



FRIENDS OF **PANDO**

2023 YEAR IN REVIEW

WHO WE ARE

Friends of Pando is a community driven non-profit dedicated to the study and care of Pando, the world's largest tree by weight, by land mass, and the world's largest aspen clone.

In 2019 a group of like-minded people began discussions about the best ways to understand and protect Pando. In 2021 we formalized our group as a nonprofit based in Richfield, Utah and received our 501c3 designation from the IRS. Today, we are an official partner to Pando's federal land stewards, Fishlake National Forest.

We apply principles of practical conservation to develop "boots-on-the-ground" programs and strategic partnerships with local, state and federal organizations in service to our mission. Since our inception, we have invested over \$100,000 in the community and have worked some 8,100 hours to realize our vision to ensure Pando can be enjoyed for generations to come.

A GuideStar Gold rated organization, we work to create opportunities and collaborate with all who work in good faith and share our wonder and concern for the Pando tree and declare a *"A friend of Pando is a Friend of mine."*



VIEW OUR
GUIDESTAR PROFILE



MISSION:

Friends of Pando works to educate the public, support research and preservation efforts and to inspire stewardship of Pando, the world's largest tree.

VISION:

We envision a future where Pando is understood, documented and, cared for so that it can be enjoyed for generations to come.



An illustration on the left side of the page. It features a grey, textured vertical band on the far left. To its right, a dark grey hand is shown reaching upwards. Further right, a thin, light grey line represents a tree trunk, with a cluster of green, rounded leaves branching off to the right.

2023 EXECUTIVE SUMMARY

2023 was a fantastic year for Friends of Pando with big strides in education, innovation, and inspiring stewardship. Building on what we accomplished in 2022, in 2023 we expanded our outreach and education efforts, innovated new ways of collecting and processing data about the tree, expanded our monitoring efforts, inspired stewardship, advanced established programs and, solidified our standing as a trusted resource on all things Pando.

We reached more people than ever before. We raised more money to protect Pando than ever before. As we look at our 2023 year in review, we are excited and hopeful about the impact we can make in 2024 with many exciting developments in education, research, monitoring and inspired stewardship.



**EDUCATING
THE PUBLIC**

Pando Online

In 2023, Friends of Pando expanded efforts to distribute factual and timely information about Pando. Our website was an invaluable tool in achieving this. We extended our reach, expanded our science communication content, published new Pando-related art and stories, and refined our existing content.

42K

Website Visitors
+38K over 2022

Most Visited Pages of 2023

- A Guide to All Things Pando (Pando Main Page)
- Jeff Rice Artist In Residency (Pando Suite Recordings)
- Pando Natural History: What is the Pando Tree
- Explore Pando in 360° (Pando Photographic Survey)
- Big List of Facts About Pando

Website Additions and Updates

- Explore Pando in 360 Degrees
- Science Communication Page
- Expanded Artist in Residency Section
- Science of Pando
- Foundational Data Sets to Support Scientists
- More mobile friendly

SIGNAGE

Responsible Recreation Signage

In 2023, we installed responsible recreation signage to help the thousands of visitors that come to Pando each year understand how they can help ensure the tree can be enjoyed for generations to come.







WELCOME TO PANDO

THE WORLD'S LARGEST TREE

106 Acres | 13.2M Lbs | 9,000 Yrs. Old | Elev. 8,907 Ft

Please Recreate Responsibly

1. **Be a good gatekeeper** - Fences help protect Pando. Please check that gates are closed and latched behind you.
2. **If you carve, Pando will starve** – Carving on tree trunks as it promotes the spread of diseases that will kill the individual trunk and starve the larger tree.
3. **Don't tamper with monitoring systems** – They are used by scientists to understand and protect the tree.
4. **Pets on a leash. Do not feed or harass wildlife** - This will protect your pets as well as the bears, cougars, fox, coyote, deer, birds and other animals that live here.
5. **Do not climb Pando** - Individual trunks readily bend while branches easily break off.
6. **Leave the tree at the first sign of a storm** - Branches and tress can fall during storms making Pando a dangerous place.
7. **Be considerate of others** - Please behave in a way that allows others to also enjoy the tree.
8. **Don't be a litterbug** - Pack out your trash.

Learn more at friendsofpando.org



SIGNAGE

Informational Signage

We increased awareness and knowledge of Pando through the addition of information stands placed throughout Pando's homeland.

5 New Visitor Information Points

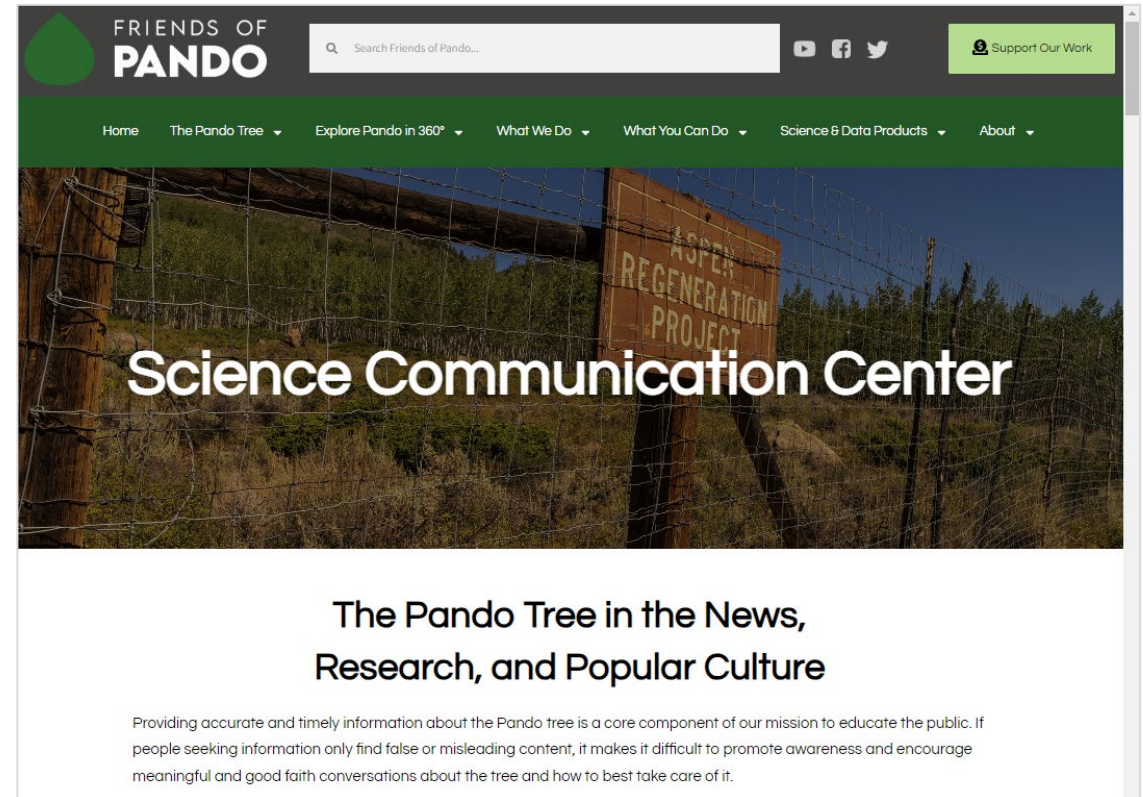
- Lower Pando Exclosure Entrance
- Old Spanish Trail Kiosk
- Hancock Flats Kiosk
- Wayne County Visitor Center
- Snuggle Inn Loa
- Mountain Home B&B in Koosharem



Science Communication and Combatting Misinformation

Sometimes inaccurate or misleading information about Pando gets published and the error is compounded when people continue to reference bad resources. In 2023, we:

- Launched our Science Communication Center working to contextualize popular and scientific claims and combat misinformation about the tree.
- Successfully advocated for removal of claims that Pando is 80,000-years-old from the Bryce Canyon National Park website, Atlas Obscura and Smithsonian Magazine
- Advocated to have Google Maps update their renderings of Pando
- Began creating YouTube videos to refute misleading claims so those can be shared online when bad information is syndicated
- Fielded 30 office hours calls to answer questions from the general public about Pando



History of Land Management

Collaborating with current and former Fishlake National Forest Staff who worked on Pando, in 2023, Friends of Pando published an authoritative historical timeline of Pando's care and protection since its discovery. This resource offers a detailed account of efforts to understand, protect and better contextualize claims about the tree and, work that is required to care for it. Read it [here](#).

Documentary Film: The Making of the Pando Photographic Survey

In 2023, Friends of Pando completed work on our first, short documentary film (12 min). The film, which documents the creation of the Pando Photographic Survey, its development, interviews with the team that undertook the effort and, insights on how it can be used in service to Pando's care.

Pando: History of Land Management Timeline

Compiled by Friends of Pando from Public and Private Sources between Fall of 2022 and Winter of 2023

- **1976:** Before its discovery, Pando's home land is set aside for recreational use as part of larger USFS National Forest Management Act.
- **1976:** Burton Barnes and Jerry Kemperman first document of a mega-clone in the Fishlake Basin during aerial observation work on the Fishlake Basin.
- **1987:** Fishlake National Forest begins research on the massive aspen clone observed by Barnes and Kemperman. Noting disease, a plan is developed to coppice parts of the tree. Coppicing is a treatment that removes diseased wood and sprurs regeneration by shifting the hormone balance in a way that favors new growth. To amplify the effort, Fishlake permits firewood collection by the public to remove diseased wood. The initial plots are 2 acres in size.
- **1988:** Another round of coppicing is undertaken to help promote regeneration. This plot measures 15 acres and is known as the "Aspen Regeneration project".
- **1992:** In a time when Aspen Ecology is still in it's infancy, the public and researchers note the new growth spurred by coppicing is being eaten by deer. The USFS begins installing protective fencing to protect new growth from deer.
- **1993:** The previously unnamed tree is now given the nickname "Pando" Latin for "I Spread" by megafauna enthusiasts and tree researchers Jeremy Mitton and Michael C. Grant. While they did not discover the tree, the name sticks. The Pando tree, now named, provides a way for researchers to easily identify Pando specific research in scientific literature.
- **1997:** Fishlake supports development of the first re-photography project about Fishlake Basin by Charles Kay. While the survey works to replicate the locations documented by the Powell Expedition, the effort includes a few aerial views of Pando. The document is used by Fishlake and researchers to this day to understand how the Pando's homeland changes over time.
- **2006:** The Pando Tree receives an official US Postal Service stamp.
- **2008:** USFS scientist Jennifer DeWoody, working with independent researchers Karen Mock, Valerie Hipkins and Carol Rowe publish genetic research that verifies Pando's size and scale of operation. Pando officially becomes the world's largest tree. Pando is the largest by weight (13.2 Million Pounds), largest by land mass (106 acres) and largest aspen clone (*Populus tremuloides*).
- **2009-2011:** USFS Ecologist Bob Campbell develops the Pando Restoration Project.
- **2011:** Forest Ecologist Bob Campbell supports efforts by Independent Researcher Paul Rogers to realize the Pando Aspen Clone Restoration Project.



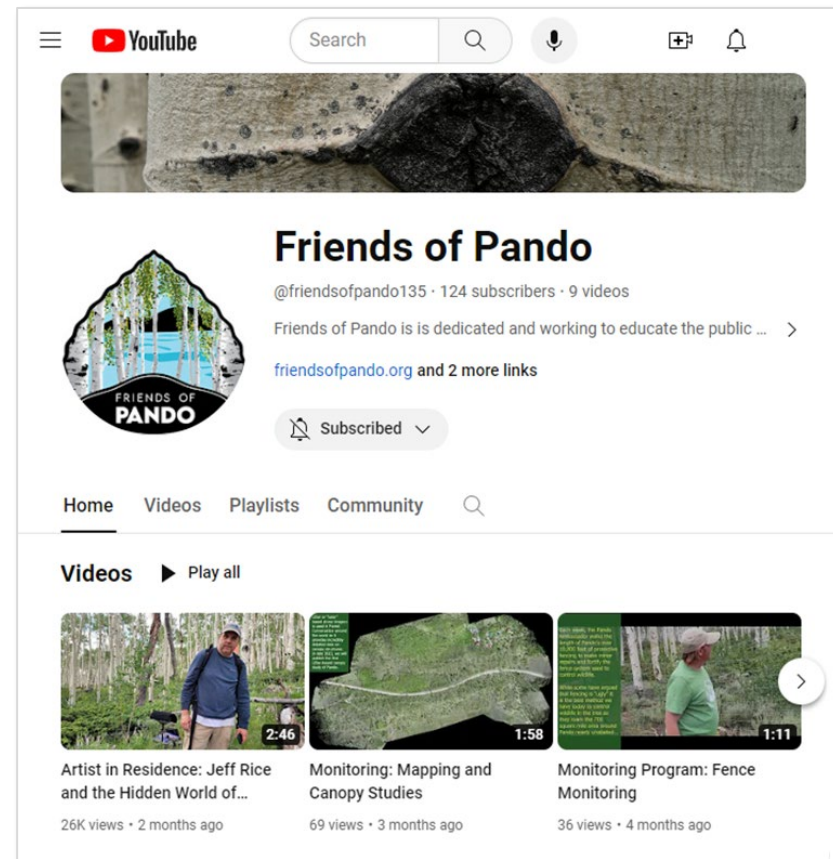
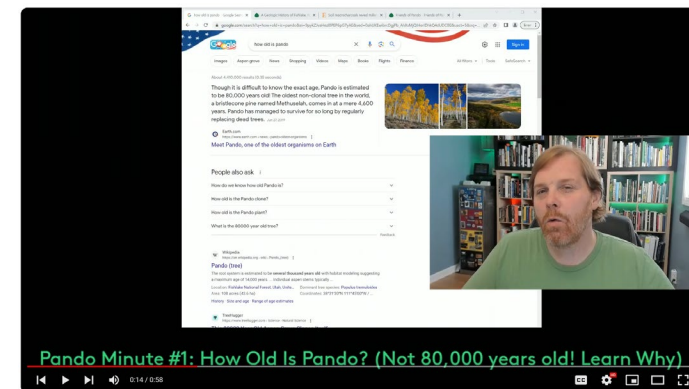
Friends of Pando YouTube Channel

In 2023, Friends of Pando launched our own YouTube. The channel offers original content to help educate people about Pando and our programs and, works to address misconceptions or falsehoods popularized in mass media.

 **123** YouTube Subscribers

 **26K** Views

 **665** Viewing Hours

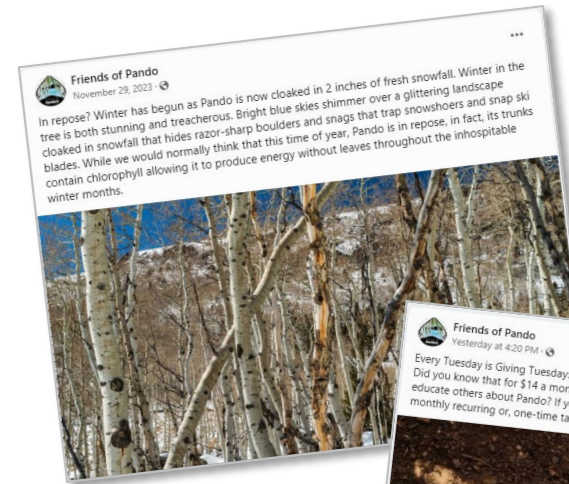


Pando on Social Media

In 2023, Friends of Pando expanded our social media presence on our Facebook (+30%) and X (Twitter, +20%). On Facebook we expanded our community while world's largest tree with a Twitter account, helped educate and inspire others while having fun confronting popular misconceptions *before* they go viral.

 **363** Facebook Followers

 **168** X Followers





RESEARCH & PRESERVATION

MONITORING

Supporting Research, Monitoring and Preservation Work in 2023

In 2023, Friends of Pando expanded our monitoring efforts and the types of data we regularly collect to support our mission and, support land managers and independent researchers. In 2023, we expanded longitudinal monitoring capacity, adding 4 new streams of monitoring work to help us gather insights to better care for Pando.

Types of Data Collected

- Protective Fence Repair and Fortification
- Recreation Studies
- Flora and Fauna Observations
- Photogrammetry

New in 2023

- Wildlife Camera Studies
- Bioacoustics Studies
- Soil Studies
- LiDAR Canopy Studies



Pando Genome Project

In 2023, we supported work to realize the Pando Genome Sequence and efforts to develop “expected rates of regeneration” model for Pando.

Developed 1m Topographic Map

In 2023, Friends of Pando collaborated with Fishlake National Forest to develop a high-resolution topographic map of Pando. This data was not previously available and offers the most detailed and up-to-date rendering of Pando’s physical land mass to date. This data set is already being used by scientists doing field studies in the tree.

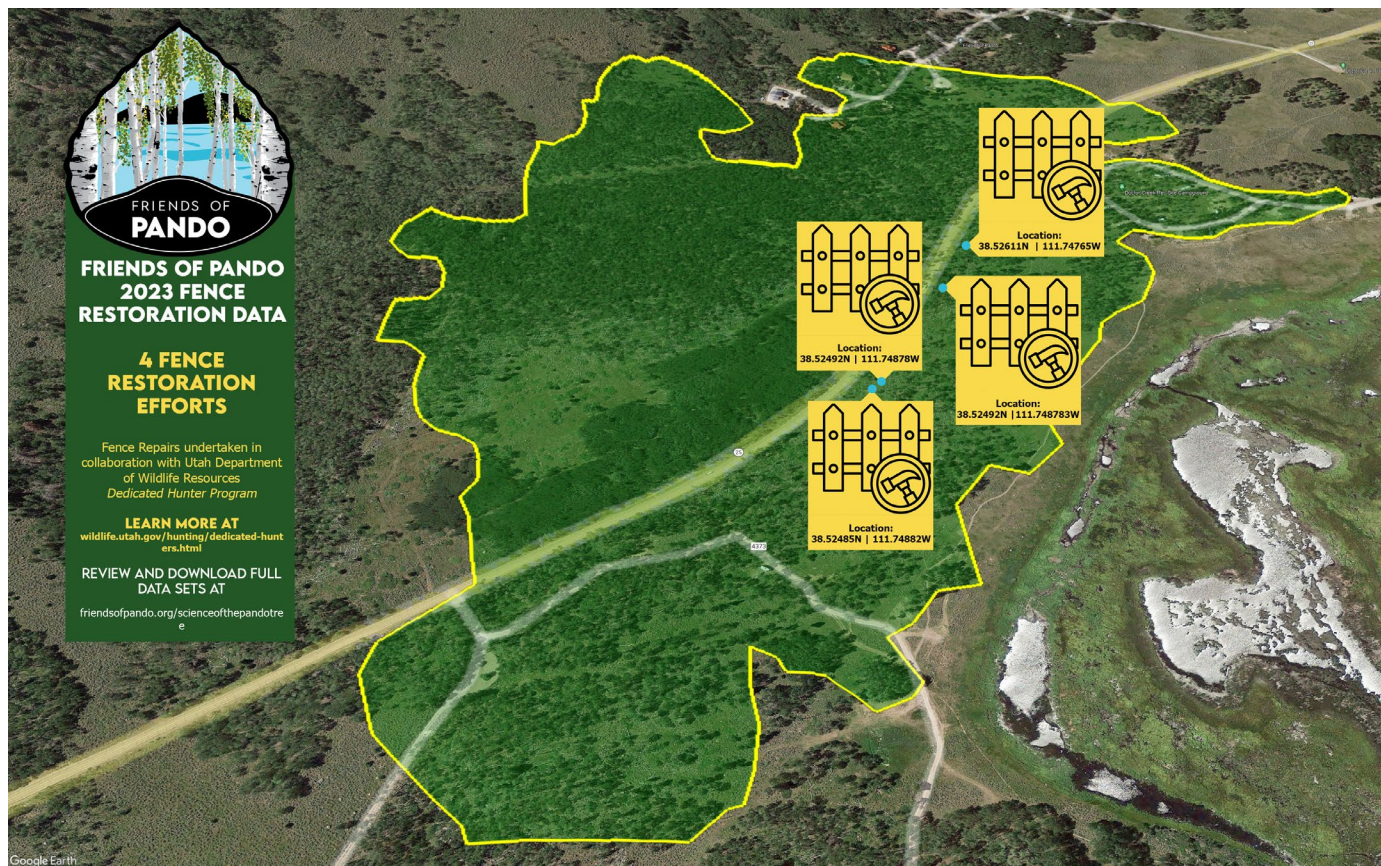
Low Elevation LiDAR Canopy Studies

In 2023, Friends of Pando collaborated with Fishlake National Forest and Snow College to collect the first low-elevation LiDAR (Light Detection and Ranging) image of Pando’s canopy. We have now captured 3 years of canopy data with work under way to render that and make it freely available. This unique data set will provide a snapshot of Pando’s growth during and after a drought period.



Fence Repair & Fortification

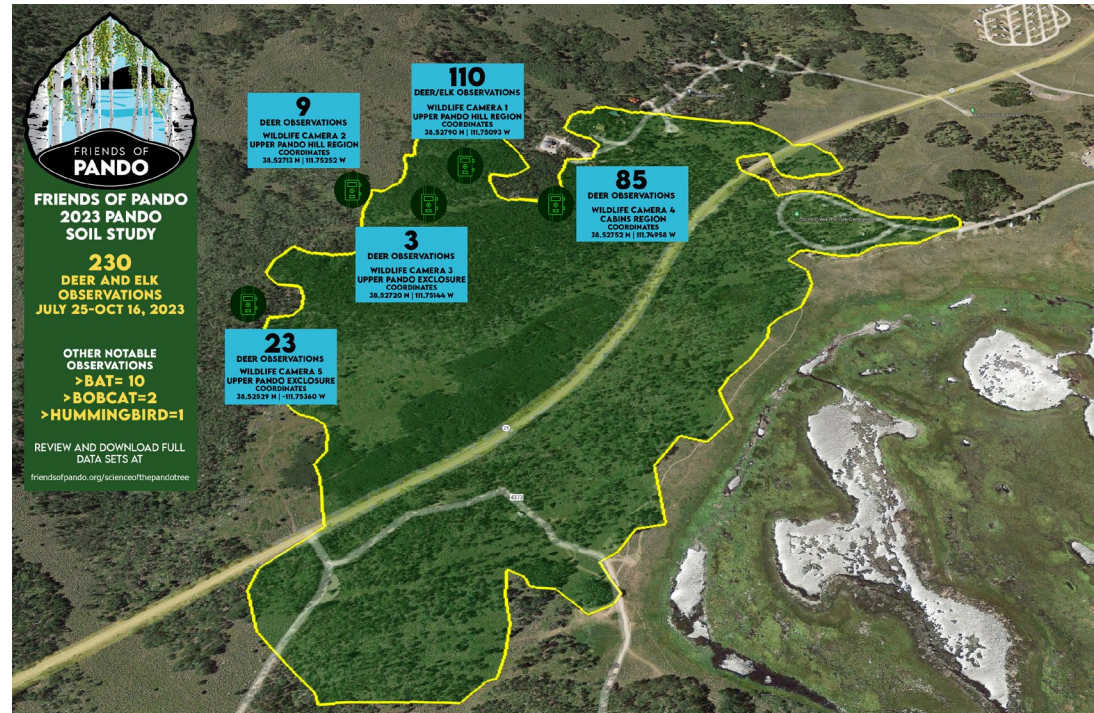
Today, 53 acres of Pando's land mass is fenced-in to protect the tree from deer and elk that undermine the tree's health. In 2023, Friends of Pando supported the work of the Utah Department of Wildlife Resources Dedicated Hunter Program to undertake 4 major fence repair projects.



Download All data sets at: <https://www.friendsofpando.org/scienceofthepandotree/>

Established Longitudinal Wildlife Monitoring

Pando is surrounded by 700 square miles of de-facto wilderness where the deer and elk who damage Pando can roam nearly unabated through a checkerboard of private and public lands managed by 7 different organizations. In 2023, working with USFS wildlife biologists and, staff from Utah Department of Wildlife Resources, Friends of Pando established the first, longitudinal wildlife monitoring program to understand deer and elk behavior and track the effectiveness of existing mitigation strategies. In summer of 2023, we recorded 243 wildlife events, including 230 deer and elk events and exciting data about other wildlife including foxes, bats and bobcats.



5 Deer roam Pando's Upper



A Bat flies across Pando

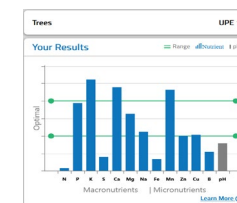
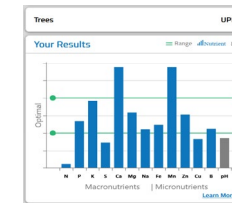
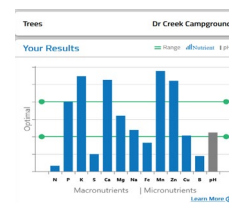
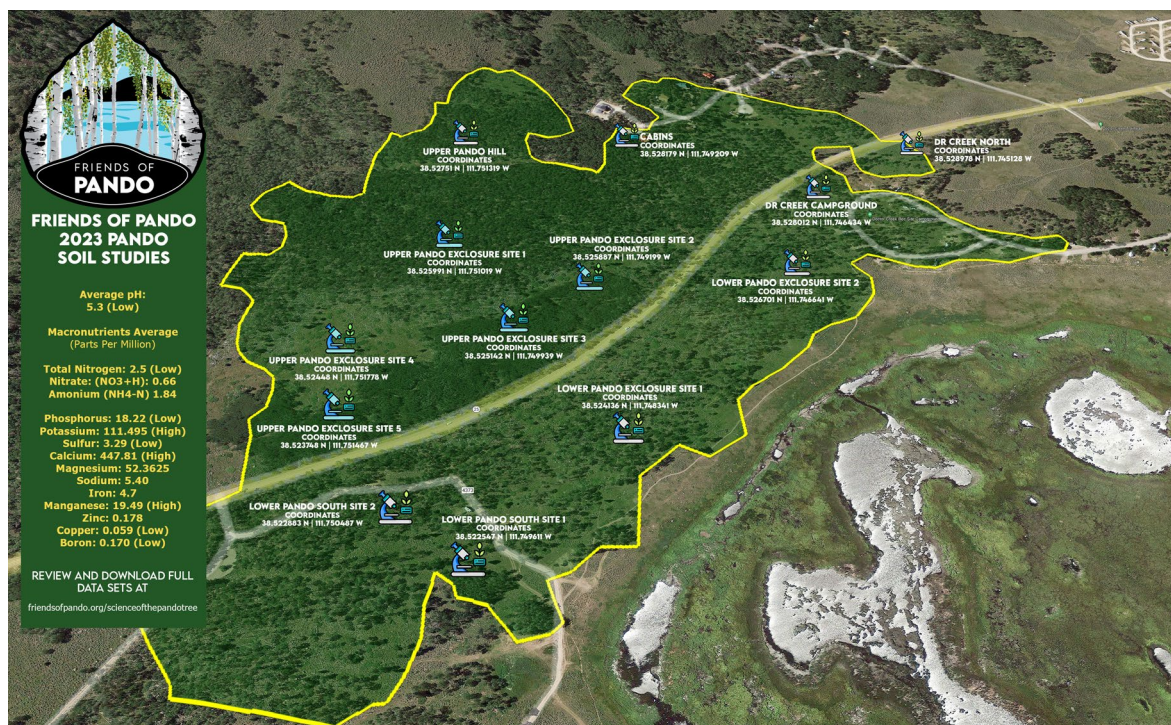


A Fox roams Pando's expanse

Download All data sets at: <https://www.friendsofpando.org/scienceofthepandotree/>

Soil Studies

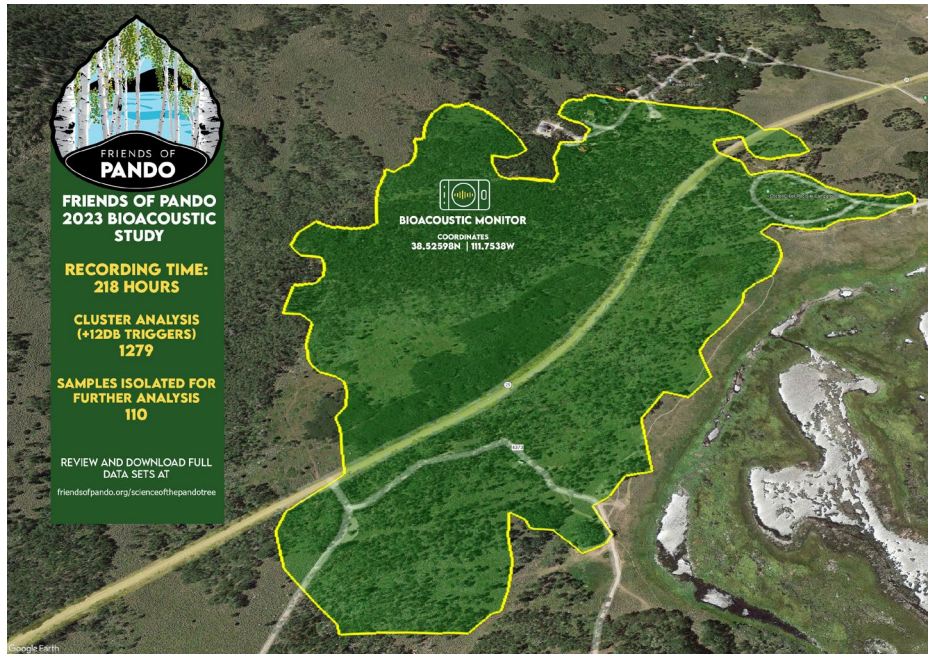
In 2023, Friends of Pando conducted the first small-scale soil macronutrient studies of Pando. Our findings offer significant insights for scientists and land managers that can be used to care for the tree. For example, soil pH and calcium concentrations provide insights about how well the tree is able to store and utilize other critical nutrients. These studies can also tell us about Pando's ability to ward-off diseases and the build-up of toxic metals, that, if left unchecked, can increase stem mortality rates. In 2024, Friends of Pando will undertake additional studies to set the stage for large-scale work to understand soil nutrient conditions best suited to Pando's health and vitality.



Download All data sets at: <https://www.friendsofpando.org/scienceofthepandotree/>

Bio-acoustic Studies

Inspired by the work of sound conservationist Jeff Rice, Friends of Pando worked with wildlife biologists at Fishlake National Forest to launch bio-acoustic studies of Pando. This will help us understand how the sounds of birds and animals reflect the health and vitality of Pando's homeland. While a picture may be worth a thousand words, sound travels further than any image in the natural amphitheater that cradles the Pando tree. Pando lives along the 4,000-mile Pacific Flyway Migration corridor. Birds that stop along the way or, live in Pando can help us understand habitat and, may also provide advanced warning about potential diseases that could be carried into Pando. In 2023, we collected 218 hours of bioacoustics data. In 2024, we will continue these efforts adding bat monitors to better understand their role in the ecosystem.



A curious hummingbird greets a wildlife cam



Image of Bio-acoustic Recorders used in Pando



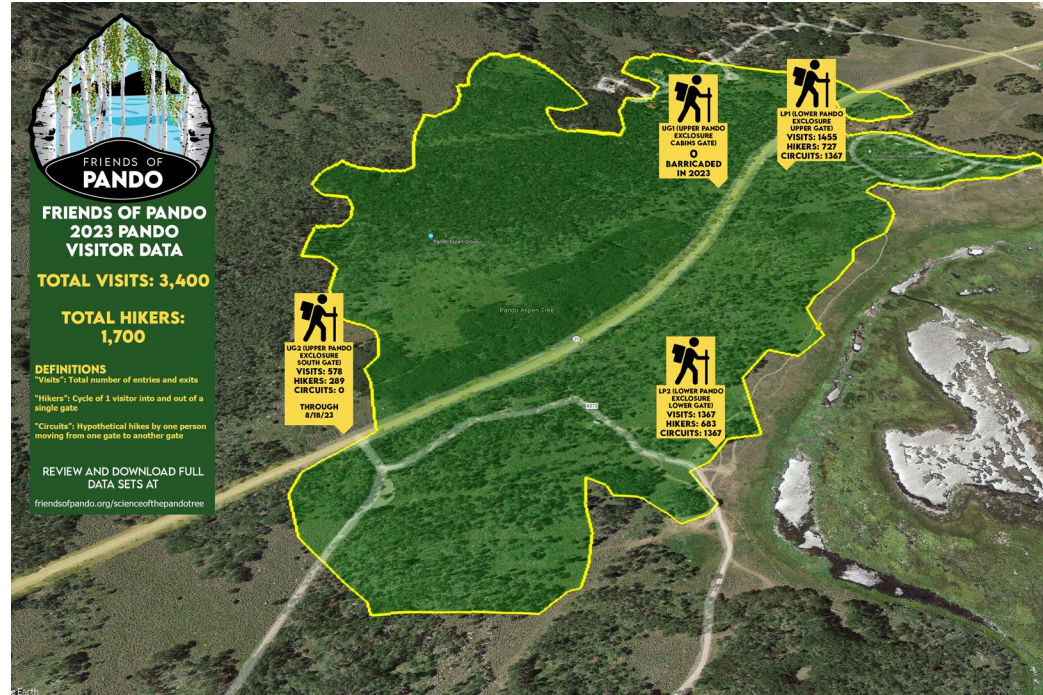
Download All data sets at: <https://www.friendsofpando.org/scienceofthepandotree/>

Recreation Studies

Data from Fishlake National Forest suggests 300,000 people visit the Fish Lake Basin each year. The cool, high mountain landscape features the largest freshwater mountain lake in Utah, a landscape some have called an “oasis in the sky”. Understanding recreational use of Pando allows us to plan and promote policies that are good for visitors and, for the Pando Tree. In 2023, our passive visitor monitors recorded 1,729 hikers (45 less than in 2022). Factors that likely impacted the number of recorded visitors in 2023 include the following:

1. Dr. Creek Campground was closed for most of 2023.
2. One of the gates into Pando was barricaded due to damage.
3. Another monitor was out of service starting in late August.
4. Search queries for Pando spike on Google in September and October of 2023.

We will continue this work in years to come to inform protection policy.



Download All data sets at: <https://www.friendsofpando.org/scienceofthepandotree/>



INNOVATION IN STEWARDSHIP

Pando Photographic Survey

In 2023, Friends of Pando began publishing data and imagery from the Pando Photographic Survey. To date, we have released data and imagery for 60% of Pando's landmass. This first-of-its-kind, 360-degree document of the Pando Tree will allow land managers, scientists, and the general public to explore and study the tree year-round, from anywhere in the world.

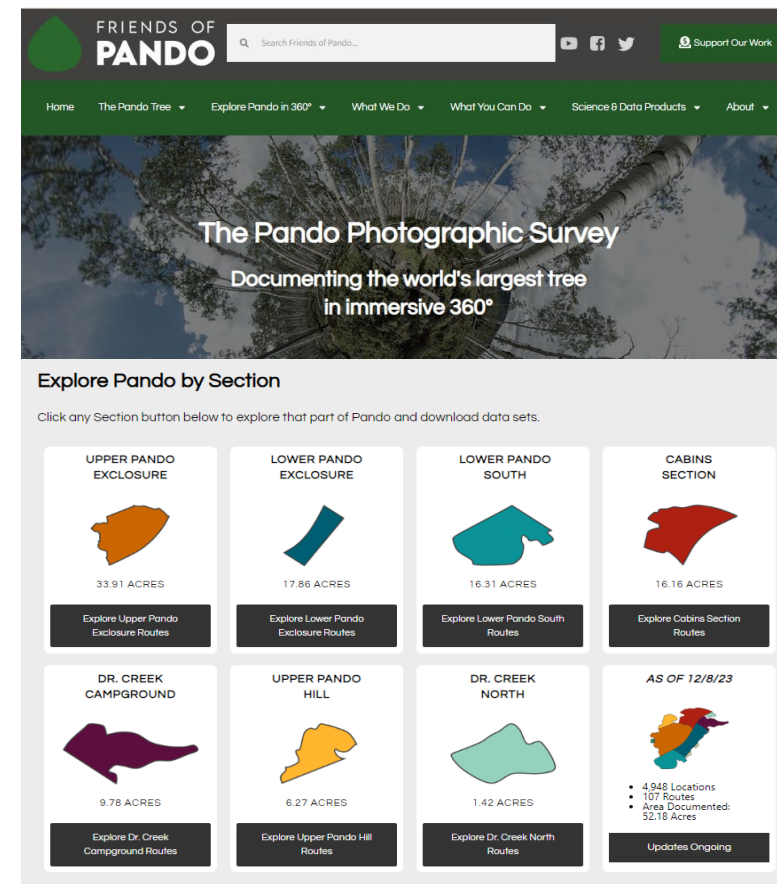
More than a picture...

The Pando Photographic Survey serves as a living document to understand and protect the tree, and also provides:

- The first publicly available plot map of the Pando Tree for use in research planning and land management
- A common naming convention for any one of the 8,542 locations documented by the project which scientists can use in their research work
- An immersive highly detailed ground-level view of the tree where satellite technology cannot reach
- A scientific document that can be reproduced on any scale to observe changes in the tree over time
- A data set that advanced imaging technologies can process to understand Pando's expanse in intimate scientific detail
- A way for people to experience the Pando Tree using their desktop, tablet, cell phone or, VR headset devices who would not be able to experience otherwise

Explore Pando, Download Data Sets and Review Methods at:

<https://www.friendsofpando.org/explorepando>

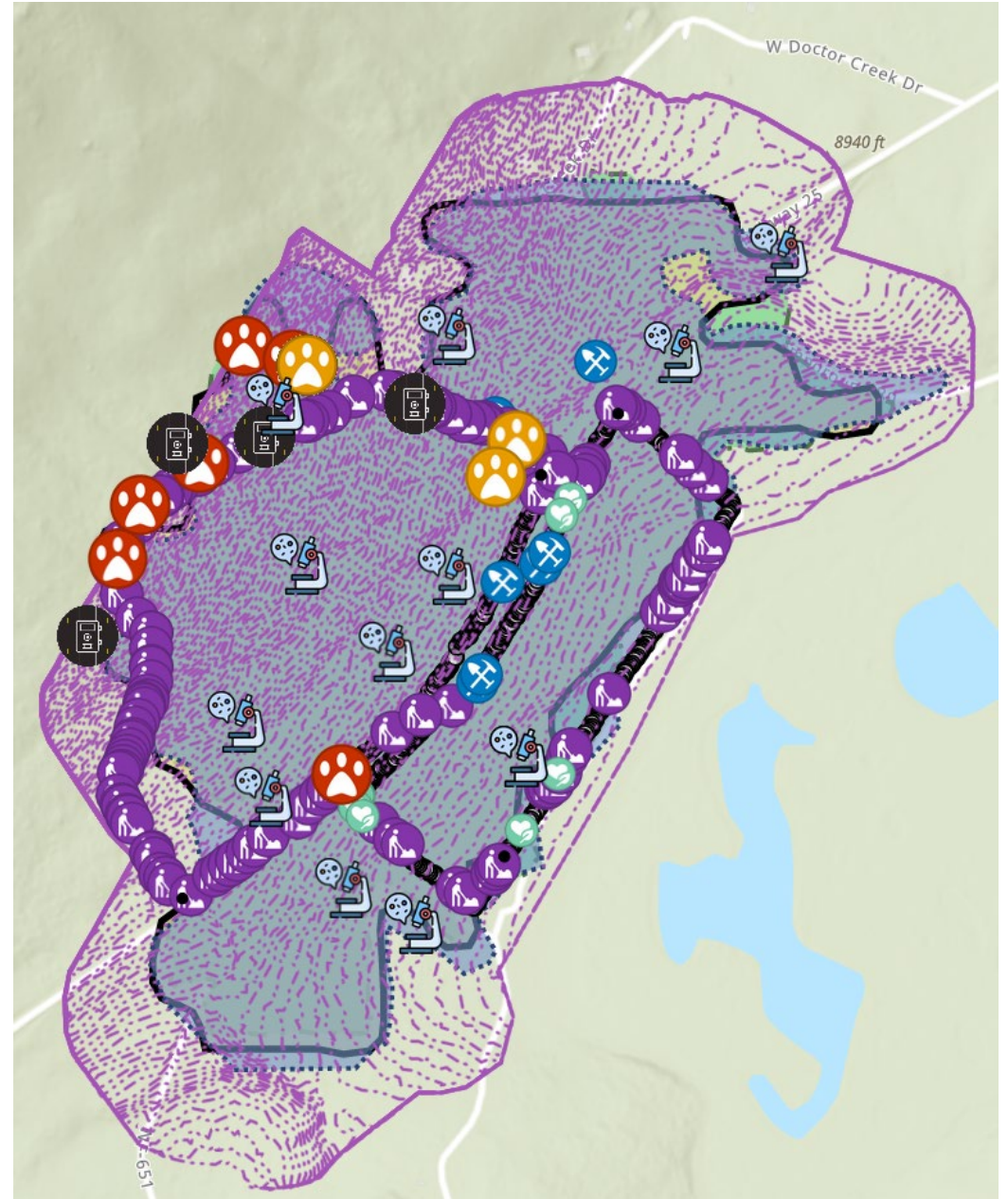


The Pando Living Map Project

In 2023, Friends of Pando developed the Pando Living Map Project. This comprehensive map, provides an eagle-eyed view of Pando, allowing scientists, land managers and the public to see and understand work to study and protect Pando. A first of its kind data product, this innovative map features:

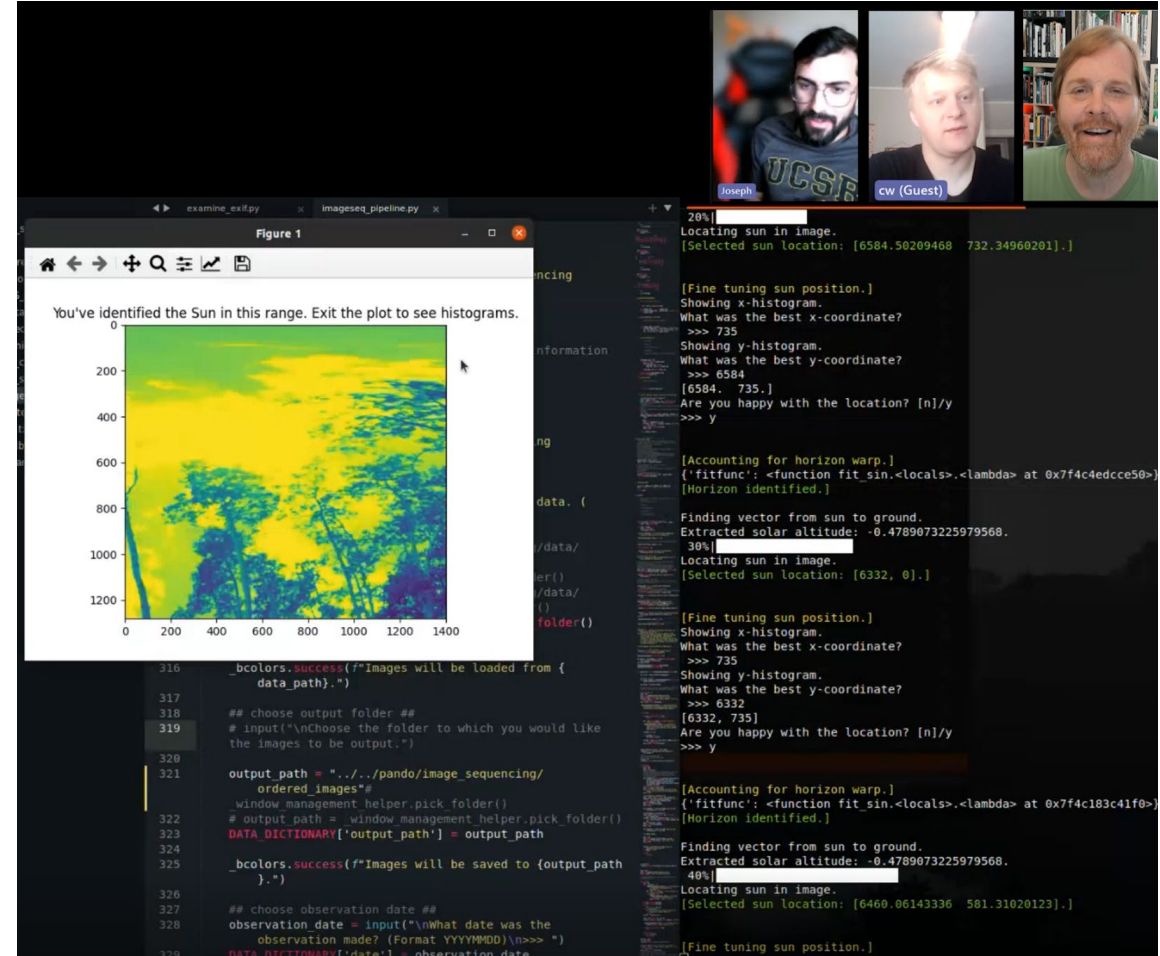
- Pando Boundary Maps (Historic and Current)
- Protective Fence Boundaries (Current)
- 1m Resolution Topographic Map (2023)
- All Monitoring Data we produce including
 - Preservation and Protective Work
 - Wildlife Observations
 - Wildlife Camera Observations
 - Bio-acoustic Data
 - Soil Studies Data
 - Recreational Usage Data

VISIT THE PANDO LIVING
MAP PROJECT



Software Development

- Developed and open-sourced a unique batch metadata injection tool for Pando Photographic Survey Data
- Developed and will soon open-source machine learning algorithms to read 360° photography for signs of health, disease, regeneration etc.
- Developed software to remedy problem data sets from the Pando Photographic Survey
- Initiated a feasibility study to explore the use of sound in monitoring, mapping, and evaluating the root system and health of the tree using Arduino based passive monitors





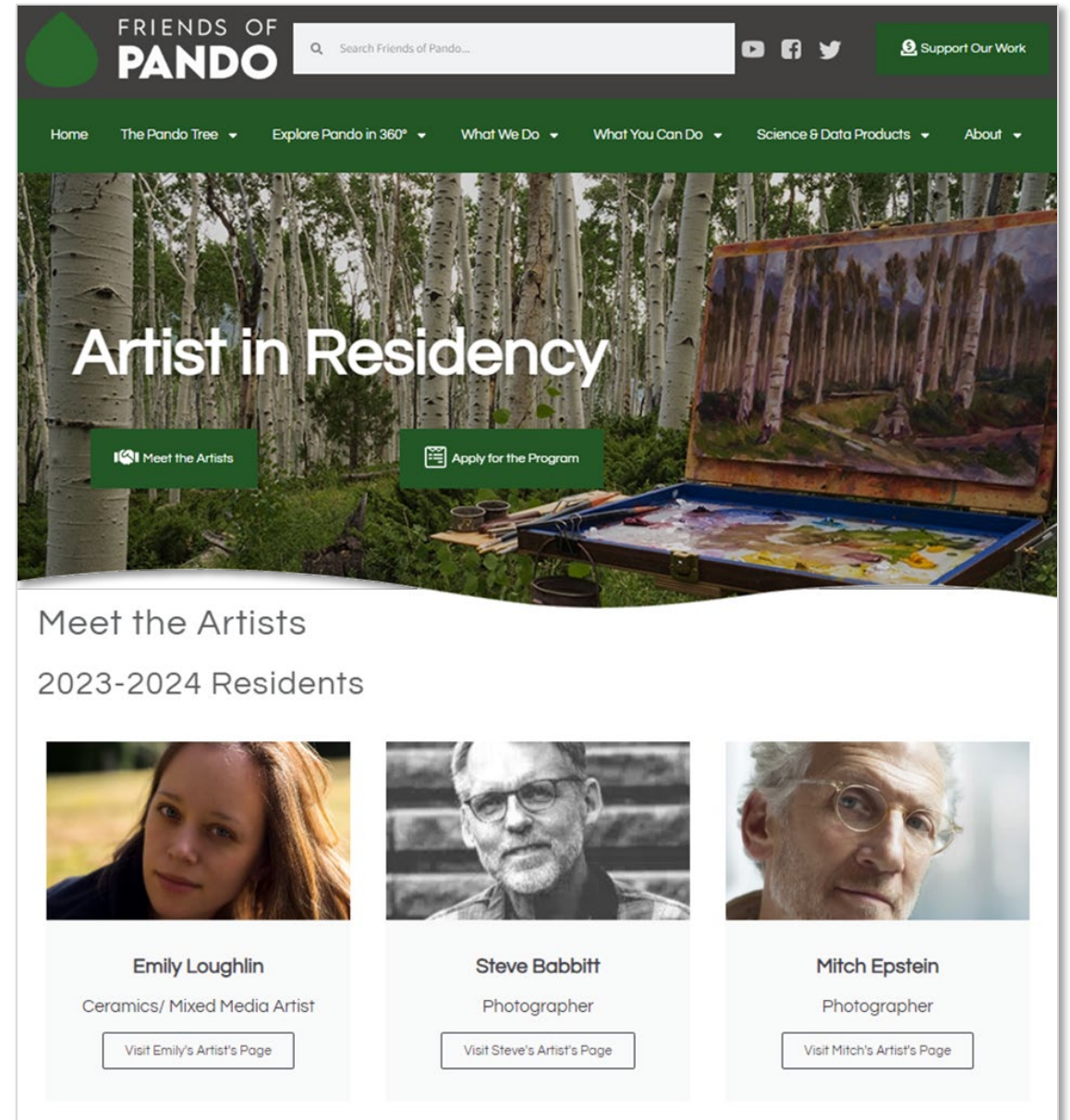
ADVANCING PROGRAMS

2023 Artist in Residency Program

We have had some incredible artists in our program to date. 2022 resident artist, Jeff Rice's work for our program was featured on NPR's Science Friday. For 2023, we were fortunate to sponsor three outstanding notable and award-winning artists for our program:

- Emily Loughlin – Sculptor
- Steve Babbitt – award-winning photographer & educator
- Mitch Epstein – award-winning photographer & film maker

Images of the artworks they produced for the program will be made available Summer 2024 and, a local art show (TBD).



Pando Ambassador

The Pando Ambassador Program is a boots-on-the-ground effort to undertake vital monitoring and preservation efforts in the tree that are critical to Pando's study and care. In our second year, this program once again created jobs for local natural resources students and, tree lovers working with us, land managers and, independent researchers.

Program Accomplishments in 2023

- Monitoring Hours: 162
- Piloted program to integrate Pando Ambassador staff with Fishlake Wildlife Management Staff and Utah DWR staff
- Added Wildlife Monitoring and Bio-acoustic Studies
- Secured sponsorship with Pando Coffee to fund the Pando Ambassador program in 2024
- Developed a strategic partnership to realize a pilot program with Southern Utah University's Outdoor Internship and Volunteer Programs.



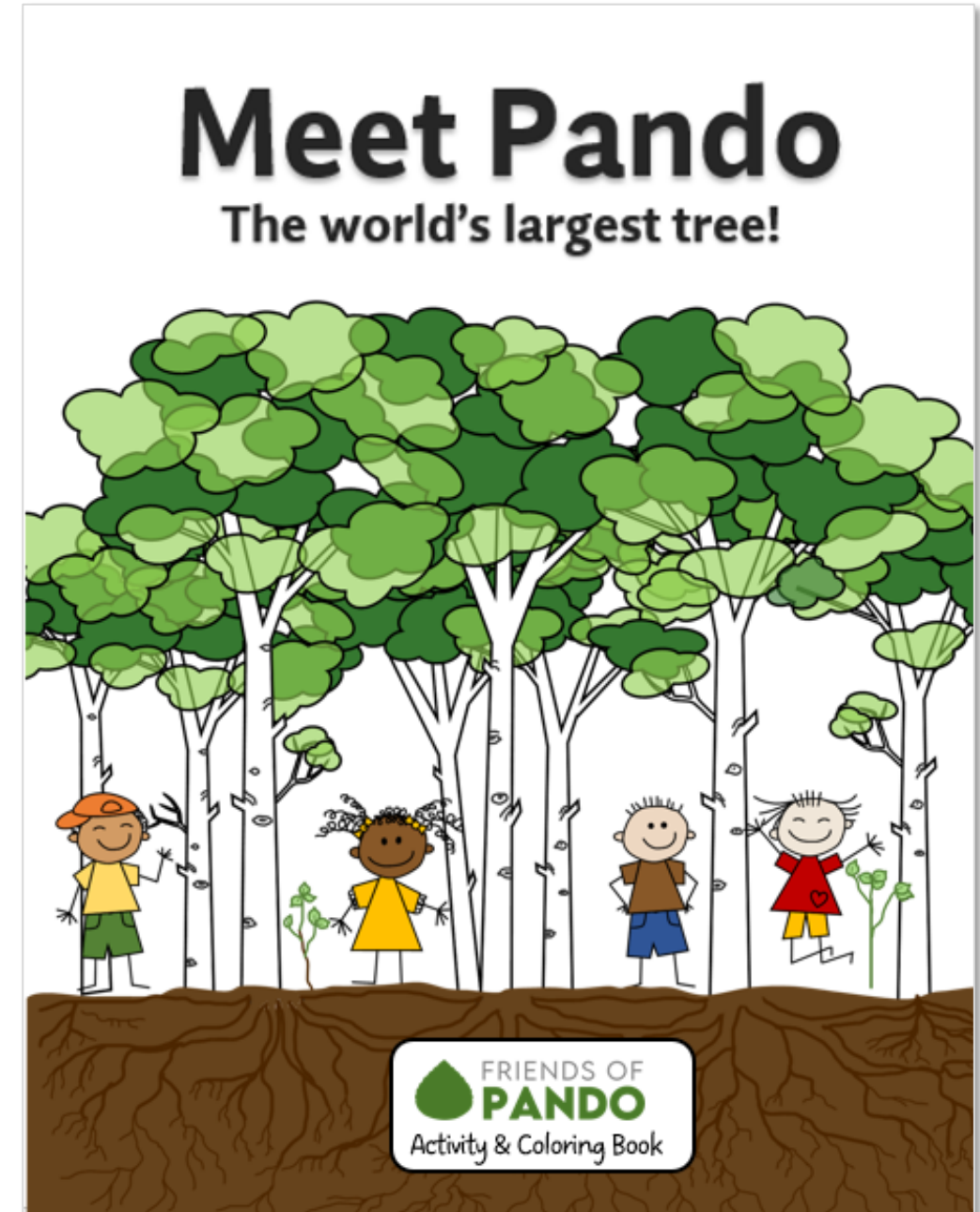
Kids For Pando

We continued to distribute our Kids for Pando Activity & Coloring book in 2023 and made pdf copies available to teachers who requested them. The coloring book is made freely available to educators to help future generations to understand and care for Pando.

200 Copies given to educational organizations

55 Distributed to children in Pando

25 PDF copies given to educators to re-print



INSPIRING STEWARDSHIP



WORKSHOPS



Aspens At Fishlake Homeowners Association

Executive Director, Lance Oditt conducted a Pando Workshop for members of the *Aspens at Fishlake Homeowners Association* in Summer of 2023.

- Approximately 15 residents from the community attended the event
- Members of the group expressed interest in becoming more involved with Friends of Pando and volunteering to help with restoration efforts in the tree in 2024
- The group also wrote a letter of support to advocate for the protection of Pando

Unitarian Universalist of Southern Utah

In October of 2023, Unitarian Universalist of Southern Utah hosted a workshop about Pando as part of their work to care for the earth. 35 members attended the talk and donated to support Friends of Pando's mission.





Salt Lake City High School Students Tour Pando

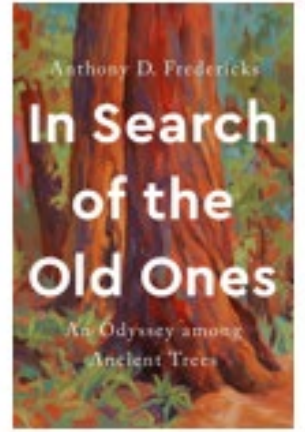
In early fall, approximately 30 students from the Salt Lake City Center for Science Education visited Fishlake National Forest to learn about Pando. Board Member Jameson Pace, met them at the tree to discuss the history of land management and protection of the tree. The trip was recorded and became part of a short documentary film.

<https://www.facebook.com/reel/312026261568314>



Promoting Awareness, Inspiring Stewardship

- Atlas Obscura: Pando As You've Never Seen it Before
<http://tinyurl.com/3sdpjvsf>
- Richfield Reaper: Friends of Pando Releases Photo Survey
<http://tinyurl.com/2w2nyvec>
- National Public Radio: The Sweet Song of Pando (Science Friday)
<http://tinyurl.com/5kkae698>
- St George News: Pando's Voice: Unveiling the Acoustic Wonders of Southern Utah's Most Famous Tree
<http://tinyurl.com/m5k9usrk>
- Salt Lake Tribune: Once Given a Death Sentence, Pando Aspen Grove has "Come a Long Way"
<http://tinyurl.com/ynpbu39t>
- Film: A Branch of Us (Billy Kanaly, Denver Botanic Garden)
- Book: In Search of the Old Ones (Anthony Fredericks)
- Television: Weather Channel (Release TBD)
- Film: The Making of the Pando Photographic Survey (Jan 2024)



A FRIEND OF PANDO...

...is a friend of mine.





OPERATIONS SNAPSHOT

VOLUNTEERS

Volunteer & Program Hours

In 2023, Friends of Pando worked 2,938 hours to support our mission to educate the public, support research and preservation work and, inspire stewardship of Pando. In 2023, local and remote volunteers worked 338 hours. In addition, Friends of Pando served 2,660 program hours to advance work to understand, protect, and monitor the tree.

2,938

HOURS OF SERVICE TO OUR MISSION



Software Engineer Cade Wolcott visits Pando



Imaging Specialist Joseph Farah proposed to CC in Pando in 2023. (She said YES!)



Community Liaison Jameson Pace and Lance Oditt visit in the Tree

\$49,180
RAISED

100+
DONORS

Funds Raised for Pando in 2023

2023 was a record year for donations for Friends of Pando's programs with support coming in from across the United States. Special monitoring grants allowed us to establish new capacity and expand existing capacity. The addition of a number of regular monthly donors helped ensure that our established programs could keep going strong.

Preliminary Estimated Breakdown of 2023 Expenditures

80% - Research, Monitoring, and
Preservation
9% - Education
4% - Inspired Stewardship
7% - Operational Costs



PROGRAM SPONSORS

EJF PHILANTHROPIES Monitoring & Research Sponsor



In 2023 Longtime supporter, EJF Philanthropies, provided support for research and monitoring of Pando. Their generosity enabled us to establish a new soil monitoring program and expand our wildlife and recreation monitoring efforts.



PANDO COFFEE Pando Ambassador Sponsor



New sponsor, Pando Coffee, has committed to funding the Pando Ambassador Program for this coming year.

WeTransfer sponsored hosting of the Pando Photographic Survey data sets by continuing their commitment from 2023

Wetransfer Photographic Survey Sponsor



ROOTED AND **BRANCHING OUT** IN 2024

JANUARY 2024

Release end of year review, and meet with Utah State Legislature to educate them on our efforts and, work needed to protect Pando



SUMMER 2024

Expand monitoring programs and undertake the 1st forest restoration project in Pando since 2013. Pilot Youth Pando Ambassador Program



FEBRUARY 2024

Release of our first documentary film "Making of the Pando Photographic Survey". Undertake planning work for 2024 season



FALL 2024

Expand our Board and launch new education and research grant programs

