of two permaculture designers from San Francisco. We gouged out earth in a large circular shape along an existing contour line, filled the gully with fine wood mulch, and molded the soil into a raised berm adjoining the recently

created trench. After the construction, we planted the berm area with an array of fruit trees and native plants.

Sustainable permaculture and the water retention swale were foreign concepts to us Tribal employees, but we pressed on with the work in the hope that this space, this garden, would eventually become a community gathering place.

The roughly two-acre piece of land chosen to bring this irrigation project to life had once contained numerous Paiute irrigation ditches and plant foods, as documented by Alexey Von Schmidt in 1893; but in 2012, dry and lifeless would describe the project area that lay just walking distance to the north of the Big Pine Tribe Administration and Environmental offices to the west of U.S. 395.

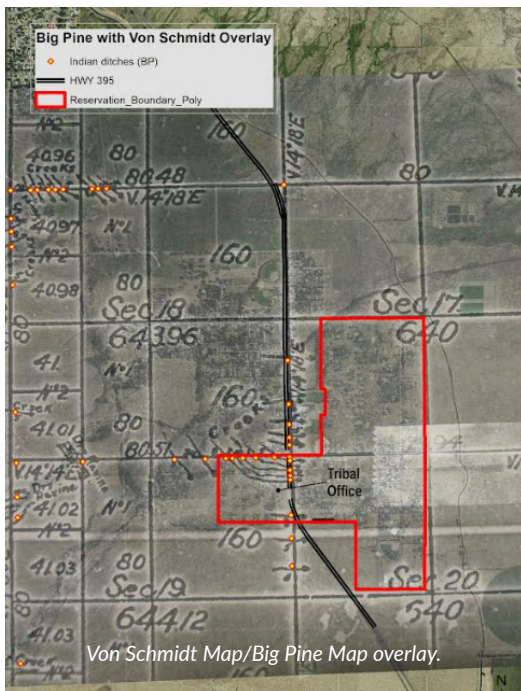
Littered with elm trees and covered in decomposed granite soil as it was, this patch would two years later become the inspiration that pulled my heart into environmental stewardship.

When I and others were novices in the concepts and implementation of permaculture design, we suffered multiple failures of fruit trees and native plants. Despite those setbacks, we were enthusiastic for success and where plants or trees had died off in the swale, new ones were planted to take their place. Learning to manage the delivery of water for irrigation became its own focus and priority, just as it had been for our Paiute ancestors. >>



Planting the water retention swale.





The hoop house when it was recently constructed.

We moved into the spring of 2013 with fresh ideas and approaches to fostering our relationship with land and water. Our place of hope had many names: Some people called it a community garden, some called it an irrigation demonstration project and others called it a park.

We constructed a 90-foot wooden-framed hoop house on the edge of the project area. Where the native plants and fruit trees dotted the landscape of the majority of the two acres, this new hoop-style greenhouse would be a permanent new home for our warm weather food crops. The structure contained 720 square feet of growing space that was planted strategically with tomatoes, green beans, peppers, cucumbers, squash and herbs.

The warm weather crops were very successful and I was excited to see my contribution to my people, my Tribe, grow. I took any chance I could to attend workshops on permaculture design, sustainable water management, farmers markets and anything related to gardening.

That year the Big Pine Tribe would open its farmers market to the Tribal and Big Pine communities as well. *Nawanaki-Ti*, words in Paiute that mean “the place to gather,” would be the chosen name for the market.

Our beginnings were humble during our first few markets that year, with just myself and a couple other Tribal employees selling a small selection of produce, baked goods and canned vegetables under simple shade canopies. The lack of vendors or crowds did not discourage us early in the season and as we pressed on, both vendors and customers came in larger numbers. The growth and success of that first year fed our enthusiasm to make the farmers market a seasonal happening for the Tribe and the town of Big Pine. Aside from a two-year hiatus during the COVID pandemic,

the *Nawanaki-Ti* Market has continued to operate and grow since 2013.

In the handful of years that passed from 2014 to 2019, my final year with the program, we saw exponential growth in both the garden area and the farmers market grounds. We built a second hoop house adjacent to the first, removed elm trees yearly, then replaced them with food-bearing trees, and we implemented new ways to shape the land to maximize water absorption.

As we continued to abide by the watering management rule to “slow it, spread it, sink it,” we started to see something happen with this land: And it was nothing short of a transformation!

When we pulled up grasses or clover, what we once found underneath to be fast draining decomposed granite sand was slowly being digested and changed by the life of the soil: Insects and microorganisms drawn to the area by the abundance of water were giving their gifts back and creating living, fertile earth. What was once dry and lifeless, was now teeming with life and needed very little prompting or maintenance to burst back into fertility every year.

Today in 2023, the garden is still full of life and enjoyed by many groups or individuals for various activities. Just as this piece of land helped many people grow closer to the earth, it also connected individuals together for something bigger than themselves.

I am fortunate enough to walk out of my front door every day and see this beautiful creation that I had a hand in bringing forth. It constantly reminds me that this place, the Owens Valley, *Payahuunadū*, the land where water flows, is not dead beyond repair—because when *paya*, the water, is returned, life flows right back into it. ■





# Fossil Falls Proves that Time Travel is Real

Story and Photos by Louis Medina  
Communications and Philanthropy Director

GET  
OUT

Standing at the edge of the now dry Fossil Falls, it is easy to imagine the roar of fast-flowing water from ancient glacial melts that carved a course through basaltic lava flows.





A landscape of fire and water: Fossil Falls provides a snapshot of the volcanic and hydraulic forces that, through time, weathering and erosion from eddying pools produced an otherworldly landscape of basaltic rock full of potholes.

Have you ever thought of your vehicle as a time machine? The DeLorean in the 1985 sci-fi blockbuster “Back to the Future” aside, in California, our vehicles can take us in a matter of hours to abandoned mining ghost towns; the sites of ancient petroglyphs inspired by the hunt for wild animals or the movement of the sun and stars; or state-of-the-art science centers that strive to predict where the human race is headed based on past and present industrial and environmental successes and, soberingly, failures—such as toward climate catastrophe unless we avert the effects of our excessive burning of fossil fuels.

Well, next time you are driving along US Route 395 just 15 minutes north of the Inyo-Kern County Line, have your “time machine” turn off at Cinder Road and, merely half a mile east of the highway, you will find yourself tens to hundreds of thousands of years back in time within the otherworldly geologic wonder of Fossil Falls.

A fossil is defined by the Merriam-Webster Dictionary as “a remnant, impression, or trace of an organism of past geologic ages that has been preserved in the earth’s crust.” While you may not readily find remnants of organisms at Fossil Falls, you will find remnants of the geological processes that formed this mesmerizing land-and-waterscape in the southwestern-most corner of Inyo County.

Piecing together a timeframe from various online sources, from about 400,000 to 10,000 years ago, basaltic lava flows from the Coso Volcanic Field poured into an Owens River Channel that, swelled with glacial melts, once extended south beyond Owens Lake.

As the volcanic rock solidified, it formed a dam that blocked the flow of the river, said Cerro Coso Community College Geology Professor Bradley Bowers, who also works for Caltrans Bishop as an Environmental Geologist and Paleontologist. “Over time,” he said, “as pressure built behind the volcanic dam, the dam was breached and released a tremendous amount of water that dug the deep channels and gorges of the falls.”

The swiftly flowing waters of the Owens River smoothed out the basaltic rock, and, acting in conjunction with other types of volcanic rocks and sediments, created the many large potholes that give the rocks at Fossil Falls their unique look.

Red Hill, a reddish cinder cone north of the falls and yet another testimony to the volcanic nature of the area, was formed by the ejection of gas-charged lava from vents in the Earth’s crust that solidified quickly as it fell as rock fragments. The igneous rocks that spewed out of Red Hill were different, granitic in nature, and it is believed that some of them landed in the Fossil Falls stretch of the Owens River and were swept into eddying currents. Because basalt wears faster than granite, the granitic rock fragments together with other debris swirled by the water, “drilled” the many potholes we can see in the basalt today.



# Useful Information for Your ‘Time Travel’ to Fossil Falls

## Cultural and Environmental Value

Fossil Falls Archeological District is listed on the National Register of Historic Places. It is managed by the Bureau of Land Management’s Ridgecrest Field Office and protected as an Area of Critical



*North of Fossil Falls, the cinder cone called Red Hill, made of loose pyroclastic material, stands almost as a signpost to the falls.*

After the Owens River stopped flowing south past Owens Lake when the climate turned much more arid around half a dozen Millenia before our common era, what was left were the remnants, or “fossils,” of a waterfall—canyon, 60-to-70-foot drop and all.

“The landscape of Fossil Falls,” Bowers said, “is fairly similar to what we see on Mars when we look for evidence of flowing water.”

Time travel. Even space travel! It’s all there, at Fossil Falls. ■

Environmental Concern (ACEC). Evidence of the life of the native Coso People, who collected obsidian to make arrowheads and cutting tools, has been found at Fossil Falls. Please enjoy the area respectfully.

## Recreational Value and Some Precautions

Due to its proximity to the Eastern Sierra Scenic Byway, it is easy to turn off US 395 and visit Fossil Falls on the way to your final destination. But the Cinder Road signs are easy to miss, so be on the lookout for them when you are about 13.5 miles north of Pearsonville, the southernmost town in Inyo County.

According to the BLM, late fall, winter, and early spring are the best times to visit Fossil Falls. The area can be very hot in summer, so be sure to have plenty of water and sun protection while hiking.

Fossil Falls Campground has 11 campsites with drinking water, restroom facilities, tables and fire rings. RV sites are available. The fee is \$6 per night and the stay limit is 14 days.

Because of the uneven terrain of the area and the sheer cliff of the falls, be sure to wear sturdy shoes and supervise young children at all times. As this was once a watercourse, you should also beware of flash flooding, which may occur after rainstorms happening upstream, even outside of the immediate area.

Besides hiking and climbing around the area of the falls, you can drive or hike to the foot of Red Hill, but the cinder cone itself is off limits to the public, as it is currently leased out by the BLM for commercial mining purposes.

## Additional Information

Contact the Bureau of Land Management for more information, including maps, by calling 760.384.5400, or visiting the BLM’s Ridgecrest Field Office at 300 S. Richmond Rd., in Ridgecrest, Monday - Friday, 7:30 a.m. - 4 p.m. You can also visit [blm.gov](http://blm.gov) and type “Fossil Falls” in the search bar.

In Lone Pine, the Eastern Sierra Visitor Center, at the junction of US 395 and CA 136, has interpretive panels with information on Fossil Falls and a handout available upon request.





**(760) 873-6500**

621 W. Line Street, Ste 201

Bishop, CA 93514

[info@friendsoftheinyo.org](mailto:info@friendsoftheinyo.org)

[FriendsoftheInyo.org](http://FriendsoftheInyo.org)

[f](#) [@](#) @FriendsoftheInyo

[t](#) @FriendsofInyo

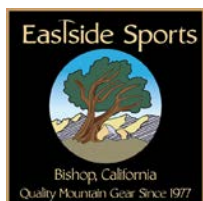


## THANK YOU!

Besides our steadfast individual donors, Friends of the Inyo would also like to acknowledge the following generous funding partners for their support:



**CONSERVATION  
LANDS  
FOUNDATION**



Inyo Mono Alpine County  
**CATTLEMEN'S ASSOCIATION**

