

A GIANT LIST OF FACTS ABOUT PANDO

Pando is a single aspen tree that spans 106-acres of the Fishlake Basin in the Fishlake National Forest in Utah ■ Pando is the world's largest tree by species, area and weight ■ Pando's weighs 13.2 Million pounds, making it three times larger than the largest single tree ■ Pando features over 40,000 branches (aka "stems") ■ Each branch is a genetically identical part of a single tree ■ Rapid field estimates by Paul Rogers suggests, Pando's roots could span 12,000 miles ■ Just like a tree in your yard, Pando works as a single tree balancing energy production, defense and regeneration ■ Burton Barnes and Jerry Kemperman were the first to document Pando in 1976. Pando is so big, they only saw it because they flew over it ■ Each Spring and each Fall, you can trace Pando's outline from above since the leaves unfurl and change color at the same time, making Pando stand out from surrounding trees ■ A helpful way to imagine Pando: hold your hand out palm up, make a fist, now slowly raise your fingers upward; the root system is your palm, the fingers are the branches rising from the ground ■ Fish Lake spans 5 square miles making it Utah's *largest natural mountain freshwater* lake ■ Fish Lake is primarily fed by springs ■ Fishlake Basin was dominated by glaciers until around 13,000 years ago ■ Archaeological research shows Fishlake Basin has been used for recreation for at least 1,500 years ■ Fishlake Basin is the homeland of the Paiute people ■ Pando lives along the edge of a fault line pulling the earth apart as the land between sinks, geologist call this a *graben* ■ In 1993 Michael Grant named the tree "Pando", which is Latin for "*I Spread*" ■ In 2008, Karen Mock, Jennifer DeWoody, Valerie Hipkins and Carol Rowe verified Pando's size by genetic testing ■ Each branch of Pando can reach 80 ft tall, 3ft around and spread 30ft at the top ■ Pando is male and creates pollen ■ Pando is constantly re-generating itself by sending up new branches from its massive root, a process botanists call *suckering* ■ Pando is a quaking aspen, scientific name *Populus tremuloides* ■ The name "*tremuloides*" refers to the way the aspen "tremble" when the wind blows ■ Locals call aspen "quakies" ■ Pando eats enough sunlight to power 70,000 homes each year ■ The "eyes" of Pando are created where branches fall off ■ Pando can grow 3 feet per year making it one of the fastest growing trees in America ■ Pando contains chlorophyll in its bark allowing it to create energy *without leaves* in Winter ■ Pando shares it's home with black bear, fox, pelicans, mountain lions and deer ■ Each branch of Pando can live about 150 years ■ Most scientists believe the Pando seed set down between 8,000 to 13,000 years ago ■ There is no way to tell Pando's actual age as no "original" part remains to test ■ Elk and deer love to eat the baby stems and bark which undermines Pando's ability to keep itself in balance ■ Fencing is used to help keep out deer and elk ■ 53-acres is fenced-in today ■ Pando has three diseases common to aspen; conch fungus, target canker and leaf spot ■ We are not sure yet how to help Pando get well ■ Friends of Pando started in 2019 to educate the public, support research and inspire stewardship.

~Science Advisors: Paul Rogers, Nick Mustoe, Ryan Thalman

HELP FRIENDS OF PANDO PROTECT PANDO

Today, we know the Pando is suffering multiple diseases while research indicates policies put in place before its discovery, challenge Pando's stability. If you share our wonder for Pando, here are some things you can do to help ensure Pando can be enjoyed for generations to come.

Donate to support Friends of Pando. Make a tax-deductible donation to support our education, research and stewardship programs which create local jobs in science, art and land management.

Shop to help us earn donations. When you choose us as your charity of choice on smile.amazon.com, Amazon will donate 0.5% of the total sale to our organization. Its easy, free and private.

Volunteer your talents. Whether you have a few minutes to create a social media post (#pando) or, want to get your hands dirty helping work in the tree, we have volunteer opportunities year round.

Find inspiration by experiencing Pando yourself. Pando is located on scenic Utah Hwy 25. Google "Pando Tree" and send us your story!

Host a Talk. The history of protecting special trees doesn't start in the marble halls of academia or government, but with people sharing the story about a tree that inspired them. Invite Friends of Pando to give a talk, or order our kit and host your own.

Become a community partner. Friends of Pando has a track record of developing innovative partnerships programs that get results. Reach out to us about how your organization would like to help support education, research or stewardship programs.



To learn more about Pando and ways you can help, visit

FRIENDSOFPANDO.ORG



A friend of Pando is a friend of mine...

Friends of Pando is a nonprofit organization founded and based in Richfield, Utah. Our mission is *to educate the public, support research and inspire stewardship of Pando, the worlds largest tree.* Each year we employ students, scientists, artists and volunteers from around the world who work to understand, monitor, document and preserve the tree. As the only organization dedicated to Pando and the land it calls home, Friends of Pando recognizes the challenges ahead will involve generations of collaboration. We welcome all who feel led to understand and protect Pando and declare, *a friend of Pando, is a friend of mine.*

501(c)3 #: 87-3958681 | Design & Photos: Lance Oditt | Editing: Hope Smith and Mark Morris

PANDO

THE WORLD'S LARGEST TREE

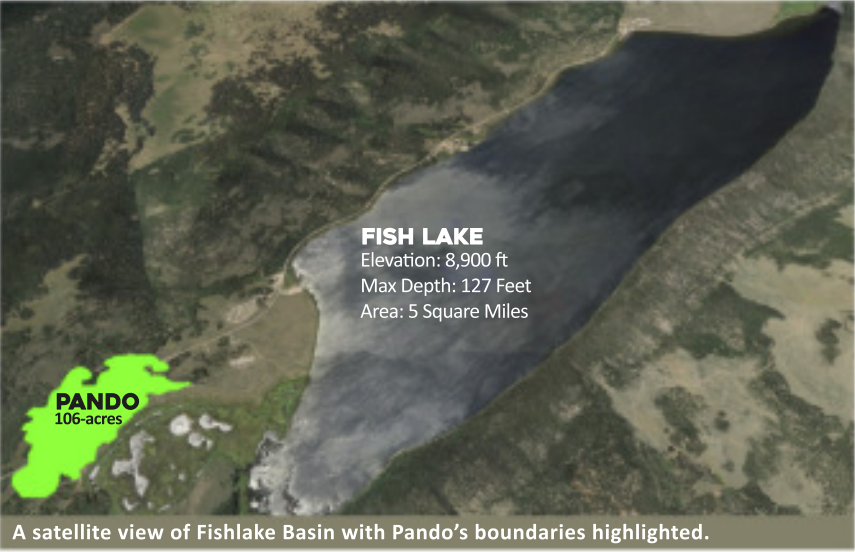


A Friends of
Pando Guide

friendsofpando.org

PANDO: THE WORLD'S LARGEST TREE

High in the mountains of the Fishlake National Forest stands Pando, the world's largest tree, an aspen clone made up of over 40,000 branches (aka "stems"). Although each branch appears to us as an individual tree trunk, they are genetically identical parts of a single tree operating over a 106-acre expanse. To imagine how Pando works, face your palm up, make a fist, then raise your fingers upward. The root bed is your palm and the branches are your fingers. Just as a tree in your yard works, Pando acts as *one tree*. Weighing 13.2 million pounds, Pando is 3 times larger than the largest single tree and, twice as large as the next largest



A satellite view of Fishlake Basin with Pando's boundaries highlighted.

aspen clone (106-acres versus 47-acres). Pando is so big in fact, it was not "discovered" until 1976, when Burton Barnes flew over the tree in a plane and noticed the outline standing out from surrounding trees. In 1993, researcher Michael Grant named the tree "Pando" (Latin for "I Spread"). In 2008, Karen Mock, Jennifer DeWoody, Valerie Hipkins and Carol Rowe confirmed Pando's size using genetic tests.

A PIONEER CONSTANTLY RE-INVENTING ITSELF

The idea of a tree that spans 106-acres doesn't fit our common-sense view of what a tree *is* nor, what a tree *can be*. How Pando came to be and dominate the land it calls home, is a remarkable lesson in resilience and longevity. Aspen like Pando are "*pioneer trees*", the first to take root in places where glaciers, wildfires, landslides or drought scour the land. Once established, trees like Pando can sustain themselves from below ground, releasing a hormone that signals the root to send up a new branch, a process botanist call *suckering*. Each new branch reinforces the massive root system depriving other trees of nutrients and water. In turn, that new branch creates a point where new connections can expand outward, securing the tree's dominance and, conditions for the cycle to repeat. Although no "original" part of tree remains to reliably test Pando's age, most scientists concur that the Pando seed took root between 8,000 to 13,000 years ago meaning this process of creation, destruction and re-creation has been going on since prehistory.

UNIQUELY ADAPTED TO THE HIGH WILDS OF UTAH

As all aspen do, Pando features adaptations that allow it to thrive in the high wilds of Utah. As a sun loving tree, Pando reaches high and fast dropping its less productive branches while leaving branch scars we call "eyes". Known as a "stable" aspen clone, Pando's massive root system forms a lattice-work that prevents other trees from settling in. Although today we do not know the extent and underground dynamics of its root, rapid field estimates by researcher Paul Rogers suggests the root could span 12,000 miles if laid end-to-end. Living where dry mountain winds



A branch scar forms "eyes" Leaves preserve moisture Watery bodies thwart fire

can reach 60 Mph, Pando features additional adaptations that allow it to thrive. The leaves connect at right angles helping deflect drying winds and have a waxy covering that helps the tree preserve moisture. In a land where fires can rage for weeks, Pando's body stores large quantities of water allowing it to thwart low-to-medium intensity ground fires, while its tall branches slow vertical fire spread. At 8,900 ft elevation where winters are harsh, Pando has another strategy; the bark contains chlorophyll, allowing it to produce energy in winter without leaves.

A DISCOVERY AND NEW CHALLENGES IN STEWARDSHIP



Deer eat away at the tree Conch Fungus infection Target Canker infection

If you have heard about Pando before today, you may have heard the tree is in decline. Studies suggests Deer and Elk are eating away at the tree faster than it can keep energy production, defense and regeneration in balance. Less well understood, is the fact Pando is suffering multiple infections common to aspen. Conch fungus takes root in damaged bark and creates duck-beak shaped formations that strangle branches from the outside in. Target Canker "girdles" the tree from within, weakening each new ring of growth. Finally, Leaf Spot destroys leaves, limiting the trees energy production. Today, about 53 acres of the 106-acre tree is fenced to keep out deer and elk, but most agree, more work needs to be done so Pando can recover. With disease, additional research is needed to understand whether known methods that *could help the tree heal, would work on a tree this large*. Beyond this, we know little about other factors that play a role in Pando's ability to sustain itself such as weather, hydrology, or erosion. What we do know, is that Pando's fate now rest with our ability to understand and protect the tree.

CONNECTING DISCOVERY & IMAGINATION

As the world's largest organism, Pando is a natural wonder that stands as a testament to the magnificence of nature's imagination. Although Pando belongs to itself, its wellbeing is now tied to how humans respond; a situation worthy of introspection. Just as Pando has re-imagined itself over millennia, we might do well to consider how



Surface detail of Pando's massive root system connecting over 40,000 branches

we imagine ourselves as part of nature and, the role we can play in Pando's future. As each branch of Pando can live two human lifetimes, the work ahead will involve generations of collaboration and, new ways of thinking about what trees *are* and, what trees *can be*.

A DESTINATION FOR ALL SEASONS OF LIFE



Located along remote Utah Highway 25, Pando is a destination for all seasons of life. In Spring, Pando sends out an explosion of bright green leaves and in Fall, those leaves change color at the same time; a process that takes weeks to unfold because Pando is *so big*. Those who visit in Summer or Winter will be rewarded with a meditation on the possibilities of life in this rugged land. In Summer, winds stir Pando's leaves creating a magnificent song that stands in stark contrast to the silent, bare-vista canyons to the south and east. In a land known for its natural formations, Pando laid bare in Winter traces of a menagerie of forms against bright blue mountain skies. If you only have a few minutes to meet Pando, use a pull-off and take a moment to run your hands over a branch of a lifeform that has learned to eat sunlight and retard fire. If you have more time and want to move in a different rhythm of life, take a short walk on the marked trail and rest against one of Pando's giant branches. When the wind comes, listen as Pando's summer song advances and the tree begins to sway. As it does, consider - you are immersed in the world's largest tree, a lifeform constantly re-inventing itself on the boundary between discovery and, imagination.