

PERCREPORTS



How to Confront the Wildfire Crisis

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As summer approaches, wildfire season is already upon us. By early May, 1.1 million acres had burned in the United States, double the amount that had burned at the same point last year.

The trends are alarming. Wildfires now consume twice as much land each year on average than they did in the 1990s.

Catastrophic wildfires are sparking bipartisan interest in active forest management to reduce extreme fire risks.

But despite growing recognition of the importance of forest management, significant hurdles remain. Red tape and litigation can hinder even the most-needed projects.

This special issue of PERC Reports explores these issues in detail. As Jonathan Wood explains (page 12), reducing the forest restoration backlog requires addressing persistent policy obstacles.

Other challenges loom large. J.D. Tuccille (page 26) describes how innovative markets for wood products can help support needed restoration work.

The lesson is clear: Fixing America's forests will take more than just spending money, as the Biden administration's plan proposes to do.



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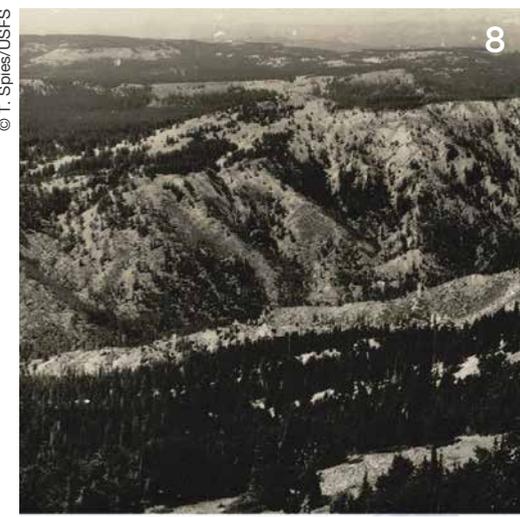
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The Big Burn of 1910 and the Choking of America's Forests

Decades of fire suppression fuel catastrophic wildfires today

© USFS Northern Region

We are living in the age of the megafire. Fires that burn more than 100,000 acres are becoming commonplace in America. Nowhere is that more evident than in California. Throughout the 20th century, there were 45 megafires recorded in the state. In the first 20 years of this century, there have already been 35—seven in 2021 alone. The 2020 August Complex Fire in Northern California became the nation's first "gigafire" since the Yellowstone Fire of 1988, consuming more than 1 million acres across three national forests.

Drought, fire weather, and climate change are all contributing factors. Less discussed, however, is how a single event in American history led to a century-old, failed government policy that delivered the primary cause of today's crisis—too much wood in the woods.

Since the early 20th century, federal policy has been to suppress fires at all costs. Now most forests are incredibly overstocked with fuel as a result. And it can all be traced to the Great Fire of 1910, an episode known as the Big Burn.

The lead up to the Big Burn is a story unto itself. Since the late 1800s, presidents have created forest reserves—public forest land set aside to be protected and sustained. President Theodore Roosevelt, however, supercharged this effort by designating 150 national forests and establishing the U.S. Forest Service in 1905. The moves were not without controversy.

Some powerful members of Congress opposed the creation of a new agency, believing that Roosevelt was taking land away and denying economic opportunity. Further, at the time of the Forest Service's creation, there was a split on how to manage

forests. For some, fire was the enemy to be exterminated with militaristic gusto by green-shirted legions of new forest rangers.

Others, though, knew that North American forests had evolved with fire for thousands of years. Tribes had used fire for select purposes, including protection, food supply, and the health of wildlife and ecosystems. Foresters in this camp recognized the value of "light burning," which would clear out the understory, preempting huge, destructive treetop fires by setting cool, low-to-the-ground beneficial ones.

It was this "who" and "how" to manage our nation's forests that provided the backdrop for the events of August 1910. Record low precipitation in April and May coupled with severe lightning storms in June and sparks from passing trains had ignited many small fires in Montana and Idaho. More than 9,000 firefighters, including servicemembers from the U.S. Army, waged battle against the individual fires. The whole region seemed to be teetering on the edge of disaster.

Then, on August 20, a dry cold front brought winds of 70 miles per hour to the region. The individual fires became as one. Hundreds of thousands of acres were incinerated within hours. The fires created their own gusts of more than 80 miles per hour, producing power equivalent to that of an atomic bomb dropped every two minutes.

Heroic efforts by firefighters to save small mountain towns and evacuate their people became the stuff of legend. "The whole world seemed to us men back in those mountains to be aflame," said firefighter Ed Pulaski, one of the mythical figures to emerge from the Big Burn. "Many thought it really was

the end of the world." Smoke from the Mountain West colored the skies of New England.

In just two days, the Big Burn torched an unfathomable 3 million acres in western Montana and northern Idaho, mostly on federally owned forest land, and left 85 dead in its wake, 78 of them firefighters. The gigafire-times-three scarred not only the landscape, but also the psyche of the Forest Service, policymakers, and ordinary Americans.

After the Big Burn, forest policy was settled. There was no longer any doubt or discussion. Fire protection became the primary goal of the Forest Service. And with it came a nationwide policy of complete and absolute fire suppression. In the years to follow, the Forest Service would even formalize its "no fire" stance through the "10 a.m. rule," requiring the nearly impossible task of putting out every single wildfire by 10 a.m. the day after it was discovered. The rule would stay in effect for most of the century.

Bad events can create bad policy. Today, more than 100 years after the Big Burn, we are left with our current wildfire paradox: Decades of fire suppression have resulted in accumulated fuels that lead to larger and more severe wildfires that cannot be suppressed. Or as former Forest Service fire tower lookout Philip Connors has written, "By suppressing fire so successfully for so long, the public land agencies groomed the nation's forests for the age of the megafire: a collision of climate change and tremendous, unnatural fuel loads."

Fuel loads today are so dense and forests so radically altered that it is nearly impossible for there to be anything resembling a "natural" fire. Forest scientists studying the drivers of high-severity fire in the West have found that the fuel loads in our forests are by far the most important factor, followed far behind by fire weather, climate, and topography. Today, 63 million acres, or one-third of the land in our national forests—an area the size of Oregon—are at high risk of catastrophic wildfire.

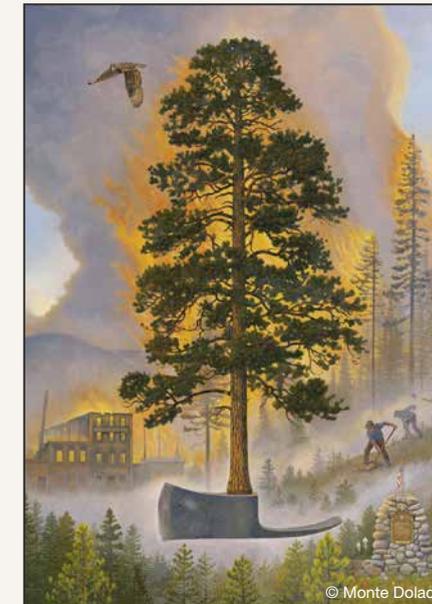
Again, California is expositive. According to Ron Goode, tribal chairman of the North Fork Mono, prior to white

settlement, Native Americans carried out "light burning" on 2 percent of the state annually. As a result, most forest types in California had about 64 trees per acre. Today, it is more common to see 300 trees per acre. This has led to a fiery harvest of destruction—bigger, longer, hotter wildfires. In 2020 alone, wildfires in California engulfed the equivalent of a Big Burn plus 1 million additional acres.

The Big Burn shaped the American fire landscape we have today. But even with a century of misguided forest management, there are promising signs we have turned the corner.

First, there is growing bipartisan recognition and scientific consensus that our forests need to be more actively managed through forest thinning and prescribed burning. Second, the Forest Service has released a 10-year "wildfire crisis strategy" with a goal of increasing by 20 million the acres treated in national forests, along with an additional 30 million acres on other federal, state, tribal, and private lands. Finally, there are serious ongoing policy conversations about addressing the barriers to accelerating forest treatments, including the regulatory hurdles, incessant lawsuits, permitting obstructions, and certification issues that are poised to stymie any large-scale forest restoration strategy.

The Big Burn of 1910 will always be with us. We will never fully escape the consequences of government policies that were solidified while the ashes of forests in Idaho and Montana smoldered. But today's "age of the megafire" can be an equally historic catalyst toward a new future for our forests, one that more closely mimics nature and the practices of those who lived closest to the land. That is how we will fix America's forests.

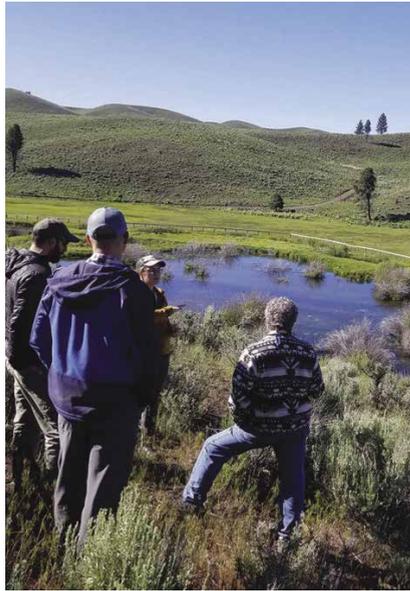


© Monte Dolack

A single event in American history led to a century-old, failed government policy that delivered the primary cause of today's crisis—too much wood in the woods.



Brian Yablonski is the CEO of PERC. In "Frontiers," he describes how PERC seeks to advance creative conservation through incentives, innovation, and cooperation.



Muddy WOTUS. The uncertain reach of the federal Clean Water Act over privately owned wetlands has been a persistent source of conflict for a half-century. In April, PERC filed an amicus brief in the U.S. Supreme Court highlighting its research that shows how lack of clarity can cause federal enforcement to be unfocused or haphazard, make wetlands a liability for private property owners, and breed ill will between landowners, conservation interests, and regulators. This conflict ultimately discourages market solutions to conserve and restore wetlands.



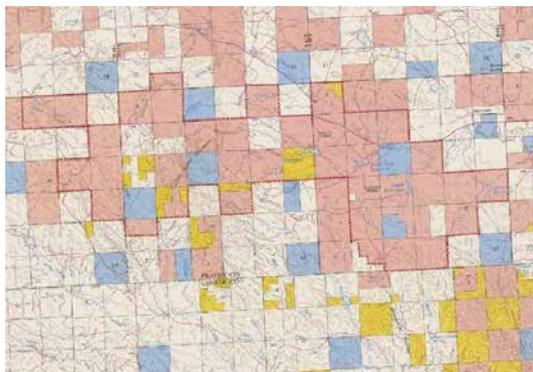
© MeatEater

MeatEater’s auction house of oddities. Steven Rinella and his MeatEater crew have assembled a bazaar of the bizarre to raise funds for the venture’s Land Access Initiative, which uses private dollars to enhance access to the 15 million acres of inaccessible public land throughout the West. Up for auction are outdoor oddities ranging from Janis Putellis’s first pheasant tail to bottled skunk stink to a bear baculum. One wingbone turkey call made by hunter-extraordinaire Clay Newcomb already sold for \$1,000, showing how MeatEater’s creative marketplace can help channel private dollars into public access.



© Phil

Getting the most from every drop. In a paper published in the *Journal of Political Economy*, past PERC fellows Andrew Ayres, Kyle Meng, and Andrew Plantinga attempted to quantify the benefits of a market for a major aquifer in water-scarce Southern California. They estimated that a groundwater market there resulted in agricultural land values 220 percent higher, on average, than for nearby land subject to an open-access water regime. The market not only led to increased property values, but it also resulted in higher levels of groundwater, demonstrating how environmental markets can improve resource management and help people do more with less.



Going digital. Due to the checkerboard nature of many western lands, public access is a significant source of conflict between the U.S. Forest Service, private landowners, and public land users. In Montana’s Crazy Mountains, for instance, conflict over disputed trails led to a lawsuit in which a trial court recently upheld a compromise between the federal agency and a private landowner. To diminish such disputes in the future, Congress recently enacted the Modernizing Access to Our Public Land Act, or MAP Act, which requires federal land management agencies to collect and digitize information about public access. A similar effort in Montana and Idaho has identified easements opening up 29,600 acres previously thought to be landlocked.



© Bonneville Power Administration

Save a salmon, and make money doing it. Northern pikeminnows are voracious eaters, consuming millions of young salmon and steelhead each year. To protect salmon populations, the Bonneville Power Administration will pay you cash to catch pikeminnows in the Columbia and Snake Rivers from May through September. Payments start at \$6 per fish but increase the more you catch, reaching as high as \$10 for each fish. Last year, one angler pocketed \$61,000—not bad for five months of fishing. Biologists estimate the reward program has reduced predation on young salmon and steelhead by 40 percent since 1990.



© Wes Overvold/Implement Productions

Carrots, not sticks. Last year, PERC joined with other conservation groups to highlight the need for federal agencies to work with, not against, private landowners to protect the West’s migration corridors. That work is paying off. In May, the U.S. Department of Agriculture announced a new partnership with Wyoming to encourage the voluntary conservation of migration corridors on private working lands. Instead of creating new regulations or designations, the initiative will provide incentive-based tools for conserving private lands. USDA Under Secretary Robert Bonnie put it this way: “We should do conservation with private landowners, not to private landowners.” We agree.



Putting the kibosh on Haber-Bosch? With war and pandemic sending fertilizer prices to record highs, Nitricity is aiming to improve on one of the most important innovations of the last century: nitrogen fertilizer production. The startup, which has launched a successful pilot in California, developed a unique chemical process to fix nitrogen using solar electricity rather than natural gas. The process also decentralizes production because it can be performed on the farm rather than in a factory. The company aims to eventually mitigate more than 10 million tons of carbon dioxide per year—roughly the amount emitted by two million passenger vehicles.



© Mass. Office of Energy & Environmental Affairs

As sharks proliferate, tech bites back. After the debut of “Jaws” in 1975, decades of indiscriminate hunting slashed the number of great white sharks off the coast of Cape Cod. Since then, conservation efforts have led to a rebound of the sharks as well as their favorite food source—gray seals. But with more fins in the water, Northeastern beaches have now seen several high-profile shark attacks, inspiring “enviropreneurs” to pursue new technologies to keep swimmers safe. One, an app called Sharktivity, provides real-time alerts every time a tagged shark swims by a network of buoys. Another, developed by Moosh Systems, uses drones to spot sharks in the surf. Both aim to help resolve a potent source of conflict with wildlife on land and sea: overabundance.

Losing the Forest for the Trees

A century of fire suppression has altered
the state of our forests

BY SHAWN REGAN

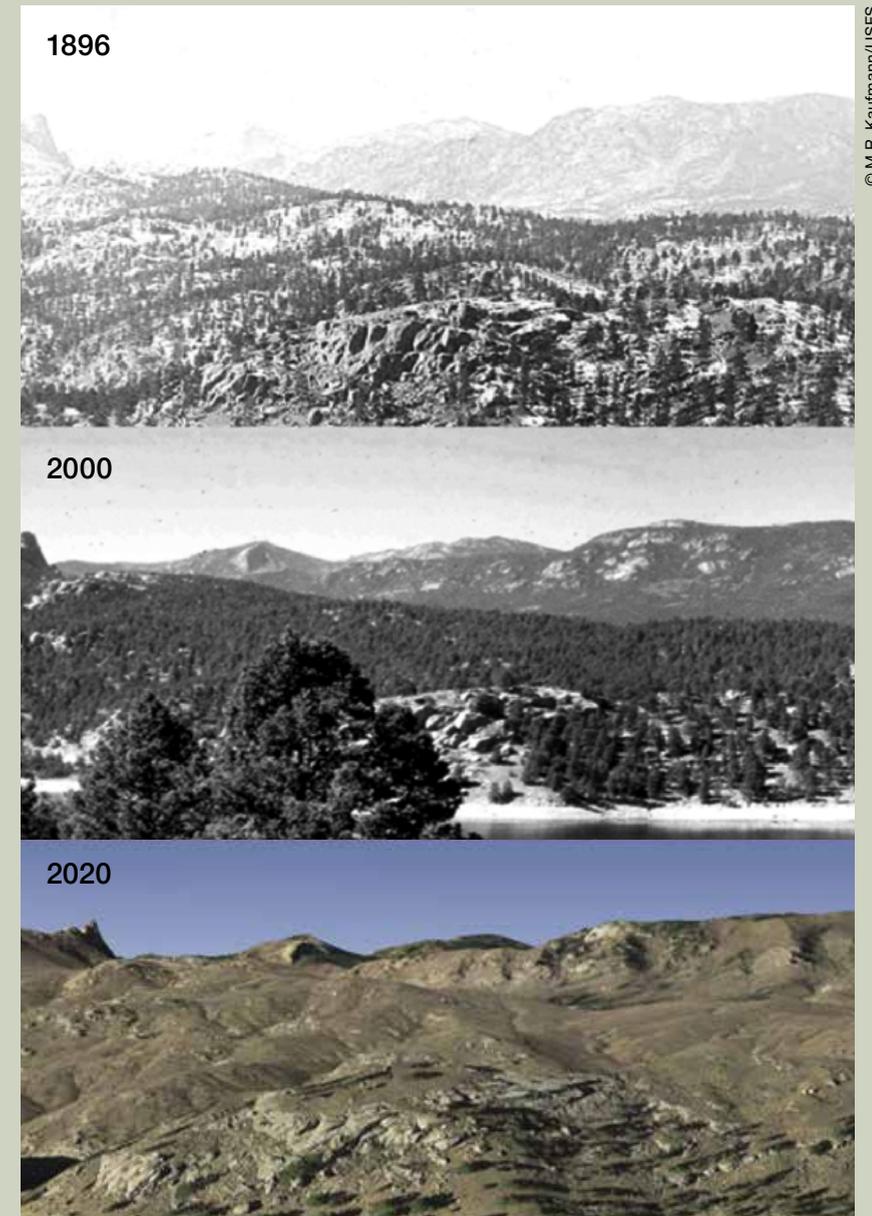
If you were to walk through the forests of the American West in the 19th century, you would see a landscape vastly different from the one that exists today: Scattered trees mixed with open meadows. Mosaics of young growth interspersed with mature stands. Fire scars from frequent, low-intensity wildfires, many of them set by Native Americans.

Visitors to the region took note of these features. The Lewis and Clark expedition observed fires set by Native Americans in the upper Missouri River drainages. John Muir described how you could ride on horseback through the “inviting openness” of the Sierra woods with little difficulty. Carleton Watkins’ photos from Yosemite Valley featured scenic meadows thinly dotted with trees.

In much of the West today, that is no longer the case. A century of fire suppression has turned many western forests into dense, fire-prone thickets. Conifers have encroached on or consumed open meadows. And shade-tolerant species such as Douglas fir have choked out old-growth stands of ponderosa pines. One recent study found that the West’s dry forests are six to seven times more crowded than they were a century ago, stocked with trees that are 50 percent smaller.

These dense forests, combined with a warmer climate, can lead to catastrophic wildfires. Dangerous fuel loads allow fires to reach the tree canopy, where they spread rapidly in thick forests and inflict significant damage to ecosystems, watersheds, and nearby communities. They also emit large amounts of smoke and other air pollution. By one estimate, fires in the western United States last summer released 130 million tons of carbon dioxide—roughly a year’s worth of pollution from 25 million cars.

A century of change



Today’s fires can burn so large, and so intense, that they threaten the ability of America’s forests to regenerate. Colorado’s Cheesman Reservoir, which supplies water to the city of Denver, was once surrounded by open woodlands scattered with ponderosa pines due to frequent, low-intensity fires. By 2000, a dense forest had built up, fueling a severe fire that burned in 2002. The fire burned so hot that, by 2020, the forest hadn’t recovered. The landscape is now dominated by shrubs.

© M.R. Kaufmann/USFS



Giant sequoias of Mariposa Grove

By the 1960s, Yosemite's giant sequoia groves were no longer regenerating. The trees rely on disturbances such as fire to regenerate, but the National Park Service was suppressing all fires in the park. In the past, frequent ground fires kept other species under control and helped open sequoia cones to scatter seeds. Without these fires, shade-tolerant white firs began outcompeting sequoia seedlings, creating a dangerous fuel load that threatens sequoias by allowing fire to reach their crowns. Last year, thousands of giant sequoias were killed by wildfires in nearby Sequoia National Park.

© G. Reichel & D. Taylor/NPS

Fuel treatments work

There is growing recognition among fire experts that restoring historic forest conditions through selective thinning and prescribed burning can reduce the risks of catastrophic wildfires by making forests more fire resilient. As the Bootleg Fire ripped through the Fremont-Winema National Forest in southern Oregon last year, the importance of forest restoration was on display: In places where prescribed fires and forest thinning had been carried out, firefighters reported that flames returned to the ground, where they moved slower, did less damage, and were easier to fight. Such restoration work, however, has been slow to get off the ground. As of 2018, 80 million acres of national forest land are in need of restoration to reduce susceptibility to wildfire, disease, and insects, according to U.S. Forest Service officials.



© S. Rondeau /Klamath Tribes' Natural Resource Department



Fixing America's forests

Dense forests, such as the one in Arizona shown in the top photo, fuel large wildfires that can be catastrophic for people and ecosystems alike, while forests that have been thinned present lower risks of extreme wildfire. Mechanical thinning projects reduce forest density by removing small or unhealthy trees while leaving large, mature trees standing, as seen in another Arizona forest in the bottom photo, resulting in a landscape that resembles the western forests of past centuries. Thinning and complementary restoration efforts help protect watersheds, enhance wildlife habitat, store carbon, and increase forest resiliency to pests, disease, and other threats.

© Salt River Project

The need for "good fire"



Prescribed burning is an effective way to reduce dangerous fuel loads and promote fire-resilient forests. In this series of images from a prescribed burn project in Sequoia and Kings Canyon National Parks in California, the benefits of these "good fires" are on display. The top photo shows an area of the park that was treated with a prescribed burn. The middle photo was taken in 2015 after the Rough Fire burned through the area. The bottom photo was captured in 2020, showing the landscape's resilience. Despite the wildfire, the trees in the area remain healthy and standing.



Shawn Regan is the vice president of research at PERC and executive editor of *PERC Reports*.

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Ramping Up Forest Restoration

The U.S. Forest Service plans to increase the pace of forest restoration by 50 million acres over the next decade. Success, however, depends on partnering with states, tribes, and the private sector and tackling persistent policy obstacles

BY JONATHAN WOOD



© USFS Pacific Northwest Region

Many collaborative restoration projects aim to improve forest health and reduce wildfire risk in public and private forests.

As the **Caldor Fire** made its menacing march toward South Lake Tahoe last summer, it burned more than 200,000 acres and destroyed over 700 homes. While the effects of the fire were tragic, greater tragedy was averted when firefighters steered the fire away from the city and to an area where fuel loads had been reduced through active forest management. This tamed the fire enough for firefighters to fight it directly and get it under control.

South Lake Tahoe was not the only area where recent management actions helped stave off disaster in 2021. In Oregon, the **Bootleg Fire** burned more than 400,000 acres, producing flames over 200 feet high. Katie Sauerbrey, a fire manager for the Nature Conservancy, told *The New York Times* that it was “the most extreme fire behavior I had ever seen in my career.” But when the fire passed from the Fremont National Forest to the conservancy’s **Sycan Marsh Preserve**, the catastrophic wildfire changed dramatically. In an area that the conservancy had thinned and then managed with prescribed burns, the flames shrank to a mere four feet, dropping from the forest canopy to the ground, where they were easier to control.

These and other high-profile examples of forest restoration projects reducing the consequences of wildfires have sparked bipartisan interest in ramping up those projects. In January, the U.S. Forest Service announced a 10-year strategy to implement strategic restoration projects—including mechanical thinning and prescribed burns—on 50 million acres (over and above its normal restoration levels) of federal, state, and private land where fire risks and threats to communities are greatest. This ambitious plan relies on roughly \$1.5 billion that Congress appropriated in last year’s infrastructure legislation

for mechanical thinning, prescribed fire, and post-fire recovery projects, and it calls for spending a total of \$50 billion over the next decade.

But carrying out the Forest Service’s ambitious plan in a mere decade will require more than increased funding. It will require Congress and the Forest Service to address policy obstacles that have sapped the agency’s ability to deliver forest restoration at scale and on time. And it will also require greater engagement with states, tribes, and private partners to capitalize on their local knowledge and capacity to perform restoration projects.

A Backlog Fuels Fire

Fire is nothing new to western forests, which are adapted to flames due to climate, terrain, and indigenous tribes’ use of controlled fire for millennia. However, recent catastrophic wildfires are far more destructive than historical fire regimes. They are more likely to threaten old-growth trees, wipe out habitat for wildlife, and cause erosion that degrades watersheds and fish habitat. And due to growing populations near forests, modern fires also threaten communities and property in ways not seen before.

Forest restoration—the use of mechanical thinning, prescribed fire, replanting, and erosion-control techniques—can reduce wildfire damage while promoting more resilient forests. The Forest Service reports an 80 million-acre backlog in needed restoration, more than 40 percent of the 193 million acres under the agency’s control. The agency deems 63 million of those acres to be at high or very high risk of burning. Add to this the 54 million acres managed by the Department of

the Interior and the total area of federal land facing high or very high fire risks is larger than the state of California.

Wildfires are not limited to federal forests. But national forests nonetheless play an outsized role due to their concentration in the West as well as the conditions throughout many of them. While the federal government owns less than a third of forests nationwide, it controls roughly half the forested land in Arizona and Washington; 60 percent in California, Colorado, Montana, and Oregon; and 80 percent in Idaho and Nevada. Due to this concentration and differences in how federal and private lands are managed, the total area of federal land facing high or very high wildfire risks far exceeds the 52 million private acres facing such risks. And federal lands are consistently overrepresented in the total area burned, including 75 percent of the acreage burned in the West during 2020.

Power in Partnerships

While the infrastructure bill’s \$1.5 billion for forest management is a lot of money, it goes quickly when spread across 50 or 80 million acres. The cost of mechanical treatments and prescribed burns varies among different forest types and landscapes, but \$1,000 per acre is a commonly used average. The infrastructure bill, however, represents only about \$30 per acre toward the Forest Service’s 10-year goal and only \$20 per acre toward the larger forest restoration backlog. Thus, it will be essential that the agency work with outside partners to stretch the money further and, through collaboration, overcome conflict.

Such partnerships are also critical because the Forest Service’s capacity to increase forest restoration is limited. Perhaps understandably, the agency has historically responded to fire’s political salience by shifting resources to suppression. The programs that fell victim of the agency’s “fire borrowing,”

Forest restoration—the use of mechanical thinning, prescribed fire, replanting, and erosion-control techniques—can reduce wildfire damage while promoting more resilient forests.

a euphemism for raiding other programs to fund firefighting efforts, were “often those that improve the health and resilience of our forested landscapes and mitigate the potential for wildland fire in future years” according to a 2015 Forest Service report. “[I]t is readily apparent that the Forest Service cannot meet national direction to increase the pace and scale of forest restoration with its current workforce,” concludes a 2019 survey of Forest Service managers.

States, tribes, and private parties are motivated to help due to the significant benefits forests provide, including clean air and water, wildlife habitat, and recreation opportunities. For instance, the National Forest Foundation and Salt River Project, a water utility, have formed the Northern Arizona Forest Fund to perform restoration in five national forests. Since 2015, the fund has raised more than \$6.2 million from a diverse group of supporters, including the Arizona Department of Fish and Wildlife, the cities of Scottsdale and Phoenix, Coca-Cola, businesses dependent on outdoor recreation, and conservation groups.

From the perspective of these supporters, paying for forest restoration today is much better than suffering the consequences of wildfire tomorrow. Thanks to these contributions, as well as volunteer time and expertise, the Northern



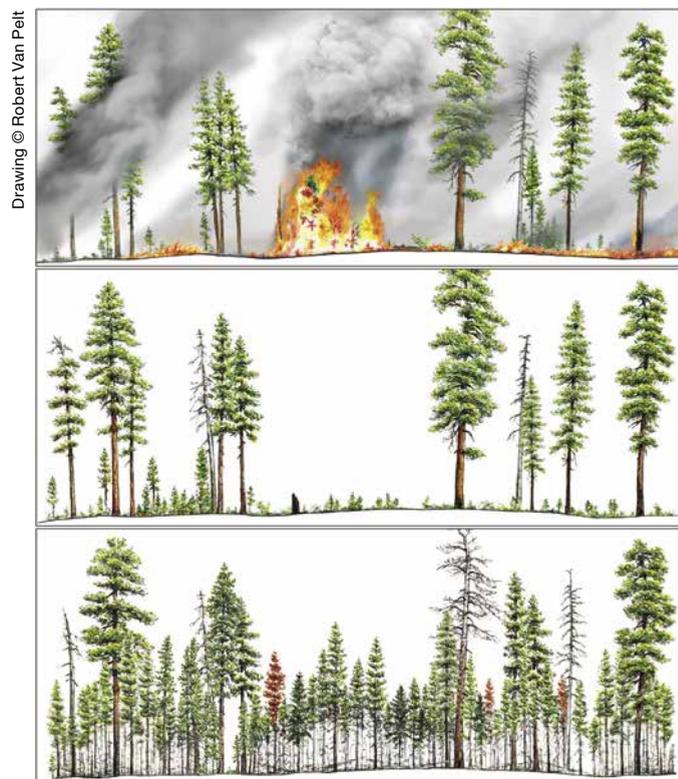
Representative photos of (A) prescribed fire reducing fuels in a forest previously thinned and burned; (B) mechanical thinning rearranging fuels; and (C) fuel accumulation in a fire-excluded forest with grand fir infilling around western larch trees

© Roger Ottmar, Susan Prichard, John Marshall

States, tribes, and private parties are motivated to help due to the significant benefits forests provide, including clean air and water, wildlife habitat, and recreation opportunities. From the perspective of these supporters, paying for forest restoration today is much better than suffering the consequences of wildfire tomorrow.

Drawing at right

Top: Frequent fire reduces surface and ladder fuels. Middle: Live and dead fuels gradually accumulate between fires. Bottom: Denser and more layered conditions prevail after prolonged fire exclusion, where high-severity fire is likely.



Drawing © Robert Van Peit



© Lisa McNeel/BLM

Prescribed fires renew grasses and reduce brush, dead trees, and other crowded vegetation that fuel wildfires.

Arizona Forest Fund has implemented fuel reduction projects on 13,600 acres, improved 2,600 acres of wetlands, planted 90,000 trees, and reduced erosion along 170 miles of roads and trails. As J.D. Tuccille reports (page 26), viable markets for small-diameter timber and brush could empower similar collaborations to restore even more forest land.

In many communities, raising large sums up front for the promise of future benefits may be difficult. To solve this problem, two nonprofit organizations, Blue Forest and the World Resources Institute, have launched forest resilience bonds, which raise private capital to pay for forest restoration and allow beneficiaries to pay investors back over time as benefits are achieved. In 2018, the groups raised \$4 million from investors to implement the first forest resilience bond, in Tahoe National Forest, with the State of California and the Yuba Water Agency signing on to repay the bond. The bond has enabled restoration projects covering 7,000 acres, completing in four years work that the Forest Service expected to take at least a decade.

With this proof of concept, Blue Forest is scaling up the innovation substantially. It is currently raising \$25 million for a second bond, to restore more than 28,000 acres of Tahoe National Forest. And it has three more bonds in the pipeline, which could help restore tens of thousands more acres across the West.

Partnering with local governments also presents an opportunity to stretch dollars further while obtaining the benefits of local knowledge and enthusiasm. As Hannah Downey explains (page 34), under the Forest Service’s Good Neighbor program, states, tribes, and counties can take the lead on planning and implementing timber sales and stewardship contracts. In 2020, Good Neighbor Authority projects constituted 11 percent of all timber sales in Forest Service Region 1, which covers Montana, North Dakota, and parts of Idaho and South Dakota. The program lets states keep receipts from timber contracts to fund additional restoration projects. But tribes and counties are arbitrarily excluded from this part of the program.

Restoration Meets Red Tape

Ultimately, there may be a long road from the Forest Service announcing its ambitious 10-year plan and Congress appropriating money to the agency and partners increasing on-the-ground work. This is because several policy obstacles hinder the Forest Service’s ability to ramp up restoration, a challenge PERC explored in its 2021 report “Fix America’s Forests.”

For one, forest restoration projects must be reviewed under the National Environmental Policy Act (NEPA). Depending on the extent of anticipated impacts, NEPA may require the Forest Service to analyze a project through, in order of increasing

complexity and expense, a categorical exclusion, environmental assessment, or environmental impact statement. The agency may also need to develop a range of alternatives to the project and analyze their impacts. The resulting documents routinely span hundreds of pages of dense text, with appendices spanning another thousand pages or more.

While well intentioned, NEPA reviews can increase project costs significantly and inject substantial delays. According to a new report by PERC Senior Research Fellows Eric Edwards and Sara Sutherland, “Does Environmental Review Worsen the Wildfire Crisis?” the average time from when NEPA review begins and on-the-ground treatment begins is 3.6 years for mechanical thinning and 4.7 years for prescribed burns, with 476 and 463 days respectively spent generating required NEPA analysis.

The key factor for determining how long it takes to review a forest restoration project under NEPA is the type of analysis required. For a project analyzed under a categorical exclusion, the NEPA analysis takes approximately seven months on average. If a project requires an environmental assessment, then the average time required will increase by nine months compared to a categorical exclusion. And if it requires an environmental impact statement, the time required increases by two years on average compared to a categorical exclusion. Forest restoration projects are more likely than other

Forest Service activities to require an environmental assessment or environmental impact statement, making NEPA a more significant challenge for forest restoration. (See page 20 for more detail about the new report from PERC.)

Unless these timelines can be reduced, they represent a significant obstacle to achieving the Forest Service’s 10-year strategy. The agency anticipates focusing on “shovel-ready” projects—which have already undergone NEPA review—in years one and two. But it may be years before the plan results in new projects ready to be implemented. If, for instance, the Forest Service hopes to carry out ambitious prescribed burns, the type of project most likely to require an environmental impact statement, it has less than three years to develop those plans and begin the NEPA process if it wants to actually implement the prescribed burns before the decade is up. (On page 40, Tate Watkins explores the state of prescribed fire use.)

In many western forests, the Endangered Species Act presents an additional complexity. If a project may affect a species or its critical habitat, the agency must consult with the U.S. Fish and Wildlife Service to identify ways that impacts to the species can be avoided or mitigated. The law’s intention is good, but the means of pursuing it presents underappreciated risks. Consider the Forest Service’s ill-fated Pumice Project, which was proposed in 2011 to reduce wildfire risks on nearly 10,000 acres of Klamath National Forest. The project faced

Conflict over the Bozeman Municipal Watershed Project in Montana presents a worst case scenario of bureaucracy and litigation compounding the effects of each other. It's questionable what, if any, benefit the public got from more than 15 years of litigation and bureaucratic morass.

a decade of objections from local environmental organizations over alleged impacts to the northern spotted owl, a species listed as threatened under the Endangered Species Act. Ultimately, 2021's Antelope Fire "burned through the site before a single chainsaw touched a tree, destroying the owl habitat that the environmental groups were trying to save," according to a recent report by the *Sacramento Bee*. Drew Stroberg, a district ranger in the Klamath National Forest, lamented the time and resources sunk "into kind of bullet-proofing" the environmental analyses, observing that "now, they might as well be in the trash can."

In much of the West, delays can give the act a cascading effect. If a new species is listed or critical habitat designated in the years between an environmental review is done and a project is implemented, the agency can be forced to stop on-the-ground work and redo the analysis. Under the Ninth Circuit's 2015 *Cottonwood* decision, such regulatory changes require the Forest Service to restart consultation with the Fish and Wildlife Service at the forest plan level, then restart consultation for individual projects before proceeding. The Obama administration urged the Supreme Court to reverse *Cottonwood*, arguing that the rule "has the potential to cripple the Forest Service."

Litigation is another obstacle—one that compounds the others. The Forest Service faces more NEPA lawsuits than any other federal agency. Roughly two-thirds of the lawsuits challenging Forest Service projects from 2005 to 2019 targeted forest restoration projects. The consequences of litigation, however, have not been evenly felt. Eighty-five percent of cases were filed in courts within the Ninth Circuit. Nearly half were filed in only two district courts: the District of Montana and the Eastern District of California, both areas facing significant wildfire risks.

Litigation risks have a cascading effect. Agency personnel report that they respond to the perceived threat by trying to "litigation proof" NEPA and Endangered Species Act reviews. According to PERC's research, mechanical treatments



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Dense forests pose wildfire risks that threaten 80 percent of the water supply for the city of Bozeman, Montana.



© USDA NRCS Montana

Public-private partnerships are essential for meeting the Forest Service's goal of improving the health and resiliency of forest ecosystems.

requiring an environmental impact statement that is litigated take nearly seven years before the treatment begins, compared to five for those that aren't litigated. For prescribed fires, these timelines are 9.4 years and 6.8 years, respectively.

Conflict over the Bozeman Municipal Watershed Project in Montana presents a worst case scenario of bureaucracy and litigation compounding the effects of each other. In 2004, the Forest Service determined that wildfire risks in an area of the Custer-Gallatin National Forest threatened 80 percent of the city of Bozeman's drinking water supply and required urgent action.

The Forest Service spent three years preparing a draft NEPA document. While the agency was working to finalize that document, a federal court overturned the delisting of the local grizzly bear population, triggering the agency's duty to consult with the Fish and Wildlife Service. In 2010, the Forest Service released its NEPA and Endangered Species Act analysis and approved the project. Administrative challenges were filed. While those were pending, the Ninth Circuit decided several unrelated cases that caused the agency to revise its analysis again to address perceived litigation risks.

After that additional review was complete, a lawsuit was filed. While that was pending, critical habitat was designated for the Canada lynx, which led the Ninth Circuit to hold in *Cottonwood* that projects like the Bozeman Municipal Watershed Project required an additional round of analysis and resulted in a district court enjoining the project. After the Forest Service completed this additional analysis, the district

court lifted its injunction in 2020, allowing the project to finally move forward.

Such delays could perhaps be justified if they resulted in material improvements to a seriously flawed project. But that wasn't the case with the Bozeman project, which remains the same as it was when originally proposed more than 15 years ago. It's questionable what, if any, benefit the public got from the protracted litigation and bureaucratic morass.

Clearing the Logjam

If the backlog is going to be overcome, more innovative public-private partnerships and policy reforms are needed. Such reforms should seek to encourage collaboration, rather than conflict, to increase the Forest Service's flexibility to partner with states, tribes, and private parties, and to facilitate market reforms that can make forest restoration cheaper, or even profitable. With fire seasons growing longer, millions of acres burning every year, and more people and homes at risk, the stakes could not be greater.



Jonathan Wood is the vice president of law and policy at PERC. This essay is adapted from its original publication in *The Environmental Forum*.

How Environmental Red Tape Inflames Wildfire Risk

While well-intentioned, environmental review requirements prolong much-needed fuel treatments

BY ERIC EDWARDS AND SARA SUTHERLAND

Last summer, the Bootleg Fire in southern Oregon grew so intense that it created its own weather—“unpredictable winds, fire clouds that spawn lightning, and flames that leap over firebreaks,” as *The New York Times* reported at the time. The fire ultimately burned 400,000 acres and destroyed more than 100 homes, but it also provided a stark example of the benefits of forest treatments.

In an effort to preemptively reduce the impacts of large and costly wildfires, forest managers use treatments that remove fuels—brush, trees, and other flammable materials—to lessen the intensity of burns. The two most common fuel treatments are mechanical treatments and prescribed burns. Mechanical treatments use machinery to remove and rearrange vegetation in forests with the intent of reducing ladder and canopy fuels. Prescribed burns are planned fires that aim to achieve specific management objectives such as reducing fuel loads or improving habitat.

Reports of the Bootleg Fire suggested that an area where scheduled

prescribed burns had been delayed suffered more damage than areas where treatments had been completed. Firefighters also reported that where both types of treatments had been applied, fire intensity was reduced, the crowns of trees were left intact, and the blaze became a more manageable

The U.S. Forest Service has not been able to undertake mitigation activities at the scale needed to address wildfire threats in a meaningful way.

ground fire. While these approaches have proven effective, the U.S. Forest Service has not been able to undertake mitigation activities at the scale needed to address wildfire threats in a meaningful way.

Regulatory processes and litigation pose significant barriers to achieving federal mitigation goals. One survey of forest managers suggested that environmental policies are viewed as an important hurdle to prescribed burns, a key method of reducing fuels. Regulatory processes that increase the time between identifying and implementing treatments exacerbate wildfire risk and limit the flexibility of managers to use new information to quickly address emerging risk. In 2021, for example, several proposed treatment areas burned in large wildfires while facing delays from environmental review and litigation.

In a new PERC Policy Brief, “Does Environmental Review Worsen the Wildfire Crisis?,” we examine the amount of time it takes the Forest Service to implement fuel treatment projects while navigating the requirements of the National Environmental Policy Act (NEPA). NEPA is a procedural law that requires federal agencies to assess the environmental impacts of proposed actions. Under NEPA, proposed projects undergo one of three types of

analysis, in ascending order of rigor: categorical exclusion (CE), environmental assessment (EA), or environmental impact statement (EIS). While only some fuel-reduction activities require an EIS, the NEPA process can be time-consuming and resource-intensive for all projects.

Advocacy groups, firms, and the general public can file objections to NEPA decisions to the Forest Service and, once that avenue is exhausted, can also file lawsuits to overturn decisions or compel additional analysis. Although most projects are not litigated, the depth of analysis and time spent on the NEPA process is commonly based on the threat of litigation, as well as the level of public and political interest and defensibility in court.

Our recent report published by PERC compiles new NEPA data to

examine the duration of administrative review for Forest Service wildfire mitigation activities. It documents how long it takes to implement fuel treatment projects and then separates out the portion that involves NEPA review from other factors, including litigation.

The Biden administration has proposed treating 20 million additional Forest Service acres to mitigate wildfire over the next decade. Changes in the process by which the Forest Service conducts environmental reviews and implements fuel treatments are likely needed to meet the ambitious goal. Our analysis shows that for projects that require environmental impact statements, the average prescribed burn takes 7.2 years before the first burn treatment begins, and the average mechanical treatment is not far behind at 5.3 years. Finding ways to reduce

the 2.7 years mechanical treatments and prescribed burn projects spend, on average, in NEPA review for an EIS would help meet ambitious fuel-reduction targets.

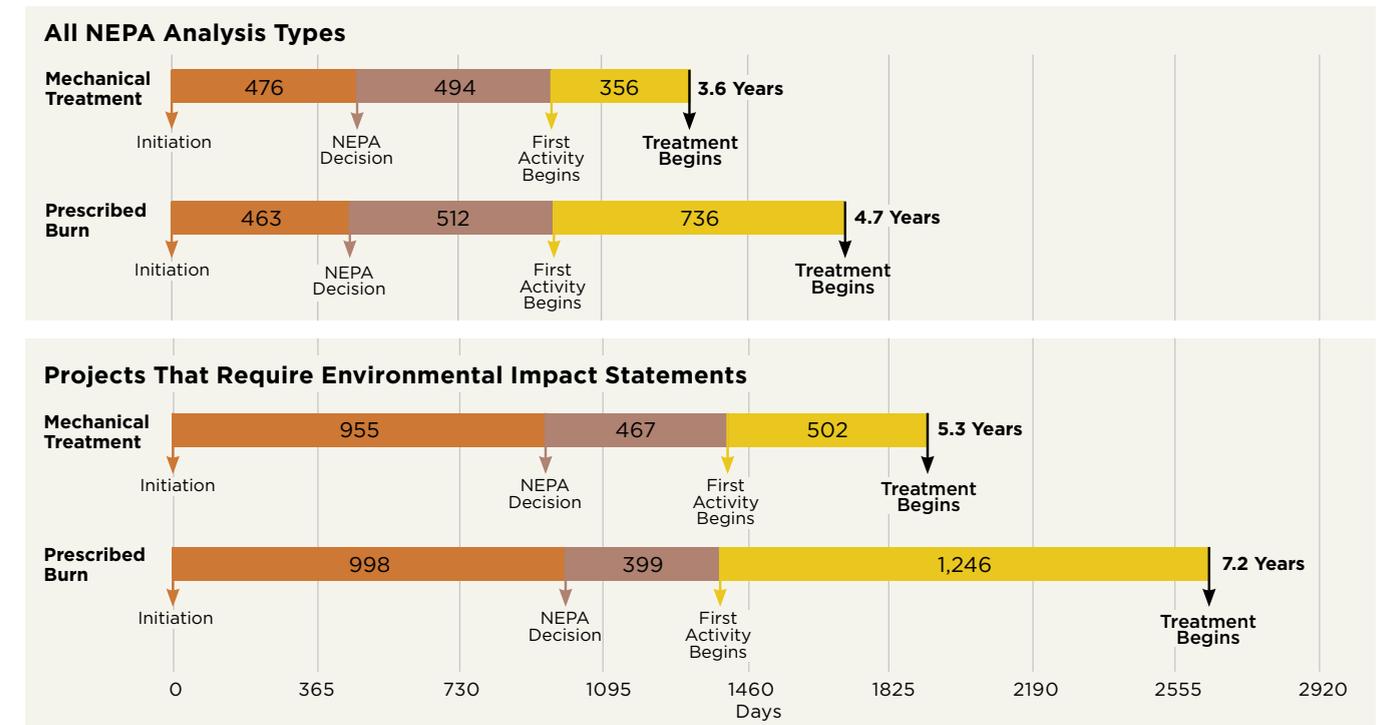


Read the entire policy brief at: perc.org/nepa-fire

Eric Edwards is an assistant professor in the Department of Agricultural and Resource Economics at North Carolina State University and a senior research fellow at PERC.

Sara Sutherland is a lecturer at the Sanford School of Public Policy at Duke University and a senior research fellow at PERC.

Average Time to Begin U.S. Forest Service Fuel Treatments



The timeline for a U.S. Forest Service fuel treatment project includes the following steps: initiation of the NEPA environmental review process, NEPA decision, first on-the-ground activity (often an inventory of fuels or similar preparation step) begins, and, finally, treatment begins. Once the Forest Service initiates the environmental review process, it takes an average of 3.6 years (1,325 days) to begin a mechanical treatment. Prescribed burns average 4.7 years (1,711 days) from initiation to beginning of treatment. For both types of treatment, projects that require rigorous review in the form of an environmental impact statement take significantly longer to begin on average: 5.3 years (1,924 days) in the case of mechanical treatments and 7.2 years (2,643 days) in the case of prescribed burns.

Wildfire, Moral Hazard, and Ways to Lessen Risk

A Q&A with PERC Lone Mountain Fellow Judson Boomhower

Does more public spending to suppress wildfires subsidize development in harm's way? Economist Judson Boomhower has found evidence in the affirmative.

Boomhower is an assistant professor in the Department of Economics at the University of California, San Diego, and was a 2019 Lone Mountain Fellow at PERC, where he studied this very question. In recently published research, Boomhower and his co-author Patrick Baylis examined how federal and state wildfire policies can create what economists call "moral hazard." We asked Boomhower about wildfire risk, the consequences of moral hazard in fire policy, and potential ways to improve the status quo.

Q: What exactly do economists mean by moral hazard, and how does it apply in the context of wildfires?

A: In the case of wildfires, it's easiest to think about this as a disconnect between who makes decisions and who bears the costs. Decisions about home building in high fire-hazard areas are usually made by local governments and individuals. But the institutional arrangement of wildland firefighting in the United States means that a big share of the cost of protecting those homes falls on federal and state agencies. That includes several billion dollars per year spent battling wildfires that threaten homes and other private property.

That disconnect raises the possibility that, in some cases, development might proceed differently if local decision makers fully internalized the costs of protecting these homes from fire. That could be true both for where homes are built and how they are built, in terms of how much is invested in making structures and communities fire-resistant.

Q: Is this an issue across the West, or only in particular places?

A: Wildfire risk is an issue throughout the West, and increasingly in other parts of the United States as well. There are millions of homes in the so-called wildland-urban interface, and they are spread across all western states. However, that risk is very much not uniform across space. Certain high-hazard areas are particularly likely to face large, dangerous wildfires. Scientists have made lots of progress in modeling fire hazard at a granular spatial scale, which gives us a pretty good picture of where the highest-risk areas are.

Q: How much of an implicit subsidy are homeowners getting from the expectation that government agencies will aggressively suppress fires near homes?

A: The amount that taxpayers are essentially transferring to homeowners, through expenditures on wildfire suppression, really varies quite a bit across locations. Patrick Baylis and I have done some research on this question. We find that, in extreme cases, it can be more than 20 percent of a home's value—often tens of thousands of dollars across the lifetime of a home.

Two important determinants are the physical fire hazard and the local density of development. In more densely developed areas, the costs of fighting a fire are essentially divided across a larger number of homes. So the really large implicit subsidies end up being for very sparsely developed communities in fire-prone areas.

Our calculation also omits some important costs, like money spent by utilities to prevent ignitions from electricity-distribution infrastructure that carries power to homes in high-hazard areas. For that reason, we think our numbers are likely conservative.

Q: What effects does this dynamic have beyond the individual homeowner?

A: Local government decisions about land use and zoning are important determinants of where construction takes place. In many states, local governments also have an important role in determining wildfire building codes. In another recent study, we find that those code decisions are quite important in determining community resilience to wildfires. And fire managers have long argued that hardening homes in this way could reduce the burden on firefighters during wildfire emergencies.

Another salient issue here is that any one home's wildfire risk depends not only on individual investments but also on community factors. How to coordinate these neighborhood and community-level investments in fire protection is an important issue.

Q: As fires continue to become more costly and deadly, more political attention is being devoted to the need to reduce wildfire risk. What recommendations would you make to help resolve the wildfire policy moral hazard?

A: The rapid intensification of wildfire risk in recent years has highlighted a lot of policy challenges around wildfires in the United States. The moral hazard issue we've been discussing is an important one, but there are also many others: difficult questions about insurance market regulation, legal liability for utility-caused wildfires, health impacts from wildfire smoke, and political questions about agency funding, just to name a few. The growth that we're seeing in this risk underscores the importance of addressing all of these challenges. Thinking specifically about implicit subsidies for risky development, a classic economic solution would be to realign incentives through development fees or other mechanisms so that decision makers internalize the fire-protection costs of new development.

Q: Are there ways to encourage people to make safer decisions about where to build?

A: Some of my colleagues in economics have done nice research documenting how homeowners in high fire-hazard areas often do not appreciate the risk that they face from wildfires. This is yet another "market imperfection" that seems important in this area, and it suggests that there

The really large implicit subsidies end up being for very sparsely developed communities in fire-prone areas.

may be scope for pure information interventions—for example, development of public-facing risk prediction tools like the U.S. Forest Service Wildfire Risk to Communities initiative. We've also seen some jurisdictions introduce disclosure requirements for wildfire risk at the time of a property sale.

Q: What could policymakers do to decrease risk where fire-prone areas have already been developed with homes and other construction?

A: This is a really hard, and really important, question. The existing stock of vulnerable homes in high fire-hazard areas will be an issue for decades to come. There are several margins for private or public investment. The urgent question is how to balance resources and effort across these approaches. Some investments can reduce the likelihood of property damage, such as hardening homes—for example, installing vent covers or replacing wood roofs—and vegetation management to reduce fuel.

An equally important goal is to ensure that homeowners are able to protect themselves financially in the event that they do experience a wildfire loss. That means trying to ensure the efficient operation of private insurance markets. It also means public support for fire victims in some cases.

Q: What role should private property owners in fire-prone areas play?

A: I think most economists would agree that the homeowners insurance market has an important role to play here. In theory, well-functioning insurance markets should provide property owners with price signals to guide mitigation investments. Actions that reduce a property's wildfire risk would reduce insurance premiums commensurately. The reality of property insurance is considerably more complicated for both economic and political reasons. Still, to the extent that these markets can be organized in a way that preserves this basic idea of risk-based pricing, that is an important thing to do.



Judson Boomhower is an assistant professor in the Department of Economics at the University of California, San Diego, and was a 2019 Lone Mountain Fellow at PERC.



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Turning Fire Risk Into Financial Reward

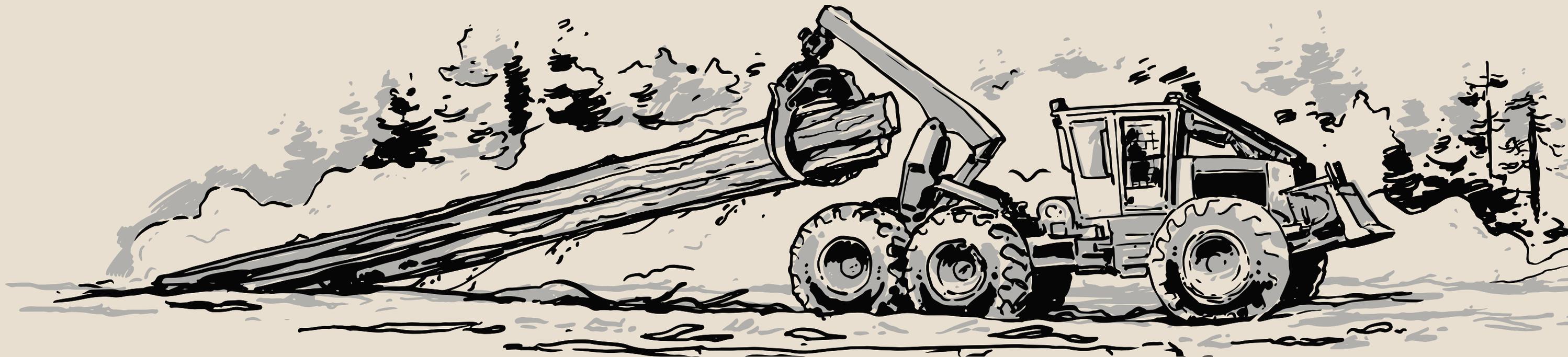
Many public forests in need of restoration are overgrown with small timber. These resources hold tremendous value—if innovative markets can put them to use

BY J.D. TUCCILLE

It's not often that you can double the bang for your buck, but timber markets are one of those happy exceptions. Not only do markets encourage the cultivation and use of a renewable resource, but they do so in a way that reduces wildfire risk in national forests. Giving private companies incentives to invest in the equipment and expertise needed to harvest trees that pose the most hazard during hot, dry seasons can expand the benefits and reduce the costs of this necessary process. Arizona, where I live, offers an example of how the right economic incentives can turn necessary forest management from a resource-suck into a self-sustaining creator of jobs and prosperity.

Rather than focusing on preventing wildfires on public lands, government agencies have for decades prioritized suppressing them. The result, unfortunately, has been a disruption of the natural cycle of regular fires that consumed fuel, leading to “choked forests” that have become tinderboxes. Those decades of well-intentioned mismanagement created an enormous accumulation of tinder, and clearing it out is an overwhelming job. It's a task with which the U.S. Forest Service, responsible for 193 million acres covering 154 national forests and 20 national grasslands, can't begin to keep pace.

“About 63 million acres,” or about a third of the land the agency manages, are “at high or very high hazard for wildfires that would be difficult to contain,” Forest Service Deputy Chief Christopher French told a U.S. Senate committee last summer. Given that the agency treats roughly 2 to 3 million acres for fire danger annually, something else needs to be done to address the highly flammable backlog. French himself emphasized the need for more “thinning, harvesting, planting, and prescribed burning across all landscapes.” Fortunately, we have models of how some of this can be accomplished. Initiatives that reduce fire danger and repurpose material from forests into marketable products can attract private companies to do the heavy lifting—if the bureaucracy can get out of the way.





Scenes from the Four Forest Restoration Initiative (4FRI)

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Small Trees, Big Potential

A promising example of getting out of the way of market solutions can be found in Arizona. Wildfire poses danger throughout the United States, but nowhere more so than the desert Southwest, where “parched” barely begins to describe the natural state of the landscape, and vital watersheds are dependent on vast but fragile forests. Since 2010, the Four Forest Restoration Initiative (4FRI), a partnership of tribal, business, and conservation interests in northern Arizona, has worked not only to reduce the risk of wildfire but also to increase the availability of water and the wellbeing of surrounding communities.

While the project is still exploring its potential, it has enjoyed early success; by 2021, the initiative had already treated 700,000 acres within its area of operation. But that progress almost came to a grinding halt when federal officials developed a bad case of cold feet. In September 2021, the U.S. Department of Agriculture, which houses the Forest Service, abruptly ended negotiations to extend the project. It cited “significant financial risks” and, oddly, also insisted the project was “not reasonably aligned to industry needs”—a finding better tested by business interest in the project rather than blanket statements from federal bureaucrats.

In light of the cancellation, it’s notable that reactionary environmental groups have long opposed the initiative despite the promise it holds to reduce wildfire risk. For example, the Earth Island Institute’s John Muir Project has decried 4FRI as “a massive logging project” in the past, and hostility toward commercial solutions to restore forests still prevails in some quarters. In a few high-profile instances, legal challenges or administrative objections have held up restoration projects for years, only for wildfires to destroy forests and wildlife habitat as the projects sat in limbo. Litigation risk from opponents deters the Forest Service from embracing initiatives that might be held up in court, but it especially threatens private partners that can’t afford long delays while disputes play out.

The cancellation was a particularly harsh blow after the year’s brutal fire season, which burned over a half-million acres in Arizona. It also drew immediate response from local officials. “The federal government’s lack of action is frustrating,” Arizona Governor Doug Ducey seethed over what many in the state saw as a betrayal. “The federal mismanagement of our forests poses an ongoing risk.”

Under considerable pressure, the Forest Service soon returned to discussions and hammered out a new deal in November for moving forward with a variety of projects. This

was not just a victory for 4FRI but also a break from the Forest Service’s traditional phobia about long-term relationships. Barred from committing funding for more than a few years at a time—even though it can sometimes enter into 20-year stewardship contracts for “innovative use” of public lands—the agency often has to get creative to satisfy the financial side of its responsibilities. That hindrance makes partnerships with private companies even more attractive and sensible for the agency.

At the core of 4FRI’s projects is finding profitable uses for shrubs and small-diameter trees that create extreme fire dangers. These types of vegetation serve as “ladder” fuels that allow flames to reach the forest canopy, where they spread rapidly and burn intensely. In a 2007 research project, the Department of Agriculture recognized the need “to develop profitable markets for the small diameter trees that need to be removed from overgrown forests to mitigate the risk of catastrophic forest fires.” But unless private companies know that there’s a reasonable chance of making their money back, they won’t build mills and other infrastructure needed to manufacture and ship products to end users. That’s one reason the federal government’s renewed commitment to 4FRI was so important.

It was sufficient for NewLife Forest Restoration, a sustainable forest products business that participates in 4FRI, to secure \$200 million in new financing in February. The company is using the money to build out a 425,000-square-foot milling facility in Bellemont, Arizona, expand another sawmill in the state, and double the capacity of an engineered-wood plant that can repurpose fibers extracted through forest thinning. The finished products from these facilities will feed the market for softwood lumber used in housing construction.

“The company will restore 25,000 acres of forestland per year, dramatically expanding the capacity to proactively

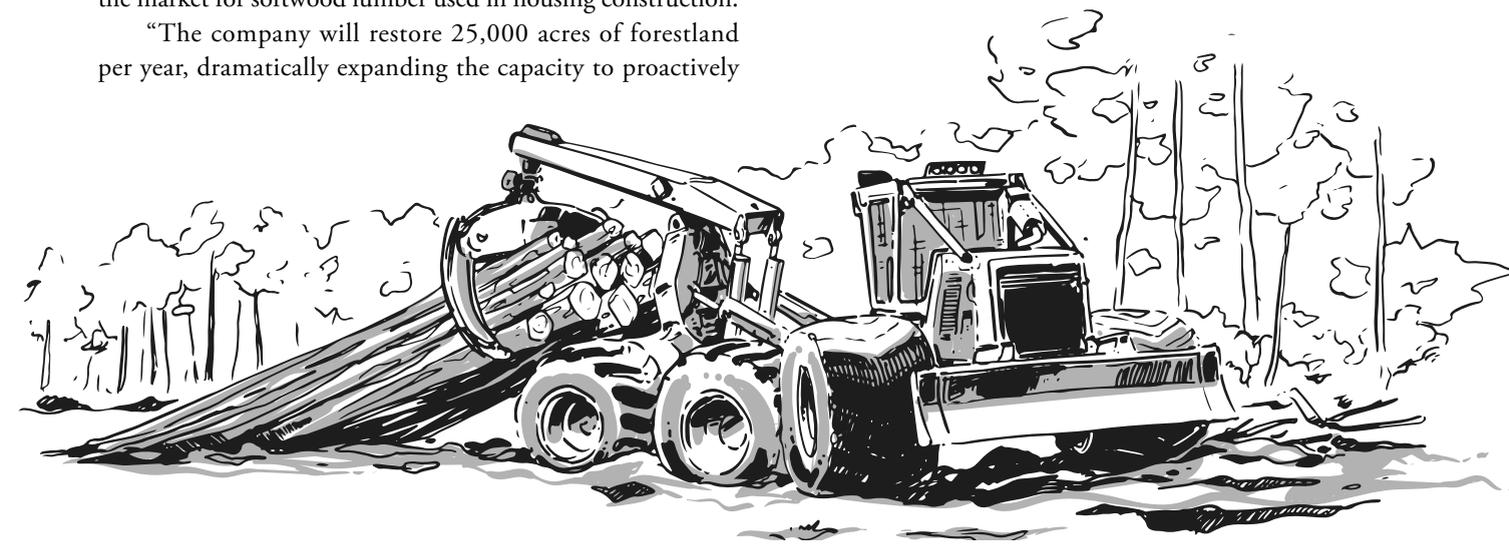
At the core of 4FRI’s projects is finding profitable uses for shrubs and small-diameter trees that create extreme fire dangers. These types of vegetation serve as “ladder” fuels that allow flames to reach the forest canopy, where they spread rapidly and burn intensely.

address the rising concerns of wildfire,” NewLife boasted when it announced the financing. It’s a goal unthinkable in the absence of commitments that justify investments in industrial facilities that make the venture viable.

The continuation of 4FRI and NewLife’s investment is a happy outcome, but it was a close call given the Forest Service’s near-cancellation of the project. Fortunately, those obstacles were overcome, because the small-timber markets developing in Arizona hold promise not just for that state’s forests, but also elsewhere in the country.

Many Uses

Sharon Friedman, a retired Forest Service geneticist who writes about forest policy regularly, has documented one recommended approach for dealing with an abundance of dead trees, which the agency sought to use decades ago in the 1980s: oriented strand board. The product, known as OSB, is a relatively low-cost building material that has largely replaced plywood in construction. “The problem at the time,” Friedman





Oriented strand board (OSB) is a low-cost building material widely used in construction.

Producing OSB, biochar, wood chips, and other products from materials that threatened to serve as fuel for wildfires benefits not only forests, manufacturers, and end users but also the communities surrounding public lands.

wrote, “was that the Forest Service couldn’t provide assurances of its share of supply.” That made the idea a nonstarter, since businesses need reliable access to raw materials before putting money into facilities, workers, and equipment. The Forest Service must address its commitment issues to successfully woo private partners.

Interestingly, OSB is among the uses planned for timber products harvested by 4FRI, which has overcome the commitment hurdle. Godfrey Forest Products, one of the bidders on the second phase of the initiative, proposed placing a state-of-the-art plant in Winslow, Arizona, to manufacture the building panels. As Friedman noted in her writing, OSB

can be produced from small-diameter trees and sawmill by-products, making it a “win-win” for forest-thinning projects that seek to clear forest tinder while leaving large, healthy trees unmolested.

Recently, demand has risen for construction products of all sorts. At one point during the summer of 2021, OSB prices had soared by 500 percent since January 2020. Of course, much of that boost can be attributed to Covid-driven supply chain disruptions involving shuttered factories, distorted demand, and snarled shipping. But demand remains strong, and lumber-based construction materials are easily produced in the United States, making them a good bet for end users hoping to avoid future chaos by keeping their sources close to home.

That’s not to say that construction supplies are the only use for small-diameter trees and other materials cleared during forest-thinning projects. Biochar, made from dead branches and woody debris, shows real promise as a soil amendment.

“While biochar is not a fertilizer, research indicates it can help retain nutrients in the soil due its charged surface and high surface area ... which allow it to adsorb nutrients like nitrogen, phosphorus, and carbon,” researchers at Michigan State University’s extension service noted in 2020. “Actually, some scientists have even found that when biochar is used in

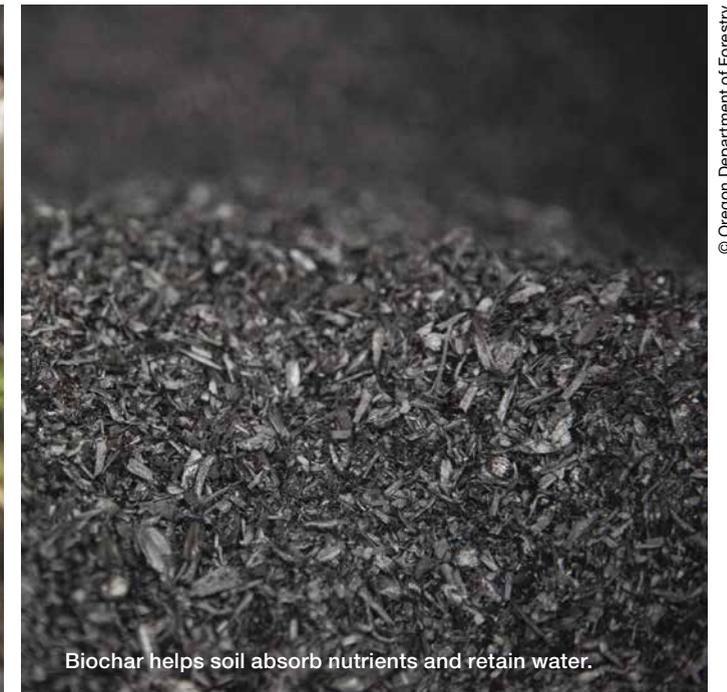


Organic material can be used to make biochar.

combination with compost it can retain the nutrients provided by the compost and can help decrease the need for commercial fertilizers.” That same year, federal land managers at Mt. Hood National Forest in Oregon tried their hand at incorporating biochar manufacturing into a forest-thinning project. Kraig Kidwell, regional timber contracting officer for the Forest Service, even called biochar “black gold,” adding that they were “taking a waste product and creating something usable.”

The limiting factor for biochar production was its uncompetitive price compared to fertilizer. In the intervening years, though, the economics have changed dramatically because of supply chain disruptions and international upheaval. Russia’s invasion of Ukraine in early 2022 compounded a global shortage of commercial fertilizer. The production of modern fertilizer often depends on natural gas, of which Russia is a major source, as well as potash, which is produced by Russia and its ally Belarus. Biochar may well prove to be a domestically sourced means of reducing reliance on fertilizers that have become challenging to purchase at any price.

If biochar has potential for reducing the need for expensive fertilizers in a wealthy country like the United States, it may be a lifesaver in developing countries that have less ability to absorb rising costs. In January, before the war in Ukraine



Biochar helps soil absorb nutrients and retain water.

began, high prices for fertilizer were already hurting developing-world farmers, “making it much costlier to cultivate and forcing many to cut back on production,” according to a *Wall Street Journal* report. “That means grocery bills could go up even more in 2022, following a year in which global food prices rose to decade highs.” A relatively inexpensive alternative to expensive fertilizers, produced from thinned forests in politically stable North America, could help to keep meals affordable to those most in need.

There’s still another use of forest debris that holds promise both in the United States and abroad: the production of wood chips for fuel at a time when energy costs are soaring around the world. For Americans, energy costs surged 32 percent in March 2022 compared to a year earlier. A 2013 report from Sustainability Solutions Services at Arizona State University specifically cited “chips and pellets for energy production” as a means of turning the thinning of small-diameter trees into a money-maker for 4FRI and similar initiatives. Forest managers in northern Arizona agreed, seeing the potential for export to fuel-poor countries even before the pandemic and conflicts over recent years made finding new sources of energy so important.

In 2019, a pilot project led by Northern Arizona University aimed to “test the logistics and efficacy of chipping and

While terrain, climate, and other specifics will vary from one location to another, ultimately, there's no reason why the philosophy behind 4FRI couldn't be replicated and applied to other national forests.

shipping wood products via railway transportation with the goal of expanding forest product markets domestically and internationally and accelerating forest restoration efforts." That experiment involved shipping wood chips to South Korea to substitute for coal in power plants. "If proven successful," Arizona Department of Forestry and Fire Management Director David Tenney commented at the time, "we can potentially expand to other markets across the country and abroad."

After the pilot, researchers from the university's Ecological Restoration Institute concluded that, while they needed a better handle on shipping techniques and improved facilities, the approach had potential. "Additional demand for wood products could increase forest industry development, employment, and economic stability for communities," a university report noted. "Along with these benefits," it continued, "delivering biomass both domestically and internationally can successfully accelerate the pace and scale of restoration treatments needed to address the forest health crisis" in the United States.

Opportunity to Innovate

Producing OSB, biochar, wood chips, and other products from materials that threatened to serve as fuel for wildfires benefits not only forests, manufacturers, and end users but

also the communities surrounding public lands. A 2019 analysis of 4FRI's efforts by the Idaho-based Conservation Economics Institute found that "logging and wood utilization associated with 4FRI spur numerous good-paying jobs in the region." The researchers found that 4FRI "has the potential to positively affect rural economies by facilitating employment and income generation with logging, wood utilization, and other restoration activities."

That's remarkable news for rural communities that have, in recent years, shed jobs and industry and fallen behind urban areas in terms of economic potential. Disruptions from the Covid pandemic have hit some small towns and rural areas hard, even as many were still recovering from the last recession. Innovative and profitable uses for resources from national forests promise a shot in the arm to people living in the remote and beautiful places near them. But such a boon will be available to other communities only if the Forest Service can overcome its risk aversion and resolve bureaucratic hurdles that stand in the way of committing to necessary, long-term projects.

While terrain, climate, and other specifics will vary from one location to another, ultimately, there's no reason why the philosophy behind 4FRI couldn't be replicated and applied to other national forests. It's a philosophy that sees forest restoration not just as a responsibility, but also as an opportunity. It views young shrubs and small-diameter trees not just as dangers, but also as renewable resources. Active management of those resources can help maintain the health of our forests, provide affordable products for consumers at home and abroad, and create prosperity for American communities.

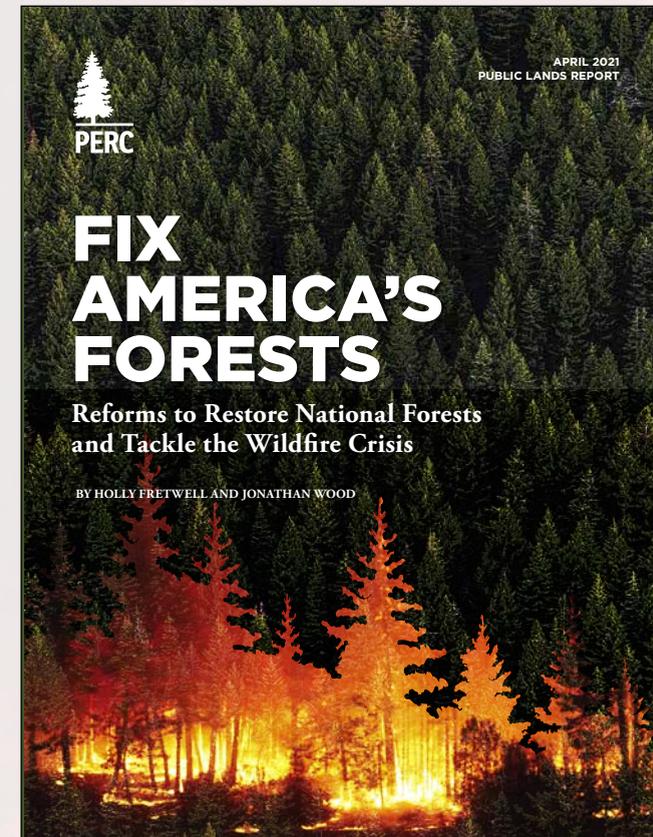


J.D. Tuccille is an Arizona-based writer who appreciates the great outdoors.



FIX AMERICA'S FORESTS

Reforms to Restore National Forests and Tackle the Wildfire Crisis



As wildfires grow larger and more costly, the U.S. Forest Service lacks resources to meet its goal of restoring millions of acres of national forests. Fortunately, partnerships with states, tribes, industry, and environmental groups are unlocking new support for projects that improve forest health and mitigate wildfire risk. PERC research fellows Holly Fretwell and Jonathan Wood have outlined reforms that would spur more investment in forest restoration and help confront the wildfire crisis.

Available at
PERC.ORG/FORESTS



Healthy Forests Make Good Neighbors

Through Good Neighbor Authority, federal agencies are working with states and other western partners to mitigate wildfire risk

BY HANNAH DOWNEY

“**W**hat’s that?” my 10-year-old brother asked, pointing to a mushroom-shaped cloud billowing up from the mountains against the otherwise clear sky. More than a decade ago, my family and I were on our annual backpacking trip in Montana’s Beartooth Mountains, happily heading down to our campsite after a spectacular July day spent fishing in alpine lakes. My dad scrambled up to an overlook and quickly confirmed what we’d all been dreading—he could see flames from a forest fire, and it was quickly moving up the trail toward us.



Good Neighbor Authority projects, such as the one pictured here in eastern California, are fueled by collaboration.
© Paul Wade/USDA



Smoke from the Cascade Fire rises toward the sky as the author (at right, second from left) and her family hike out of the area in 2008.
© Hannah Downey



We hurried back to our campsite, where other hikers had begun to gather, speculating about what to do. The West Fork of the Rock Creek is a spectacular mountain canyon framed by steep, rocky walls with only three routes out. As a family of five with all of our backpacking gear in tow, we weren't exceptionally nimble or quick moving. Factor in that this was before satellite beacons or reliable cell coverage in the woods were widely available, so no one was able to communicate with the outside world.

Then it happened: A helicopter flew in and landed next to us. "We're saved!" my siblings and I jumped around yelling. Fire management personnel in the helicopter were able to provide valuable information about the wildfire, but with limited occupancy, they could only fly out those without enough gear to make it through the night or unable to hike the strenuous alternate routes out.

Equipped with all of our gear, we began an arduous off-trail hike out. Along the way we grew crabby, developed massive blisters, and suffered a sprained ankle, but the next day we finally reached the safety of a trailhead.

The Cascade Fire of 2008 burned 10,173 acres—small compared to many of the fires that together routinely torch millions of acres each summer these days. The Beartooth Ranger District credits fuel-reduction treatments around structures in the West Fork with saving many homes during

the Cascade Fire. The fire subsided substantially and even failed to burn in tree stands that had been treated for hazardous fuels. Where we were backpacking, however, was in the wilderness, and no fuel treatments had been applied.

With catastrophic wildfires becoming increasingly common, western states are stepping up to help fix America's forests. One creative tool that is contributing to the cause is Good Neighbor Authority, a framework that empowers states and other entities to take the lead on mitigating wildfire risk on federal lands. With greater recognition that forest management is needed at landscape scale across various government jurisdictions, federal land agencies are committing to work with states and western partners to accomplish much-needed forest restoration.

It Takes a Neighborhood

Nearly half of all lands in the West are owned by the federal government, most of them managed by the Bureau of Land Management or the U.S. Forest Service. States have a significant stake in managing the risk of wildfires on federal lands, which can spread to destroy homes and infrastructure, release air pollution that harms human health, and disrupt recreation opportunities and local economies. States are, therefore, willing to step up and help treat federal forests within their boundaries so that they can reduce wildfire risk

and enjoy the benefits of healthy forests. In the early 2000s, Congress began developing Good Neighbor Authority as a mechanism to allow states to do just that.

Congress first authorized a Good Neighbor Authority pilot in 2001, permitting the Colorado State Forest Service to partner with the U.S. Forest Service to conduct work on federal land for five years. The agreement was eventually expanded to include BLM lands and areas in the state of Utah. And in 2014 the program was expanded nationally. Since 2018, counties and tribes have also been allowed to enter into Good Neighbor agreements. But those entities have so far used the program only a handful of times in the West, partly because they are prohibited from retaining timber revenues, which decreases their incentive to participate in the program.

Agreements made under Good Neighbor Authority allow state, tribal, and county partners to carry out forest restoration projects on federal lands. Partners' roles can include planning and preparation as well as the restoration work itself. In return for their efforts, state partners can receive a share of revenues that result from selling materials harvested or compensation directly from the federal government.

It's an approach that has expanded the resources available to accomplish needed forest treatments on federal lands, and it's expanding the pace and scale of forest work in the West. As former Idaho Governor C.L. "Butch" Otter has put

As former Idaho Governor C.L. "Butch" Otter has put it: "Before Good Neighbor Authority, Idaho could not legally help the Forest Service with the enormous and complex job of restoring our national forests."

it: "Before Good Neighbor Authority, Idaho could not legally help the Forest Service with the enormous and complex job of restoring our national forests." Fortunately, that's no longer the case.

Meet Me at the Forest Treatment

Under Good Neighbor Authority, states can enter 10-year agreements with either the Forest Service or BLM to conduct specific restoration projects on federal forest lands. These agreements can take several forms, but all of them provide a legal framework that identifies the specific projects that will be completed by the state. From there, the state can take the lead—including contracting with third parties to carry out particular treatments or even conducting environmental reviews. Good Neighbor Authority is largely aimed at



expanding capacity for treating federal forests, and state-run timber sales are an important component of these agreements. Part of the motivation for states to join Good Neighbor agreements is that they can keep the revenues from these timber sales, offsetting the costs of the work and, sometimes, even funding additional forest restoration work.

While the goal for states is to build self-sufficient programs from timber revenues, profitable harvest simply isn't possible everywhere given that many federal forests are overgrown with small-diameter vegetation that's generally not valuable (an issue J.D. Tuccille explores on page 26). In these cases, the relevant federal agency compensates the state for its costs of labor and supplies.

States across the West have proven themselves capable forest management partners, and many consider Good Neighbor Authority to be an important—and at times, crucial—tool for accomplishing their forest action plans. The Forest Service, for example, recognizes that expanding Good Neighbor Authority agreements will be crucial to meeting its 10-year wildfire crisis strategy.

Much has been achieved since Good Neighbor Authority was expanded nationally less than a decade ago. Twelve western states have signed Good Neighbor agreements with federal agencies, and seven states have agreements in place on every forest within their boundaries. Alaska, Colorado, Idaho, Montana, Oregon, Washington, and Wyoming have generated or expect to soon generate enough revenue from timber sales to fund subsequent restoration activities.

The Montana Department of Natural Resources and Conservation, for example, signed a 10-year Good Neighbor Authority agreement with Forest Service Region 1 in 2016 and has put the tool to good use. Forest projects conducted by the state under the program began in 2018 with hazardous tree removal in the Helena-Lewis and Clark National Forest. With 85 percent of forested acres in Montana at risk of severe wildfire, Montana State Forester Sonya Germann has described Good Neighbor Authority as “another way to get all hands on deck to get these issues addressed.” Today, nearly 20,000 acres of forest land across all seven national forests within Montana's boundaries have either been treated with selective thinning, prescribed burns, and other management tools or are under contract for treatment. Twenty-six timber sales have also been completed or are under contract, generating nearly \$11.7 million in revenue for the state.

Nationwide, the volume of timber sold from all Good Neighbor Authority projects doubled from 2018 to 2019,

Good Neighbor Authority is one tool that is bringing more resources to manage western forests and reduce the risks of severe wildfire.

when it comprised more than 5 percent of all federal timber sold. In 2020, timber sales from the program represented 11 percent of the volume sold in Region 1.

Even More Neighborly

While Good Neighbor Authority has become a successful tool for empowering state partners in forest management, reforms could make it even more inclusive and effective for landscape-scale wildfire risk reduction. Giving counties and tribes the legal authority to keep timber revenues, for instance, would not only treat those partners as “full” neighbors but also make it easier to harness their expertise in conducting forest treatments.

Restrictions also specify that program funding can only be spent on the federal lands within a Good Neighbor project boundary, even if state or other lands are interspersed in the project area. Letting revenues from Good Neighbor Agreements be spent across the landscape, including state and private lands, would help improve the effectiveness of forest restoration treatments at a wider scale.

Two summers ago, I stared out my window in Bozeman, Montana, and watched a fire ravage the Bridger Mountains. As heroic firefighters worked around the clock, smoke filled the air, entire hillsides were scorched, and friends lost their homes. A decade after my first wildfire experience, with the Cascade Fire, the threat of wildfire continues to grow.

Good Neighbor Authority is one tool that is bringing more resources to manage western forests and reduce the risks of severe wildfire. States are proving themselves capable partners. Leveraging their capacity and expertise even more, while also bringing in tribes and counties as equal partners, will only improve the chances that our public forest managers can fix America's forests.

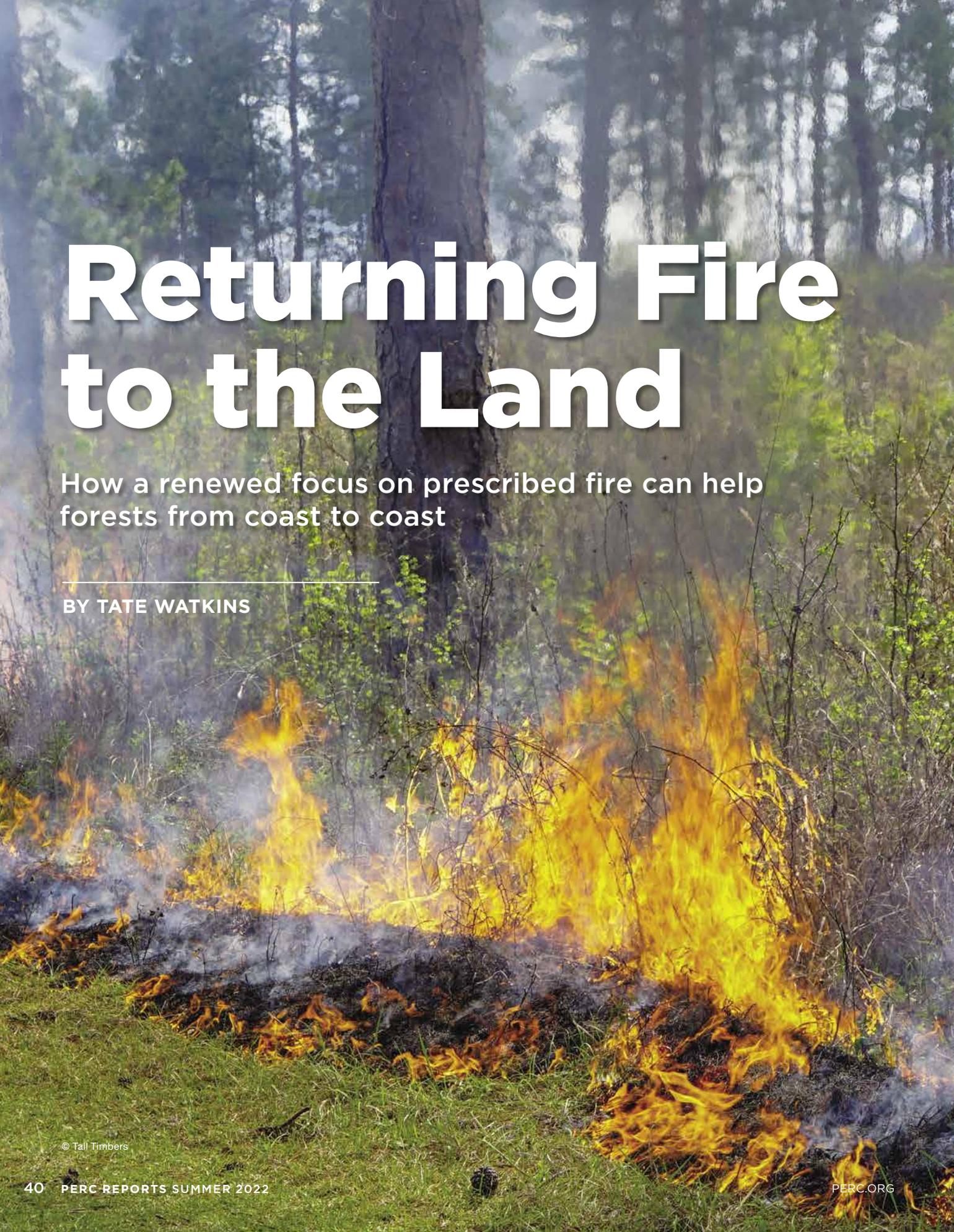


Hannah Downey is the policy director at PERC.

Returning Fire to the Land

How a renewed focus on prescribed fire can help forests from coast to coast

BY TATE WATKINS



One morning last March, the South Carolina Forestry Commission website displayed the number of active fires in the state: 163. An interactive map showed each fire, represented by markers that ranged from red to orange to yellow to teal. In contrast to similar maps that are followed closely throughout the summer, particularly in the West, the markers didn't represent wildfires. Indeed, South Carolina's wildfire tracker showed zero active that day. Rather, these were "good" fires: prescribed burns that had been planned in advance, set deliberately, and aimed to achieve specific land management objectives, typically to control vegetation and reduce hazardous fuels.

"It's gonna burn one day or another," says Darryl Jones, forest protection chief of the South Carolina Forestry Commission, "so we should choose when we burn it and make sure we do it on the right days when it's most beneficial." He adds that the idea is to "burn an area purposely before it can burn accidentally."

The different colors of map markers signified the purpose of each fire. Some burns aimed to improve wildlife habitat by stimulating seed production, clearing out a landscape's lower layer of growth, or creating forest openings. Others were set to clear crop fields in preparation for planting or to burn debris piles that had been gathered and stacked. Still more were tagged "hazard reduction": fires set to remove dangerous accumulations of pine needles, briars, shrubs, and other fuels that naturally build up in southern forests. Spring is the prime time to burn given its favorable conditions for wind, temperature, humidity, and fuel, although the burn window can extend earlier or later into the year.

According to Jones, 61 percent of acreage burned in the state is done by private landowners on private land. "It's not just 'rednecks with torches,'" he says. "It's a very consciously done plan to do a burn where you want it." Southern landowners have been using prescribed fire for generations, and their ethos helps explain why the South burns more land for management purposes than any other part of the country—by far. From 1998 to 2018, 70 percent of all controlled burning was done in the Southeast, according to one recent study, and burning had steadily increased in the region over that period.

That has not been the case elsewhere. The same study found that the use of prescribed fire outside of the Southeast either remained flat or decreased. One explanation for this difference is policy: Like many southern states, South Carolina has tweaked liability standards for state-certified burners in ways that promote the use of beneficial fire. Western states, however, have not been as proactive in using policy to encourage prescribed fire.



A drip torch being used during a prescribed burn

Southern settlers saw the value of using fire to clear out overgrown vegetation, improve wildlife habitat, and, where livestock was raised, provide new shoots of forage. The result is that fire has been used in the South as a management tool virtually uninterrupted for millennia.

The backdrop of these trends is alarming: Wildfires have become much more destructive over the past two decades, now costing billions in economic damages annually, most of it in the American West. There is growing recognition among conservationists, private landowners, academic researchers, and government officials of the need to proactively reduce wildfire risk through fuel treatments in the region. The Biden administration, for instance, plans to treat up to an additional 50 million acres of land over the next decade with a combination of mechanical thinning and prescribed burns. The U.S. Forest Service specifically aims to work with partners to "dramatically increase fuels and forest health treatments by up to four times current treatment levels in the West."

"We're taught that fire is bad," Jones says, adding that it obviously is in many contexts. But he notes that mindset is a hurdle when it comes to promoting prescribed burning. It's one that will have to be cleared to meet the growing interest—and need—to return more good fire to landscapes across the country.



A crowd watches a prescribed fire demonstration in Gainesville, Florida.

© Brian Wiebler

A Culture of Fire

Long before European settlers arrived in North America, fires ignited by lightning or set by Native Americans changed landscapes from the Atlantic to the Pacific. Indigenous peoples used these fires for various purposes, including cultivating plants for food, medicine, and basketry as well as altering lands to clear travel corridors or manage wild game.

“In some ways, the tribes handed a drip torch to the early settlers and landowners in the South,” says Morgan Varner, director of fire research at Tall Timbers in Tallahassee, Florida. The research station and land conservancy is regarded as a national leader in the study of fire ecology and use of prescribed burning. In the American South, many settlers learned and continued traditions from Native Americans, who burned frequently, but at low intensity. Southern settlers saw the value of using fire to clear out overgrown vegetation, improve wildlife habitat, and, where livestock was raised, provide new shoots of forage. The result is that fire has been used in the South as a management tool virtually uninterrupted for millennia, though modern development—cities, subdivisions, commercial properties, and the like—make it more difficult than it once was.

Elsewhere, especially in the West, fire became a bad word sometime in the 20th century. Part of the reason is explained by the vast amounts of public land in western states

combined with the federal government’s approach to fire. After several devastating fire years in the early 1900s, federal agencies turned toward a strategy of “all-out” suppression. While that produced byproducts like the “10 a.m. policy”—which sought to extinguish all wildfires by that time the day after ignition—and, eventually, Smokey the Bear, another consequence was squashing the use of most fire for land management, including the cultural burning that Native Americans had continued to carry out in California and other western states.

A 1911 quote from scientist F.E. Olmsted sums up the stance many foresters of the time took on the view that fire could be a useful management tool, an idea they dubbed “Indian forestry”: “It is said that we should follow the savage’s example of ‘burning up the woods’ to a small extent in order that they may not be burnt up to a greater extent by and bye. This is not forestry; not conservation; it is simple destruction.” One result of the shift to suppression was a gradual loss of prescribed fire know-how in the West, although the practice continued in pockets. “In the 1950s and ‘60s, California was a leader nationally in prescribed fire,” says Varner, who lived in the state for eight years working as a forestry professor and researcher. He adds that it was often private landowners, mostly ranchers, who kept the practice alive. But even those

pockets diminished over time. Eventually, a culture of good fire in the West has faded over generations of urbanization, development, and other changing land uses.

Many private timber owners and land managers in the South, however, had held onto a tradition of fire use. Mitigating wildfire risk was not their principal concern; they mostly used fire because it benefited commercial timber growth or habitat for wildlife, particularly quail. Today, Florida is regarded as the leading prescribed burn state in the country, partly due to the work of Tall Timbers. Fire ecologists and practitioners at Tall Timbers preached that fire was not only good but also a valid—or, on some landscapes such as longleaf pine, even crucial—management tool. After a few decades of spreading those ideas through research and advocacy, Varner jokes, “even Smokey would have said that prescribed fire is good.”

‘We Need to Burn’

One major obstacle to prescribed burning is the fact that fire can, of course, be dangerous. Landowners in particular may want to burn, but many are discouraged by the risk that comes along with setting things on fire. A fire that escapes clearly can cause great destruction, but smoke from a prescribed burn can harm others as well—damages that a burner might be liable for.

Florida has used a series of legislative and policy changes to encourage the use of prescribed fire, some of which then dispersed to nearby states. South Carolina, for example, has passed legislation that recognizes prescribed fire use as a property right and management tool available to all landowners and clarifies

that the practice is not a public nuisance. The state also gradually expanded liability protections for certified prescribed fire managers—also referred to as “burn bosses”—who demonstrate competency by participating in several monitored burns. Property owners, state agency officials, or anyone else interested in the designation can apply for certification.

Now, certified burners in South Carolina who follow all applicable laws and plan a burn properly are governed by a gross negligence standard for smoke from a burn—meaning that they are liable for harms resulting from smoke only if their actions are reckless. “The rationale was that if a fire escapes,” says Jones, the South Carolina forest protection chief, “you probably did something wrong with firebreaks or planning. But if you did everything right and complied with all laws and rules and smoke management guidelines—you could do everything right but still have something go wrong with smoke if weather changes.”

Today, any landowner in South Carolina, certified or not, can use prescribed fire. But the liability advantages that come with certification make it an attractive pursuit. Many insurance providers also now require burners to be certified to obtain coverage.

With these policies in place, South Carolina burns about 500,000 acres a year, but state officials aspire to double that. “We know we need to burn more for fuel loads, ecological functions, and healthy forests,” Jones says. The way to do that, he says, is to continue to spread the flame with private landowners. Certifying more of them is a key part of that



In and beyond the South, much of the effort to build capacity with prescribed fire is bottom-up.

© Tall Timbers



California's inaugural group of state-certified burn bosses, May 2021

© Lenya Quinn-Davidson

effort. In 2021, the average prescribed burn in the state was just 19 acres for non-certified burners. For certified burners, it was more than four times that—88 acres.

In and beyond the South, much of the effort to build capacity with prescribed fire is bottom-up. While certification is aimed at people who already have a degree of fire experience, the initial steps into prescribed fire use are often “learn to burn” workshops sponsored by conservation groups, wildlife organizations, and state agencies. In about a dozen states, including a strong vein in the Midwest, landowners and fire practitioners have also formed prescribed burn associations to share expertise, equipment, and manpower.

“Landowners know they need to burn but don’t feel comfortable taking the first step,” says Jones. “It’s intimidating to come to a class, make a plan, and then go ‘light the woods on fire.’” And the dangers are real—one harrowing escaped fire occurred during a Colorado state-agency prescribed burn in 2012, which killed three people and damaged 27 homes. In May, a prescribed burn carried out by the U.S. Forest Service in New Mexico grew into the largest wildfire in state history, engulfing more than 300,000 acres, after wind conditions changed rapidly. As the fire raged, the agency announced it was halting prescribed burns on its lands nationwide to conduct a 90-day review of its prescribed fire program. Such cases of escaped fires are undeniably tragic, but a blanket ban on controlled burns will only make it harder to meet the agency’s treatment goals. And thankfully, prescribed burns are exceedingly safe on the whole. According to one study that reviewed more than 23,000 prescribed burns covering 3.7 million acres across the nation, only one insurance claim was reported, only one minor injury occurred, and more than 99 percent did not involve even a small escape.

Data show that burns have been increasing in the South, even if spreading good fire remains a steeper hill to climb in

other places. Jones notes that he’s seen progress over recent decades. In 2008, certified burners accounted for 43 percent of acreage burned in South Carolina; last year they accounted for 71 percent. “That number has steadily increased since about 2005,” says Jones. “That tells me something’s working.”

Growth of Good Fire

Prior to 1800, approximately 4.5 million acres burned annually in California, much of it done by Native Americans. Today, roughly 125,000 acres are treated with prescribed fire each year, a total the state aims to increase nearly fourfold. Florida—a state less than half the size—burns about 2 million acres annually.

“When I go out and I burn, I have no liability protection,” Lenya Quinn-Davidson, a fire adviser for the University of California Cooperative Extension and director of the Northern California Prescribed Fire Council, told NPR last year. “I’m assuming full responsibility for those projects. And most of the time, we’re doing those projects for public benefit, to reduce wildfire risk, to restore habitat, for cultural reasons.” A few months later, Quinn-Davidson had reason to celebrate. California had passed legislation that protects certified burners from liability for suppression costs incurred as a result of a prescribed or cultural burn. The state also recently committed \$20 million to a fund that will pay damages above and beyond private insurance if a prescribed fire escapes.

In March, California released a “strategic plan” outlining how state politicians and officials aim to expand the use of beneficial fire. A prominent goal is to accelerate the review and approval of prescribed burns, a notoriously slow and unpredictable process in California, where it can take months to obtain a burn permit. By contrast, various southeastern states issue permits over the phone in minutes to burn the same day.

A report from *Bay Nature* magazine noted that California’s “restrictive permitting procedures impede rather than facilitate prescribed burning.” It continued: “Most years, starting in May and running through summer and fall—roughly the season when megafires have engulfed the state—the agency prohibits most intentional burning, pausing much of its own burning activity, too.” In a similar vein, research in the journal *California Agriculture* lamented uncertainty around permit approvals and the fact that there are “no standards for how long a permit lasts.” It also noted that the blanket seasonal suspensions of permits are overly blunt and counterproductive to burn goals, especially during the state’s prime burn window—the most favorable weather and fuel conditions—in the fall.

Other state priorities include continuing to address liability barriers for private landowners and supporting tribes to revitalize cultural burning. In contrast to bygone, bigoted views toward “Indian forestry,” it’s notable that California is making it a priority to include tribes when it comes to forming new fire policy. “While there is common knowledge of the use of fire by Indigenous peoples,” a recent Karuk Tribe report reads, “the ability to utilize cultural burning is largely curtailed by state and federal policies rooted in paternalistic governance and the legacies of racism, which conflict with traditional law and cultural practices for burning.” The state’s new plan—on paper at least—makes a long-overdue pledge: to “better integrate tribal organizations and cultural fire practitioners into public agency prescribed fire projects and programs.”

A Humboldt County resident, Quinn-Davidson supports the use of good fire with local private landowners and prescribed burn associations. She also helped develop and then lead California’s first burn certification course in the spring of 2021. While she lamented the nearly year-long delay it took for the state to certify the first participants, the process has been streamlined since, and she helped lead a second cohort through the class in April. “It makes sense for the people who live in and know a place to be empowered to use prescribed fire,” she says. “A local, flexible workforce will be better able to jump on burn windows and manage for the resources they care about.”

Keeping the Flame

The efforts in California exemplify how several western states are starting to overcome decades of inertia and entrenched policy challenges to promote the use of prescribed fire. Last year, New Mexico passed a bill to establish liability protection and certification similar to those in many southern states. Oregon legislators also recently directed the state forestry department to set up a program to certify burners,

A prominent goal is to accelerate the review and approval of prescribed burns, a notoriously slow and unpredictable process in California, where it can take months to obtain a burn permit. By contrast, various southeastern states issue permits over the phone in minutes to burn the same day.

and Washington is carrying out a pilot to help develop its own prescribed fire programs.

While many of these western states have taken a lead from the experience of Florida and its neighbors, their prescribed fire approaches don’t have to—and indeed shouldn’t—mirror eastern states exactly. The West is more or less defined by seasonal drought and aridification. In many southern states, heavy humidity is taken as a given, and locals think something is wrong if it doesn’t rain for two weeks. Beyond climate, there are many other distinct factors, including forest types, mix of public and private lands, and approaches to air quality regulations, that warrant careful consideration. As with any policy, local context and on-the-ground knowledge will be paramount.

The fact that western states are now crafting policies to support good fire is also an opportunity to innovate. For instance, an idea to establish a “catastrophe fund” outlined by Varner, Quinn-Davidson, and fellow researchers, could hold promise to compensate for losses from prescribed fires while still limiting liability for practitioners.

Given the destruction of recent fire seasons, western states seem especially ripe for creative policy innovations that can unleash tribes, landowners, and public land managers to use more prescribed fire. Efforts to mitigate wildfire risk in the West by returning more good fire to the land may hinge on how successful they are in doing just that.

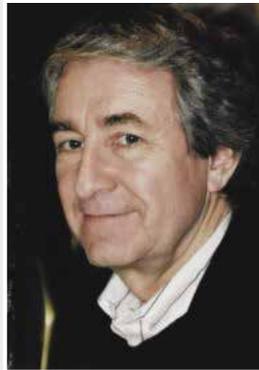


Tate Watkins is a research fellow at PERC and managing editor of *PERC Reports*.

In Remembrance of Rick Stroup

A memorial to a mentor extraordinaire

BY HOLLY FRETWELL



“Compared to what?” the late Rick Stroup often asked. “Markets are imperfect, but are government solutions better?” Rick’s passing in November 2021 is a loss felt by the entire PERC family and a reminder to analyze that question more often.

As a co-author of *Economics: Private and Public Choice*, now in its 17th edition, and author of many other books and articles,

Stroup was much more than an economist; he was an educator. His writings help decode economics from its mathematical rigor into applicable ideas.

Rick’s teachings forced students to look beyond accepted norms and explore the intricate dealings of human behavior, whether as a voter, consumer, bureaucrat, or politician. Each of these roles are motivated by different incentives, thus driving different behaviors. Incentives matter. This is such a basic idea but one that few people pause to explore. It is a concept that changed how I think.

Rick took his wealth of knowledge and produced a set of fundamentals that help explain why choices made within the public sector may seem misdirected and help identify when private markets may perform poorly. Understanding the workings of both public and private choices is what Rick believed would help create a more prosperous and fair society.

One of those basic fundamentals described by Stroup was private ownership. Clear property rights provide the incentive for stewardship and encourage cooperative exchange. Rick’s “three Ds” of property rights—Definable, Defendable, and Divestible—are simple attributes that nevertheless brought great clarity to me nearly 40 years ago. These key characteristics of property rights provide the foundation for well-functioning markets.

What many would call market failure Stroup called insecure property rights. To be fair, these ideas were not created by Stroup alone. As a co-founder of PERC with Terry Anderson and John Baden, and, soon thereafter, P.J. Hill, Stroup and his colleagues held multiple workshops exploring institutional structures and their underpinnings.

Through these fundamentals, Rick encouraged students and peers to look beyond idealized notions of government solutions, yet with no pretense that markets are perfect. He encouraged an evaluation of public and private choices without romance. He looked to the incentives driven by different institutional structures as the key to understanding the motivation behind productivity, efficiency, stewardship, and mutual gains.

Rick was a great economist, a professor, and an originator of New Resource Economics. To me, he was a mentor extraordinaire. To look back at what I learned from Rick tells a great deal about who I am today.

Rick was a friend, teacher, associate, and mentor. He profoundly influenced my thinking and how I approach life by

presenting ideas foundational for liberty and freedom. By simplifying the economic way of thinking into basic fundamentals, Rick helped me understand the underpinnings of private and public choices. When discussing markets and government policy I echo, “Compared to what?” Markets may not be perfect but tend to produce better outcomes than government-defined solutions. Ignoring these lessons will send us down the road to serfdom.



Holly Fretwell is a research fellow at PERC, where for more than two decades she has researched public land policy, property rights, and markets.

To look back at what I learned from Rick tells a great deal about who I am today.

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