https://lmtribune.com/outdoors/ancient-tree-clings-to-life/article_a7960533-68a9-527b-afd9-08201dfa1fb5.html

Ancient tree clings to life

Genetic resistance found in ancient whitebark pines gives hope for embattled species in northeastern Washington

- By Eli Francovich of the Spokesman-Review
- Feb 19, 2021 Updated 9 hrs ago

Perched high on a wind-lashed crest near the Canadian border sits a tree that may be the single oldest living thing in the Pacific Northwest.

On the short end of reason, it was a seedling 500 years ago as European sailing ships scavenged the world. Less conservatively, but still feasible, it is 1,000 years old.

Not that you'd know simply by looking.

Standing 100 yards downhill on a foggy December day, it's not the tallest tree in sight, although what it lacks in stature is made up for in gnarled weightiness.

"See how big the branches are?" said Tim Coleman, executive director of the Kettle Range Conservation Group, while huddled at the base. "Think about how many sunrises this tree has seen. ... (how many) wildfires."

On this particular day, the sun is distant, its light muddled by a thick December fog. The mountains here on the Kettle Crest in the Colville National Forest are ancient, rolling affairs, rounded by roiling glacial retreats. At 7,000 feet, winter comes early and loiters late.

Which suits these whitebark pines just fine.

"They love growing in the harshest climates," Coleman said. "Man, they're amazing trees."

For millennia, their hardiness gave them a unique advantage. They could thrive where faster-growing trees — subalpine fir, Engelmann spruces or hemlocks, for instance — could not. And through an ancient and symbiotic relationship with a small, feisty mountain bird, these pines spread along crests and mountaintops despite taking half a century to reach sexual maturity.

Now, that complicated balance is disturbed.

The pines have been decimated by an invasive tree fungus native to Asia and inadvertently introduced to the Americas via seedlings grown in European nurseries in the 1900s. Today, there are more dead pines than living, the ghostly hulks familiar to any alpine hiker.

Meanwhile, hungry pine beetles made numerous by a warming climate killed 600,000 of the trees between 2005 and 2007 in Washington and Oregon alone.

Suddenly, at least when viewed through the scope of centuries, a famously hardy species is enfeebled.

Starting in the early conservationists raised the alarm, asking the U.S. Fish and Wildlife Service to protect the tree under the Endangered Species Act.

This December, the service acted, proposing threatened species protection for Pinus albicaulis, the first time a tree species has been protected due to climate change.

That's a step in the right direction, advocates say. It will provide more funding and attention. But the threats are numerous, interconnected and widespread. And any endeavor to protect them is made all the more complicated, and important, by the unique lifecycle of this keystone species.

To illustrate, consider the gnarled tree on the Kettle Crest and some unknown and long-dead Clark's nutcracker.

A millennium of cooperation

This is how it happened, more or less: Centuries ago, a Clark's nutcracker landed and hid a beakful of seeds plucked from an equally ancient tree.

The bird left with every intention of coming back.

After all, this was just one of roughly 100,000 seeds cached that year by the flighty prepper. Nutcrackers fly upward of 20 miles from their nests to bury their winter food supply. A uniquely evolved pouch underneath the birds' tongues can carry 150 seeds at a time, and a single gram of those seeds contains between 5,000 and 7,700 calories.

But something happened.

What? We can't know. Perhaps a hawk or owl got the drop on the 4.5-ounce bird. Or maybe an avalanche roared through, irreparably rearranging the landscaping and throwing the bird's refined spatial map (used to locate its numerous food caches) into disarray.

No matter. It's was all part of the process.The bird didn't return. The seeds settled into their new home and grew. Years passed. Some seeds survived, sending roots into the thin soil and breaking out into the clear mountain air. They persisted through countless threats. Grazing moose. Forest fire. Avalanches.

The tree grew older, although you'd never know it just by looking. At 50, it's no taller than 6 feet and has only just started to produce seeds. At 100 years old, trees a quarter of its age still tower over it. But it's uniquely fit for this environment. The long and cold winters don't bother it. The thin, nutrient-poor soil is just fine. Whipsaw winds bend but do not break it.

Ah, wind. And gravity. Two undeniable facts of mountain life. And yet, two forces with which whitebark pines do not concern themselves. See, unlike other pines, their seeds are not carried by these winds, nor by gravity. Instead, they rely on the nutcracker to open the tree's cone, remove the seeds and then bury them. In turn, the nutcracker relies on the tree for the nutritious meal to carry them through long winters.

The nutcracker isn't the only one that benefits from the whitebark's largess. Grizzly bears, a keystone species in their own right, also eat these seeds. And while the big ursines can and do switch to other foods when necessary, mainly meat, some research indicates the loss of whitebark pine has fueled human-grizzly bear conflict, particularly in the Greater Yellowstone Ecosystem, where whitebark pine populations have been decimated.

The trees are not only good for a meal. They also anchor rocky, erosion-prone soils, particularly after fires. And the tree's broad crown collects snow, while its branches provide shade late into the spring, helping regulate snow melt throughout the season. And like soldiers storming a beach, they shade more fragile plants, giving them a toehold up high.

Still, at the core of these spiraling dependencies sits the nutcracker and the whitebark pine, a small and short-lived bird and a gnarled old tree, a cooperative mutualism that has existed for millennia.

However, like any cooperative agreement, if one end of the bargain falls apart, things start to unravel. White pine blister rust, the disease caused by the introduced Asian tree fungus, has decimated the nutcrackers' primary food source. When that happens, the birds stop breeding or move to lower elevations to feed on Douglas fir cones instead, some research has indicated.

"It just highlights the fact that as we lose species, the world that sustains us comes a little bit more unraveled," said Noah Greenwald, the endangered species director for the Center for Biological Diversity. "Scientists from around the world are warning that we're in an extinction crisis. That we're at risk of losing more than a million species. This is just one."

'We're just speeding it up'

Once, the trees could be found as far north as British Columbia, south to northern Nevada, west through the Pacific Northwest and east into Wyoming. While the species as a whole is in dire straights, with more than 90 percent of all whitebark pines dead in some parts of Montana and other places, the story is rosier, if only slightly, in the Pacific Northwest — the Colville National Forest in particular.

“It’s not that it’s doing well, it’s just doing better than in the Rocky Mountains,” said Andrew Bower, a Forest Service geneticist and a lead for whitebark pine restoration in the Pacific Northwest.

Why?

Partially because a higher proportion of trees in northeast Washington has some resistance to blister rust. Not all of them, Bower emphasized. But enough to notice.

“It’s curious,” he said of the resistance. “And it’s not something that I think anyone could have predicted. We don’t know what it is.”

Some resistance is normal in all whitebark pine populations. And that curiosity may allow the Forest Service to speed up a process that would occur on its own, albeit slowly.

Natural selection

Biologists have been collecting seeds from resistant trees and planting them, hoping eventually to replant millions of acres with blister rust-resistant pines. But determining whether the trees are resistant is hard work.

In July, cones are caged to keep nutcrackers away. The cones are collected in September and the seeds planted in Forest Service nurseries. There, they’re grown for two years before being exposed to blister rust. Scientists then monitor the seeds for five years to make sure they are truly resistant to the fungus. Per tree, this costs about $1,200.

Currently, the Whitebark Pine Genome Initiative is working to develop a genetic test for the fungus. If effective, that would allow scientists to determine resistance simply by taking a sample from a tree.

Regardless, the current strategy looks familiar, a mimicry of what Clark’s nutcrackers have done for thousands of years.

“This is what would happen naturally over time with evolution,” Bower said. “We’re just speeding it up before the population numbers get too low.”

Buying time

That’s where Coleman and his conservation organization have a role. Over the course of several years, Coleman and his wife, Sue, spent months on the Kettle Crest cutting down subalpine firs, spruce and other fast-growing species that can quickly choke out the slower-moving whitebark pines. The effort received funding from the Forest Service.

It’s all part of a wider Forest Service effort to use vegetation management, prescribed burning and other methods to help improve growing conditions for whitebarks.

Normally, these larger trees would be controlled by the occasional wildfire. But, after decades of suppression the juvenile trees have grown large, taking nutrients and sunlight from the whitebarks. When fires do come, they tend to be hotter, killing whitebark pines where, in past eras, they may have only singed them.

“There are a lot of trees up here that were choked out by subalpine fir,” Coleman said on the foggy December day. “That’s the issue up here.”

This alone won’t save whitebark pines. But, it may buy them time. A handful of decades, perhaps.

An ironic twist for such a long-lived tree.