FOREST NEWS

The Newsletter of Forest Service Employees For Environmental Ethics

Winter 2023

GIANT *Threat*

Inside

IMPROVING FOREST RESILIENCE / MASSIVE GAS PIPELINE /
GUEST COLUMN: READING THE RINGS / BUSIEST NATIONAL FOREST

The Forest Service has painted itself into a corner. Half a century of logging high-value timber on public lands created an industry of federally dependent sawmills throughout the Western states. Concurrently, the Forest Service did its darnedest to stamp out forest fires. That was pretty easy during the mid-20th century logging era when Pacific Ocean currents were in a cool phase, which kept Western forests damp. This logging-firefighting combination has now created dense thickets of small trees across millions of national forest acres.

These small trees are financially worthless. The trees are too far from mills and often on steep, inaccessible slopes. The cost to remove them is more than can be earned from selling a product, whether biomass energy or lumber. It makes no more economic sense to cut worthless trees than it does to mine worthless minerals.

Having fouled up our forests, the Forest Service could let nature sort out the mess the agency has created. That would be the most cost-effective strategy. Trees would grow, trees would die — as they have for millennia. Fires would burn and then go out — as they have for millennia. In other words, pretty much what happens now across much of the West's national forests.

But cost-effective for taxpayers means something totally different to a bureaucracy. It means lower budgets, fewer employees and contractors, less pork-barrel spending, and an erosion of political capital and patronage — outcomes that are anathema to any agency.

The staggering cost to taxpayers of removing worthless trees requires a public relations campaign equal to the task. Messaging is job number one. Change worthless trees to "hazardous fuels" and the Forest Service can sell its logging strategy as a Superfund-style cleanup program that protects homes and communities. Never mind that the "hazard" to homes and communities has nothing to do with how national forests are managed. It has everything to do with how private homes are built and backyards are maintained, but this is simply an inconvenient fact the Forest Service brushes aside.

Doling out small slices of the pork pie to its sycophants is also a useful tactic. The National Wild Turkey Federation (NWTF), which has never seen a clearcut it doesn't like, is the Forest Service's perfect ally. Late last year, the Forest Service and NWTF entered into a "stewardship" (sic) contract that will launder 50 million tax dollars to pay for rail-freighting national forest logs (aka "hazardous fuels") from California to Wyoming and South Dakota sawmills. Why? Because neighboring Black Hills National Forest has been overcut and has run low on merchantable timber. You can't make this stuff up.

Sincerely,

Andy Stahl

Cover: A giant sequoia dwarfs a Forest Service firefighter doing fire mitigation work during the 2021 Windy Fire in Sequoia National Forest (Forest Service photo by Teresa Benson).

Inside

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Alta Ski Area in the Uinta National Forest was one of the first ski areas in the country.

Featured Forest

Uinta National Forest

Located in North Central Utah, the 880,719-acre Uinta National Forest was designated as a Forest Reserve by Grover Cleveland in 1897. The forest's name is derived from the Ute word Yoov-we-tueh, which means pine forest.

Uinta forests once lined the eastern shores of Lake Bonneville, the massive paleolake that left behind the Bonneville salt flats and the Great Salt Lake. Fossilized remains reveal the presence of mammoths and other large mammals in the forest during this time. While climate variations have reshaped the forest, it has supported human habitants for at least 12,000 years.

Following the first hunter-gatherers, the Fremont people cultivated corn, beans, and squash in the region from about 400 to 1300 CE and relied on wild plants and game in the forest. By 1300, the Numic people arrived, replacing the Fremont culture. In the Uinta, these hunter-gatherers included the Utes and Gosuites.

In the 1820s, mountain men of European descent began exploiting forest resources. In 1847, Brigham Young established nearby Salt Lake City, and by the 1890s, the rangeland and timber resources of the Uinta were depleted. Pollution and erosion had degraded water resources, promoting the spread of typhoid. The Uintah Forest Reserve was established in response to local communities campaigning for protection of their water resources.

In 2007, the Forest Service merged the Uinta with the Wasatch-Cache. The Uinta-Wasatch-Cache National Forest encompasses 2.2 million acres and extends into southwestern Wyoming. The Forest hosts 9 million visitors annually, making it one of the most heavily visited forests in the nation. Many visitors are wintersports enthusiasts, drawn by the "Greatest Snow on Earth" to the Forest's five ski resorts.

The Forest features nine wilderness areas, six scenic byways and parts of three national historic trails — the California Trail, the Mormon Pioneer Trail, and the Pony Express Trail. The Forest is also a popular destination for backpacking, horseback riding, snowmobiling, ATV riding, fly-fishing, mountain biking, and hiking.

A Forest Service crew clears combustible material from the base of a giant sequoia in the Black Mountain Grove, Sequoia National Forest. The work is part of the Giant Sequoia Emergency Response (Forest Service photo).

In Depth

Sequoia Deaths Prompt Emergency Response

Giant sequoias are the most massive trees on Earth. They are also among the oldest, with the age of some trees exceeding 3,000 years. The trees grow in about 70-80 groves that cover less than 30,000 acres on the western slopes of California's Sierra Nevada. In this fireprone environment, giant sequoias' thick, fibrous bark — up to 2 feet thick — provides insulation against fire, and the branches of large trees grow high enough above the ground to avoid the flames of most wildfires. In fact, these "big trees" (as John Muir called them) need fire for their seeds to germinate.

Their size and longevity are a testament to the trees' resilience, so the loss of an estimated 13-19% of mature giant sequoias to fire in just two years alarmed scientists, conservationists, and land managers, who cite human-induced climate change and a century of forest mismanagement as factors in such catastrophic fires.

In July 2022, Forest Service Chief Randy Moore announced the Giant Sequoia Emergency Response to counter the threat. His statement reads, "Without urgent action, wildfires could eliminate countless more iconic giant sequoias. ... This emergency action to reduce fuels before a wildfire occurs will protect unburned giant sequoia groves from the risks of high-severity wildfires."

Encompassing approximately 13,377 acres and 12 giant sequoia groves, the emergency action will expedite environmental reviews and allow the Forest Service to "remove surface and ladder fuels that present the greatest wildfire risk and include ... mechanical removal of trees, ... pulling duff away from the base of large giant sequoias and prescribed burning."

Of the three recent fires to burn into sequoia groves, the 2020 Castle Fire did the most damage, killing an estimated 7,500-10,600 large sequoias (those with trunk diameters of 4 feet or more) in the Sequoia National Forest and Sequoia National Park. At a December 2022 meeting of the Giant Sequoia Lands Coalition, Jessica Morse, deputy secretary with the California Natural Resources Agency said the recent fires were far worse than the fires of 1297.

The 1297 fires occurred during the Medieval Warm Period, which produced multi-decade droughts

in the West, including one that lasted about 60 years. Between this medieval drought era and the arrival of European colonists, tree-ring data show that low- to moderate-intensity fires burned through sequoia groves every 6-35 years. National Park Service information indicates this beneficial pattern changed after about 1860, "probably a result of intensive sheep grazing ... and a decrease in fires set by Native Americans, followed by fire suppression by government agencies," including the Forest Service.

Scientists studying sequoia groves on National Park lands determined that giant sequoia populations were "stable or increasing" from 500 B.C. through the 1800s, but in the 1900s, "there was a massive failure of giant sequoia reproduction." Giant sequoias are among the first trees to establish after a disturbance, and without fire, "conditions did not favor growth and survival of young sequoias." Before the arrival of European settlers, "successful establishment of mature sequoias depended on fires intense enough to kill the tree canopy in small areas, allowing enough light for young sequoias to grow and thrive." The centuries-old fire regime helped maintain the balanced forest ecosystem that sequoias need to flourish, thinning smaller trees and removing highly combustible fine fuels from the forest floor. Without fire, sequoia seeds stopped sprouting, and the likelihood of more severe fires increased.

In the late 1960s, the National Park Service implemented a prescribed burning program in giant sequoia groves "to reduce the hazardous fuel buildup, hoping to avoid catastrophic wildfire, while at the same time restoring fire to a more natural role." In 1987, the Park Service formed a panel to evaluate the fire management program in the sequoia-mixed conifer forests of the Sierra Nevada. The report affirmed "a continuing need for fire management programs in these ecosystems."

In 1998, the Forest Service published a report on the effects of prescribed fire in giant sequoia groves in Sequoia and Kings Canyon national parks. The report documents the results of eight prescribed fires over a 9-year period, including significant increases in soil nutrients, especially available nitrogen, in the aftermath of the fires, benefiting seedlings and mature trees alike. The report also documents "complete consumption of the litter and duff ... over most of the area," generating "instantaneous lethal temperature (150°F) in the soil and cambium" of some giant sequoia and sugar pine trees. (Cambium is a thin layer of tissue important for new cell generation and plant health.) While the resulting root and cambium damage caused a 67% mortality rate among sugar pines, no deaths occurred among giant sequoias.

In the aftermath of the Windy Fire, giant sequoia seedlings surround the remnants of burned trees on the Trail of 100 Giants in the Sequoia National Forest (Forest Service photo).

Clearly, fire plays a crucial role in maintaining healthy stands of giant sequoias. According to Alexis Bernal, a researcher with the University of California at Berkeley, Sierra Nevada forests typically had about 20 trees per acre prior to 1860, but fire suppression policies have produced forests with as many as 120-160 trees per acre. In addition to more fire, Bernal insists that extensive logging is needed to restore the forest ecosystem. "We want to get a forest back to what a fire-resilient landscape would look like," she said. "You would have to take out a lot of these trees to do that."

The Giant Sequoia Lands Coalition's 2022 Progress Report highlights "restoration treatments" on 4,257 acres in 36 groves — a preview of projects that align with Bernal's strategy and which will benefit from the $5.5 billion budget increase bestowed upon the U.S. Forest Service by the Infrastructure Investment and Jobs Act (IIJA). The progress report documents member activities that include "salvage logging," "mechanical treatment," and "hazard tree removal." Coalition members include the Forest Service, the National Park Service, the California Department of Forestry and Fire Protection, and California State Parks.

John Muir Project Director Chad Hanson, a forest ecologist, acknowledges the need to return fire to the landscape, but he sees mechanical thinning as an excuse to continue commercial logging of public lands. mechanical thinning as an excuse to continue commercial logging of public lands. He called the work of Bernal "scientific fraud" that uses underestimated tree densities as a baseline.

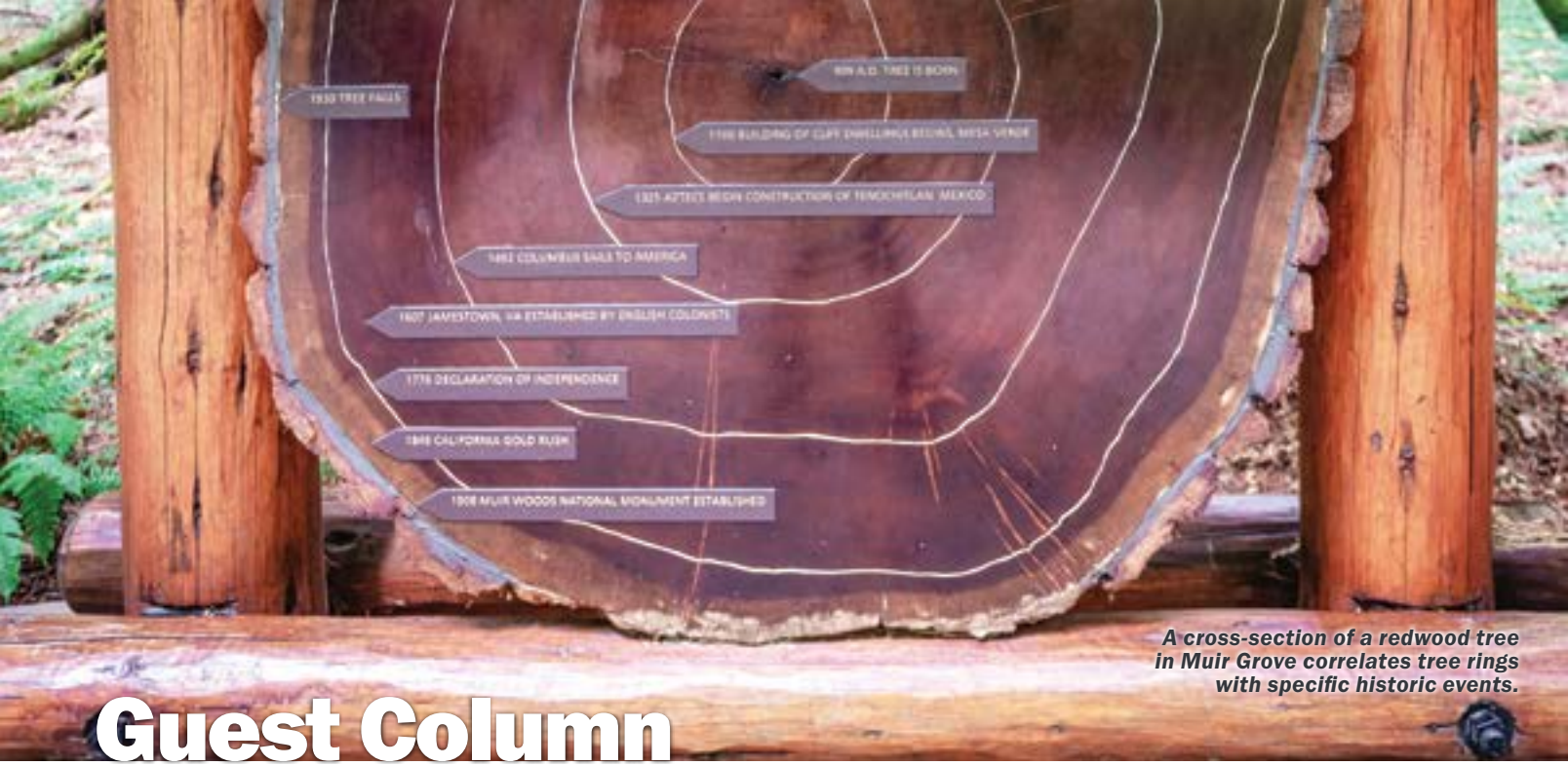
Bernal and others, like Forest Service Research Forester Mark Finney, accuse Hanson of "agenda-driven" science. Nonetheless, Hanson was joined by 200 of his peers in signing a letter to President Joe Biden discouraging funding for these types of projects in the IIJA. In spite of the letter, the legislation established a new exemption to allow trees to be cut for fuel breaks, which are of dubious benefit according to research by Finney.

Hanson sees the recent megafires as a historical correction. He believes sequoia mortality has been far less than official estimates and that new trees can regenerate despite increasing wildfire intensity.

Finney asserts, "The only way to maintain a forest in a low-hazard condition is through repeated burning ... but you can't introduce fire without some mechanical treatment first. ... You can't restore structure without mechanical means."

Meanwhile, the Sequoia Coalition is promoting additional legislation to expedite "fuel treatments" in sequoia groves. The bipartisan Save Our Sequoias Act, introduced by Kevin McCarthy (R-Calif.), would expedite fuel treatments in part by further bypassing environmental laws.

A sawyer cuts a standing dead tree in the Indian Basin Grove in the Sequoia National Forest as part of the Giant Sequoia Emergency Response (Forest Service photo).



A cross-section of a redwood tree in Muir Grove correlates tree rings with specific historic events.

Guest Column

Reading the Rings

by Susan J. Tweit, excerpted from Wildflower, *March 21, 2021*

Say the word "dendrochronology," and what comes to mind? Perhaps a tree cross-section showing concentric circles of annual rings, with arrows pointing to the rings from years that mark historical human events. But there is so much more to the science of studying "tree time" (dendro + chronos) than just counting rings to calculate a tree's age.

Dendrochronology began in 1904 when astronomer Andrew Ellicott Douglass sawed rounds from ponderosa pine logs at a Flagstaff, Arizona, log yard to analyze the patterns in their growth rings. Douglass theorized that, since the growth of ponderosa pines in the Southwest is limited largely by available moisture, the width of the rings would reveal past climate patterns with narrow rings indicating drought and wide rings, wet periods.

He was searching for a correlation between climate and sun spots; what he found was a rich climate history stretching back 1,000 years. Douglass' tree-slices started the world's largest dendrochonology library at the Laboratory of Tree-Ring Research at the University of Arizona.

NOW AND THEN

Today, researchers usually sample trees with an increment borer laboriously screwed into the tree's heart, rather than a saw. And what they find in reading cores from around the world (except in the tropics, where trees don't accumulate tissue in annual rings) reveals trees as super-sensitive recorders of their environment. Whether looked at on the cellular level or the macro level, tree-ring data is yielding fascinating new stories explaining our planet's history, human events, and future perils.

Take the fall of the Roman Empire. Dendrochronologist Valerie Trouet, professor at the Laboratory of Tree-Ring Research, says that European tree ring data reveals three centuries of climate instability (exceptionally warm and dry periods alternating with cold and wet ones) between A.D. 250 and 550. Those climate fluctuations, she points out, would have depressed farming and food supplies, contributing to the empire's collapse.

Over in Central Asia, the tree-ring story shows that the period between 1211 and 1225, when Genghis Khan and his cavalry conquered Asia, was wetter than any time in the previous 1,000 years. That bounty of precipitation, Trouet theorizes, likely gave Khan's cavalry a boost by dramatically increasing the productivity of the region's semi-arid grasslands.

Here in North America, Park Williams, professor of Geography at UCLA, analyzed the tree-ring evidence of four mega-droughts in the Southwest during the 900s, 1200s, and 1500s, periods that he characterizes as "phenomenally dry conditions lasting for decades or even centuries, unlike anything we have experienced recently." That is, until the Southwest's extremely dry years from 2000 through 2018.

When Williams compared the pattern of soil-moisture loss for those recent dry years to the onset of the medieval

mega-droughts, the tree-ring data showed a troubling similarity: the sharp decline in soil moisture in the modern data was more severe than that of all but one of the mega-droughts, he says. Hence the shrinking Colorado River and its impacts on power generation and surface-water supplies.

PEERING INTO THE RINGS

Researchers are also looking beneath the surface of tree cores. Trouet and her colleagues examined the density of wood in tree rings to parse the movements of Earth's jet streams, those waving rivers of wind powered by Earth's rotation that separate cold arctic air from warm tropical air. First, the researchers trekked to remote forests in the Balkans and Scotland, increment borers in hand, to sample the oldest trees in each area.

After constructing a 1,000-year-long tree-ring chronology, they calculated the thickness of the cell walls to see if it correlated with opposing poles of summer temperatures in the region. It did. Density measurements showed when Scottish summers were anomalously warm and the Balkans shivered because the North Atlantic jet stream had oscillated north, and when the jet stream had strayed south, chilling Scotland's summer and searing the Balkans. Reading the past in the tree-ring record may help us predict climate change — which regions might be sizzling in heat waves and apocalyptic forest fires or buried in "snowmageddons."

An increment borer provides tree-ring data without harming the tree.

At the University of Texas, a conversation with a colleague over coffee inspired geologist Dr. Claudia Mora, dean of the College of Geosciences, to examine stable isotopes of oxygen in tree-ring samples as a way of revealing the source of a tree's drinking water. By analyzing the ratio of O-16 to O-18 in wafer-thin samples of tree cores from the Southeast, Mora showed when trees were slurping water from tropical cyclones (richer in O-16 due to repeated evaporation and condensation) or parched in droughts (when water loses O-16 to soil evaporation).

LIKE A HURRICANE

As befitting a field of tree science invented by an astronomer, dendrochronology research is often interdisciplinary. A recent project to map hurricane patterns before written records involved dendrochronologist Trouet, paleotempestologist Grant Harley, and dendroarcheologist Marta Domínguez-Delmás, with later input from a historian of piracy.

By analyzing Harley's data correlating ring patterns in slash pine trees on Florida's Big Pine Key to hurricane occurrence along with Domínguez-Delmás' work wreck-diving to retrieve preserved timbers for dating, the researchers modeled hurricane activity stretching back to 1495.

A lull in both shipwrecks and hurricane activity between 1645 and 1715 neatly overlapped with the Maunder Minimum, a period known for low sunspot activity and, thus, less solar radiation — which meant cooler sea-surface temperatures, fewer hurricanes, and fewer shipwrecks. That gap also correlated with the Golden Age of Piracy, when pirates such as Anne Bonny and Blackbeard roamed the Caribbean. Without hurricanes, they could freely plunder treasure-laden Spanish ships returning from the Americas.

Tree rings clearly have a lot to teach us. The more carefully we read the rings, the more we learn about our planet's past and our potential future.

A plant ecologist, Susan J. Tweit began her career studying grizzly bear habitat, mapping historic wildfires, and researching big sagebrush while working for the U.S. Forest Service in Wyoming. She turned to writing after realizing that she loved the stories behind the data more than collecting those data. Tweit has written 13 books on the nature of life and our place in it, along with hundreds of magazine articles, newspaper columns, and essays. Her latest book, *Bless the Birds: Living With Love in a Time of Dying*, won the Sarton Award for memoir and was a finalist for the Colorado Book Awards.

Briefly

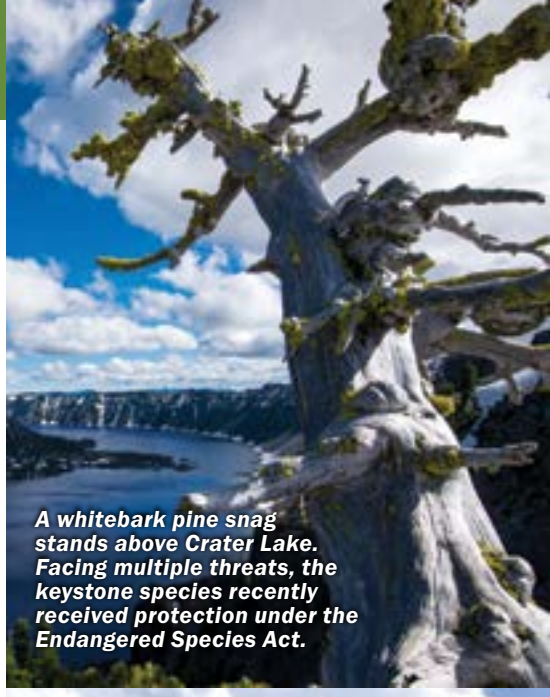
Whitebark Pine Receives Threatened Listing

The U.S. Fish and Wildlife Service has issued a final rule to list whitebark pine (*pinus albicaulis*) as a threatened species under the Endangered Species Act.

Whitebark pine is a slow-growing, long-lived tree species that inhabits high-elevation forests up to 12,000 feet. As a keystone species, the tree provides multiple ecosystem services, and its nutritious seeds are an important food source for many wildlife species.

While the tree inhabits more than 80 million acres in western North America, its population is declining rapidly, with mortality rates as high as 90% in the Northern Rockies. White pine blister rust, a fungal disease introduced from Europe, is the primary threat.

Most of the trees grow on lands managed by the Forest Service, which is collaborating with the Whitebark Pine Ecosystem Foundation and American Forests to conserve the species.



A whitebark pine snag stands above Crater Lake. Facing multiple threats, the keystone species recently received protection under the Endangered Species Act.

Forest Service Accepting Comments on Mountain Valley Pipeline

If approved, the Mountain Valley Pipeline will carry natural gas across 3.5 miles of the Jefferson National Forest and intersect the Appalachian Trail in Virgina. The Forest Service approved the right-of-way for the 42-inch-diameter pipeline in 2017 and again in 2021, but both decisions were vacated by the Fourth Circuit Court of Appeals.

Given the steep, unstable slopes in Appalachia, erosion and landslides are a major concern. Opponents also say the large size of the pipeline creates additional risk.

The Forest Service is proposing to amend the Jefferson National Forest Land Management Plan "as necessary" to allow for the pipeline to cross the national forest. A 45-day public comment period will begin when the Forest Service releases its draft supplemental environmental impact statement, expected at the end of January.

In the long-running battle over the pipeline, the Appalachian Trail Conservancy, which originally opposed the project, signed a "voluntary stewardship agreement" for $19.5 million. Mountain Valley Pipeline LLC has already paid half of that amount to the Conservancy for its support.

If approved, the 42-inch Mountain Valley Pipeline would carry natural gas through Jefferson National Forest in Virginia and West Virginia.

White River National Forest is Nation's Busiest

A recently published economic analysis shows White River National Forest attracts the most visitors and produces the greatest economic impact of any U.S. national forest. Based on pre-pandemic data from fiscal year 2019, the report attributes more than 12 million recreation visits per year to the Forest along with an annual economic impact of $1.59 billion.

The report credits the Colorado national forest with supporting 22,230 jobs and attributes 54% of visits — 6.6 million people per year — to the Forest's 11 ski resorts, which include Aspen, Beaver Creek, Breckenridge, Copper Mountain, Keystone and Vail. All other forms of recreation accounted for 45% of visitors, and wildlife-related visits contributed 1%.

At 2.3 million acres, White River National Forest includes eight wilderness areas and four large reservoirs.

The Lake Tahoe Basin Management Unit, with 14 ski areas, 15,870 jobs, and an economic impact of $1.1 billion, ranks second.

The Maroon Bells, two of Colorado's most recognizable peaks, tower above 14,000 feet in the White River National Forest.

New Panel Will Review Landmark Forest Plan

The Forest Service is forming a new advisory committee for national forests managed under the Northwest Forest Plan (NWFP). The 20-member board will recommend changes to the 1994 plan, which dictates management of 19 national forests in Washington, Oregon, and northern California.

The advisory committee will consist of 20 members approved by the Secretary of Agriculture. Membership will include:

- "Up to 9 members" with relevant scientific expertise.
- "Up to 7 members representing organizations that share a collective interest in the health and sustainability of the [affected] National Forest System lands."
- "Up to 4 members representing state, county, and Tribal governments."

According to the Forest Service, "The Committee will provide input on modernizing landscape management to promote sustainability, climate change adaptation, and wildfire resilience while addressing the increased demands on Northwest Forest Plan lands." The committee will "assist the U.S. Forest Service transition to greater proactive wildfire risk reduction and related vegetation management," indicating more intensive "forest treatments" that will include mechanical thinning and prescribed fire.

The committee will also be tasked with advising "how to protect and promote conservation of mature, old-growth forest while ensuring national forests are resilient to high-severity wildfire, insects, disease ... ." Organizations like The Wilderness Society and The Pew Charitable Trusts have applauded the move as an important step toward fulfilling President Joe Biden's Earth Day 2022 executive order, a primary goal of which is "Restoring and Conserving the Nation's Forests, Including Mature and Old-Growth Forests."

Whether such optimism is merited remains to be seen, given the committee's role in ramping up logging under the guise of "proactive wildfire risk reduction." The Forest Service's reputation for having "never met a tree it didn't want to cut" is underscored by the Forest Service web page devoted to NWFP modernization. Even though local timber-based economies had been in decline for decades prior to creation of the NWFP, the webpage states, "The goal to maintain a viable timber industry to sustain rural communities and economies was not fully realized." Biden's Earth Day executive order also hedges on protecting mature and old-growth forests by including an emphasis on "strengthening local economies."

The federal government created the NWFP in response to pressure to stop clear-cutting old-growth forests, which culminated in the northern spotted owl court ruling and a "threatened" listing under the Endangered Species Act (ESA). FSEEE Executive Director Andy Stahl spearheaded the northern spotted owl campaign, and the ESA listing significantly curtailed old-growth logging in the region.

A trail meanders through old growth Douglas-fir trees in Oregon's Willamette National Forest.

Low-Tech Restoration Improves Forest Resilience

A recently published report concludes that restoring headwaters streams and wetlands enhances wildfire and drought resilience. The report, authored by Jackie Corday and published by American Rivers, reviews and synthesizes published and ongoing research on low-tech process-based restoration (LTPBR) in Western headwaters regions.

LTPBR projects include beaver dam analogs (BDAs), temporary structures made with natural materials (e.g., willow branches, native sod, and cobble). BDAs mimic the influence of beaver dams. As they trap sediment, stream levels gradually rise, floodplains reconnect, and aquifers rehydrate. As incised streams begin to reconnect with their historic floodplains, they become habitable by beavers, which can maintain and expand upon these temporary structures.

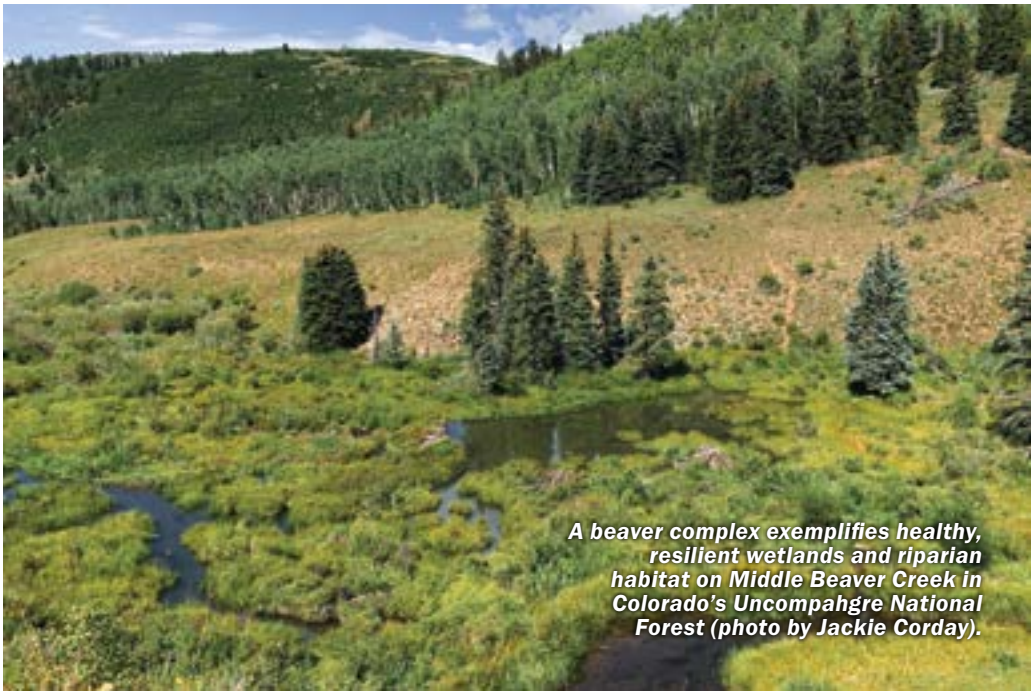
With the presence of beavers, a keystone species across North America, streams return to their natural state prior to the intervention of non-indigenous people. Healthy, functioning floodplains attenuate peak streamflows to recharge groundwater, reduce flood risks, filter sediment and toxins, and provide critical plant and wildlife habitat.

The LTPBR report is especially germane to the Forest Service, which manages millions of acres of headwaters lands across the West and recently received $3.3 billion for wildfire risk reduction. With support from the timber industry, much of that money is being directed toward "forest treatment" projects that involve logging carbon-sequestering trees with petroleum-powered heavy equipment — simultaneously reducing carbon sequestration and increasing greenhouse-gas emissions. By comparison, LTPBR projects mainly rely on manual labor and small equipment.

Stream and wetland degradation began with the practical extermination of beavers in the 1800s, long before records were kept to document the damage. Industrial mining, logging and associated road building followed on the heels of beaver removal, intensively degrading thousands of miles of streams and thousands of acres of wetlands in Western national forests. LTPBR offers a practical way forward. The low cost of LTPBR projects enables implementation at a scale capable of responding to the urgent need to address forest resilience in the face of climate change.

Highlights of Corday's report include a 2020 study of large Western wildfires that found riparian vegetation around beaver complexes had a three times greater rate of survival than around stream segments without beavers. Since increasingly common weather-driven fires are unstoppable, restoring national forest streams and wetlands can provide critical oases in fires-scorched landscapes, maximizing the survival of iconic species needed for biodiversity.

Case studies cited in Corday's report also document water-quality improvements resulting from LTPBR projects. According to the Forest Service, national forests and grasslands are "the largest source of fresh water in the U.S. under a single manager," supplying some 180 million people. Given well-publicized threats to Western water supplies, Corday's report provides a timely reminder that LTPBR projects can, in addition to improving drought and wildfire resilience, help address the Forest Service's original legislative mandate "to protect and enhance water supplies."



A beaver complex exemplifies healthy, resilient wetlands and riparian habitat on Middle Beaver Creek in Colorado's Uncompahgre National Forest (photo by Jackie Corday).

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Inyo National Forest in the eastern Sierra Nevada is home to bristlecone pines, the oldest trees in the world, with some having lived almost 5,000 years.

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