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Preventing Wildfires

Can better forest management solve the problem?

By Barbara Mantel and Brock Hall



David McNew/Getty Images

A firefighter works to protect a home in Chino Hills, Calif., on Oct. 27, 2020. Greater development near forested lands has increased the toll of damages wrought by wildfires in the Western United States.

THE ISSUES

On the morning of Sept. 8, the Bear Fire in Northern California's Plumas National Forest, ignited by a lightning strike a few weeks earlier, appeared to be coming under control. Some 30 miles away, residents of the small community of Berry Creek were reassured.

"It didn't seem like it was going to come toward us," said one resident, Bobbie Zedaker. But later that day, a windstorm propelled the fire across the nearby Feather River with unexpected ferocity and ultimately into town.¹

"The flames reached from the ground to the treetops, more than 60 feet high," said volunteer firefighter William "Zac" Gable, an Army veteran who served in Iraq. "We later learned that the fire front was a wall more than a dozen miles wide. There was no fighting this onslaught."

Instead, the volunteers worked all night evacuating residents and trying to stay ahead of what Gable called the "flaming winds" that consumed Berry Creek's fire station and more than 90 percent of its homes and structures. "It was one of the most terrifying and destructive things I have ever seen."²

The fire destroyed Zedaker's house and killed her 16-year-old nephew Josiah Williams. It was one of several closely spaced fires known as the North Complex Fire, the fifth deadliest wildfire in recorded California history, which has killed 15 people, consumed

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more than 300,000 acres and destroyed more than 2,300 structures. As of late October, it was 96 percent contained. (Fires in the same general area and managed by one fire official are called complex fires.)³



Justin Sullivan/Getty Images

The Bear Fire destroyed Berry Creek School in Berry Creek, Calif., in September 2020. The blaze was part of the North Complex Fire, the fifth deadliest wildfire in recorded California history.

Wildfires, a perennial fact of life in the arid West, have become larger, hotter and more frequent in recent decades, and the fire season longer.⁴ So far this year, fires have scorched more than 2.5 million acres in Oregon, Washington, Colorado and Idaho, plus a record 4.2 million acres in California.⁵ One, the Creek Fire, has become the largest single inferno in California history, burning nearly 380,000 acres as of the end of October—much of it on national forest lands. It also triggered 125-mph fire tornadoes that forced more than 24,000 people to flee, including hundreds of campers rescued by military helicopters.⁶

Scientific research has led to greater understanding of the key factors behind this disturbing trend, which include a century-old fire suppression policy that has resulted in denser, more flammable forests; increased human development near wildlands; and a warming climate that makes forests drier, promotes insect infestations and exacerbates drought conditions. Yet, efforts to better prevent and control wildfires face three major obstacles. Managers of public lands have insufficient workers and resources to utilize “prescribed” fires to thin forests of flammable debris,

brush and saplings. (Such prescribed burns, used to keep forests healthy, are conducted under controlled conditions and after careful planning.) In addition, communities near wildlands struggle to balance safety with population growth. And some politicians are skeptical of climate change science.

In September, at a briefing about California’s historic wildfires, President Trump claimed that the climate would soon start to cool. When California Natural Resources Secretary Wade Crowfoot told the president that science does not support that view, Trump responded, “I don’t think the science knows.”⁷

Five of the 10 Largest California Wildfires Occurred This Year

Half of the 10 largest wildfires, by acreage, in California’s history occurred this year. The August Complex Fire, which began in August, is the largest by far, having scorched more than 1 million acres. All the fires occurred in the last two decades.

Top 10 Largest California Wildfires, 1932–Present

Name	Date	Acreage
August Complex	August 2020	1,032,649
Mendocino Complex	July 2018	459,123
SCU Lightning Complex	August 2020	396,624
Creek	September 2020	377,693
LNU Lightning Complex	August 2020	363,220
North Complex	August 2020	318,930
Thomas	December 2017	281,893
Cedar	October 2003	273,246
Rush	August 2012	271,911
Rim	August 2013	257,314

Note: Data as of Nov. 3, 2020. August Complex and Creek fires are still burning.

Source: “Top 20 Largest California Wildfires,” CalFire, accessed Nov. 3, 2020, <https://tinyurl.com/y29fya8>

The stakes are high for the region's forests, according to an August joint memorandum from the U.S. Forest Service and the state of California. "A cycle of catastrophic wildfires, longer fire seasons, severe drought, intense wind, tree mortality, invasive species and human population pressure threaten to convert conifer forests to shrublands and shrublands to invasive grasses," it said.⁸ The stakes also are high for human health: Smoke from the wildfires threatens the health of people across the Western United States. (*See Short Feature.*)

At the September briefing, Trump blamed this season's conflagrations on poor forest management by Western states. Yet, most of this year's wildfires occurred on federal—not state—land. And while federal agencies, such as the National Park Service and the U.S. Forest Service, treated more than 6.2 million acres with prescribed fires last year—up more than 200 percent in 10 years—much more is needed to significantly reduce the risk of megafires, experts say.⁹

For example, federal agencies have been mechanically thinning, setting prescribed fires and letting natural fires burn under controlled conditions in about 1 percent of California's Sierra Nevada mountain range annually, says Anthony LeRoy Westerling, professor of management of complex systems at the University of California, Merced. "They need to be doing five times as much," he says, and even that amount "wouldn't necessarily make a

big dent in the backlog areas where there has been a lot of fuel accumulation."

One of the biggest barriers to using controlled burning to manage forests is a shortage of crews to do the work, says Christopher Field, director of Stanford University's Woods Institute for the Environment and co-author of a paper on the subject.¹⁰ "What frequently happens is that . . . crews get called off of the prescribed burns, which are considered the low priority activities," to fight large wildfires, which are emergencies, Field says.

In addition, the accumulation of decades worth of undergrowth and other fuels has increased chances that prescribed burns can get out of control. Many forests first must be mechanically thinned, says Westerling, but not all forests are accessible to the equipment, and "it's expensive to do it right and it takes a lot of expertise."

Meanwhile, wildfires are causing ever-growing amounts of property damage, as people increasingly move into rural areas next to public lands, the so-called wildland-urban interface, in search of cheaper housing, seclusion or natural beauty. For example, the Northern California Wildfire Urban Interface Fire in October 2017 caused \$10 billion in property damage, according to the National Fire Protection Association.¹¹

"From 1990 to 2015, we saw a growth of 32 million new homes . . . about a 145 percent increase overall" in the wildland-urban interface nationwide, says Nathan Mietkiewicz, co-author of a recent paper on the topic and a data scientist at the National Ecological Observatory Network in Boulder, Colo., which is operated by the private global research organization Battelle.¹² These homes are in high-risk areas for wildfire, yet developers and homeowners often do not use fire retardant materials and are not "clearing land around the home for defensible space," says Mietkiewicz. "So, when fire happens, it's probably going to be devastating."

However, there are exceptions. Oregon has a nearly 50-year-old land-use system in which cities must get approval from the state before expanding. In 2012, when Bend, central Oregon's largest city, asked that 5,000 new homes be built on private land near a national forest, the nonprofit Central Oregon Landwatch successfully lobbied the state to cut the number of new homes to 170, says Ben Gordon, the group's executive director. The organization then persuaded some of the biggest

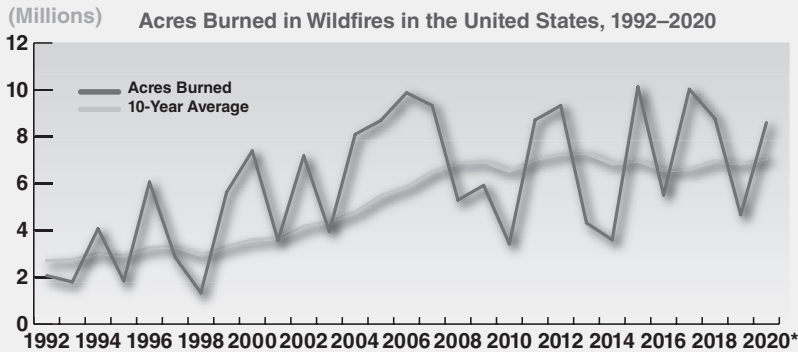


MARK RALSTON/AFP via Getty Images

Dry land surrounds boat docks at Folsom Lake Reservoir near Sacramento, Calif., in 2015, during a seven-year-long drought that ended in 2019. The warming climate produces dry, tinder-box conditions that enable fires to spread rapidly.

Number of Acres Burned on the Rise

Wildfires have burned more than 8.6 million acres across the United States so far this year. Although the number of acres burned by wildfires in the United States varies widely from year to year, the 10-year average rose by more than 150 percent from 1992 to 2019.



* 2020 includes acres burned through Nov. 3.

Sources: "How many wildfires occur in America each year?" USA Facts, Oct. 30, 2020, <https://tinyurl.com/y53nndd87>; "Year-to-date statistics," National Interagency Fire Center, accessed Nov. 3, 2020, <https://tinyurl.com/nqg8glg>

landowners to agree that the homes would be built to stringent wildfire safety standards, he adds.

"Our goal is not to suppress fire," says Gordon. "Our focus is keeping people out of the way of those fires."

But the state of California has no such land-use restrictions near wildlands, Gordon says. Nor will such rules likely be adopted, judging from California Gov. Gavin Newsom's remarks last year that "there is something that is truly Californian about the wilderness and the wild and pioneering spirit."¹³

In the meantime, climate change is only worsening these fire conditions, say experts. The warming climate has increased evaporation, drying out soil and vegetation and making it more susceptible to burning. It has also changed precipitation patterns so that in many years "we didn't get the rain in the fall that would normally wet down the fuels and put an end to the fire season," says Westerling.

Winter precipitation also has been decreasing, says Melissa Lucash, a research assistant professor of geography at the University of Oregon. "We have less snowmelt, and it's affecting the water supply." In fact, the country is experiencing the most widespread drought since 2013, with nearly half of the continental United

States suffering through a prolonged water shortage, according to the Climate Prediction Center at the National Oceanic and Atmospheric Administration.¹⁴

The lack of water not only contributes to wildfires but can make it more difficult for some forests to regenerate, Lucash says. "In some areas there is just not enough moisture for those young trees to come back after a wildfire," she says. How and whether to intervene by clearing severely burned forests and replanting is subject to debate. (*See Pro/Con.*)

BACKGROUND

Fire Suppression

The month of August 1910 was a turning point for wildfire policy in the United States. Over a two-day period, devastating wildfires known as the Big Blowup burned more than 3 million acres in Idaho and Montana, destroying small towns and killing 85 people.¹⁵

A national debate ensued about how to deal with such threats. The choice presented was stark: total fire suppression or periodic light burning of forests to reduce flammable material and pre-empt large, destructive wildfires. Gifford Pinchot, chief of the five-year-old U.S. Forest Service, part of the Department of Agriculture, favored suppression. Secretary of the Interior Richard Ballinger fiercely opposed the idea and said the nation might need to "revert to the old Indian method of burning over the forests annually at seasonable periods."¹⁶

"Those who favored total fire suppression won the debate, and the nascent Forest Service began approaching fire as an enemy," said Philip Connors, a veteran Forest Service fire lookout and the author of two books about his experience.¹⁷ The service began to seriously train and professionalize its force of woodland firefighters "to work year round at this job, not just fighting fires but also managing the forest," says Steven Beda, an environmental historian at the University of Oregon.

C H R O N O L O G Y

1910–1950s *Devastating wildfires lead the federal government to adopt a policy of total fire suppression.*

1910 During two days in August, huge wildfires known as the Big Blowup burn more than 3 million acres in Idaho and Montana, destroying small towns and killing 85 people; the U.S. Forest Service, part of the Department of Agriculture, adopts a policy of suppressing all wildfires on lands it manages.

1911 The Weeks Act expands the total fire suppression policy by allowing the Forest Service to cooperate with states to combat wildfires in state and private forests.

1935 The Forest Service decrees that every wildfire must be suppressed by 10 a.m. the day after it is reported.

1956 Firefighters begin using planes and later helicopters to drop water and chemicals onto wildfires.

1967–1990 *The federal government recognizes that wildfires can have some benefits on forests.*

1967 The National Park Service, part of the Department of the Interior, recognizes for the first time the beneficial role fire plays in forests in promoting the perpetuation of fire-adapted species; it tells park managers to develop programs for allowing some natural fires to burn.

1972 Fire management programs are in place in Yosemite, Sequoia and Kings Canyon national parks in California, as well as Yellowstone in Wyoming and Saguaro National Monument (now Saguaro National Park) in Arizona.

1974 The Forest Service changes its policy from fire control to fire management and allows some lightning fires to burn in wilderness areas.

1978 The Forest Service abandons its 10 a.m. policy.

1988 Dry conditions and high winds make large fires in the Greater Yellowstone Ecosystem nearly uncontrollable and 1.2 million acres burn; the secretaries of Agriculture and Interior set stricter rules for allowing natural fires to burn.

1990 Yosemite, Sequoia and Kings Canyon national parks and several national forest wilderness areas re-establish programs to allow some fires to burn; progress is slower in other areas.

2000–Present *After decades of fire suppression and climate change, dry and dense forests contribute to record-breaking wildfires.*

2000 Driven by high winds and drought, a prescribed fire on lands in the Bandelier National Monument in New Mexico escapes into adjacent Santa Fe National Forest and the town of Los Alamos. . . . The Interior and Agriculture departments suspend all prescribed fires in the West for one year.

2004 Alaska's Taylor Complex Fire burns 1.3 million acres, helping to make the year's fire season the worst in state history.

2006 The East Amarillo Complex Fire kills 12 people and burns 907,245 acres in the Texas Panhandle, more than half the acreage destroyed by wildfires nationwide that year.

2011 Wildfires engulf more than 8 million acres nationwide, making for one of the worst years on record. The longest drought in California's recorded history begins on Dec. 27 and lasts more than seven years.

2015 Wildfires burn through more than 9 million acres nationwide, the highest amount in a decade.

2018 The Camp Fire, propelled by drought and winds, is the deadliest and most destructive fire in California to date, killing 85 people and destroying 19,000 structures; it rampages through the town of Paradise, displacing thousands. . . . Congress allocates an extra \$2 billion-plus annually, starting in fiscal 2020 and lasting through 2027, for suppressing wildfires.

2019 After 376 weeks, California's drought ends on March 5. . . . Gov. Gavin Newsom signs 22 bills aimed at mitigating and preparing for wildfires in the state.

2020 Large wildfires ignite in the Western United States, burning land in California, Washington, Oregon, Colorado, Idaho and other states, and setting records for acres burned in some states. . . . Sen. Dianne Feinstein, D-Calif., introduces bipartisan legislation to increase the fireproofing of structures and clear dead trees from forests. . . . Sen. Ron Wyden, D-Ore., introduces a measure that would appropriate funds for controlled burns.

Wildfire Smoke Endangers Human Health

“Almost the entire Pacific Coast has had pretty bad wildfire smoke exposures.”

Smoke from forest fires contains cancer-causing substances and other chemicals that can burn humans’ airways and increase the risk for various short- and long-term health effects, according to Dr. John Balmes, a professor of environmental health sciences and director of the Northern California Center for Occupational and Environmental Health at the University of California, Berkeley. In this interview with CQ Researcher freelance correspondent Barbara Mantel, Balmes says this year’s record-breaking wildfires likely will lead to new cases of asthma along the nation’s West Coast. The transcript has been edited for length and clarity.

CQ Researcher: How bad has the air quality been during this current wildfire season?

Balmes: The Air Quality Index, the U.S. Environmental Protection Agency’s system for informing the public about health risks of poor air quality, is used to assess how bad wildfire smoke or pollution is. And in Salem, Ore., it was literally off the scale. The scale goes to 500, which is extremely, extremely bad. Sacramento, Calif., [had an index] over 400 at one point. Almost the entire Pacific Coast, from British Columbia down to Los Angeles, has had pretty bad wildfire smoke exposures.

CQR: What is in wildfire smoke that makes it dangerous to breathe?

Balmes: It’s basically tobacco smoke without the nicotine.

CQR: How is it similar?

Balmes: There certainly are the same carcinogens in wildfire smoke that are in tobacco smoke, though the exposure is usually less to the public, although maybe not to wildland firefighters. And there are also gases, and some of those are carcinogenic, such as formaldehyde and benzene. Both the gases and the fine particles cause sort of a chemical burning of the airways and air sacs that leads to an inflammatory response; white blood cells and other cells in the immune system go to the lungs to deal with this injury, and that reaction increases the risk for multiple other short-term health effects.

CQR: What kinds of short-term health effects?

Balmes: I did a review with colleagues . . . that was published in 2016. We reviewed the literature on wildfire smoke and community exposures through 2015. And at that time, we felt that the published literature supported acute short-term health effects with regard to respiratory outcomes, specifically, increased risk of exacerbations of asthma and chronic obstructive pulmonary disease. Since we published that review, multiple studies have strengthened the evidence for an association between wildfire smoke exposure and cardiovascular outcomes—heart attacks, out-of-hospital cardiac arrests, strokes.

CQR: Who is most at risk?

Balmes: The people at most risk for serious adverse effects of wildfire smoke exposure are older people with pre-existing heart and lung disease. And younger people with pre-existing heart and lung disease, primarily folks with asthma.

In 1911, Congress passed the Weeks Act, which allowed the Forest Service to cooperate with states to combat wildfires in state and privately owned forests, thus expanding the federal government’s influence over wildfire policy.¹⁸ That policy of total suppression was reinforced in 1935 when

Forest Service Chief Ferdinand Silcox decreed that every wildfire should be suppressed by 10 a.m. the day after it was reported. As a result, “forests slowly choked under the proliferating deadfall of unburned fuel, making the inevitable later fires hotter and more destructive,” said Connors.¹⁹

There is evidence that wildfire smoke exposure increases the risk for lower respiratory tract infections, pneumonia, acute bronchitis, infectious bronchitis—and we are very concerned about the nexus of wildfire smoke exposure in the COVID-19 pandemic.

QCR: Are there longer-term impacts from inhaling wildfire smoke?

Balmes: That's an open question, but there is concern. We know that for some people who are at risk for asthma but don't actually have it yet—people with a family history of asthma and allergies—air pollution exposures can be a trigger to develop clinically important asthma. So, I think it's quite likely that there will be new cases of asthma as a result of the current wildfire smoke exposures along the West Coast.

QCR: Can wildfire smoke, especially with chronic exposure, cause cancer?

Balmes: The cancer risk related to wildfire smoke is really not well understood. There is an ongoing study of career wildland firefighters, who get way more exposure to wildfire smoke than the public. The National Institute for Occupational Safety and Health (NIOSH) is trying to collect the data to answer the question on whether heavy exposure to wildfire smoke really does pose an increased risk of lung and other cancers. We do know about the health effects of exposure to fine particles from other sources, such as coal-fired power plants or diesel-powered vehicles, and there is a lung cancer risk associated with chronic exposure to fine particles.

QCR: Exposure to wildfire smoke is lasting a lot longer than normal this year. How much does the duration of exposure matter for the general public?

Balmes: We are increasingly concerned about children, because it's hard for parents to keep their kids inside all the time, especially when they're Zooming for school. So, kids want to go outside, even when the air quality isn't good. But their lungs are developing until early adulthood, and there is evidence that chronic exposure to outdoor fine particles from

sources other than wildfire smoke can slow growth of lung function to the point where there actually is lower lung reserve.

We don't know what prolonged recurrent exposure to wildfire smoke will do to the growth of lung function, but we're concerned about that.

QCR: What can people do to reduce the harmful effects of wildfire smoke?

Balmes: Reducing exposure is the key to reducing health impacts. So, staying indoors with the windows closed with the ventilation system on recirculation, and if possible, having a MERV* 13 or better filter in your ventilation system; the higher the number, the better the filtration of fine particles. So that's in your central ventilation system, if you have such a system.

And then if you don't, you can create clean air rooms with portable HEPA [high-efficiency particle air] filters.

QCR: What needs to be done to better understand the health effects of wildfire smoke?

Balmes: Over the last five years there has been an explosion of studies about the health effects of wildfire smoke, and this fire season is going to spur more of that.

It's really the long-term health effects that we need the most research about, because we already understand short-term health effects fairly well. That's why it's a shame that the study of career wildland firefighters, which NIOSH started in 2019 or maybe even 2018, got canceled for this year because of COVID-19. They were literally taking a trailer around to U.S. Forest Service fire stations in the Mountain West to measure lung function on an annual basis and to take biological specimens. We would learn a lot about the long-term effects of wildfire smoke exposure from this study, and it's been at least delayed by the pandemic.

*The Minimum Efficiency Reporting Value (MERV) is a scale designed by the American Society of Heating, Refrigerating and Air-Conditioning Engineers to rate the effectiveness of air filters.

New Policies

In 1967, the National Park Service, created in 1916 within the Interior Department, recognized for the first time the beneficial role that fire plays in forest ecology. The department encouraged national parks managers to

develop plans to allow some naturally occurring fires to burn. Sequoia, Kings Canyon and Yosemite National Parks in California and Yellowstone, which is predominantly in Wyoming, were some of the first to establish “let burn” zones. In 1974, the Forest Service followed



A sign in Los Angeles' Griffith Park featuring a mask-wearing Smokey Bear, the longtime fire prevention icon of the U.S. Forest Service, warns of high fire danger in May 2020. U.S. fire policy changed in the 1960s, allowing for some naturally occurring fires to burn under controlled conditions.

suit and began allowing natural fires to burn in wilderness areas, and in 1978 it formally abandoned its 10 a.m. policy.²⁰

In July 1988, the policy of allowing naturally occurring fires to burn under controlled conditions created an unintended disaster. In the Greater Yellowstone Ecosystem, which spans northwestern Wyoming, southwestern Montana and eastern Idaho, “dry fuels and high winds combined to make the larger [of such] fires nearly uncontrollable,” according to a National Park Service history. By October, when firefighters finally were able to contain the fires, 1.2 million acres had burned.²¹

The secretaries of Agriculture and the Interior suspended all burn programs in parks and wilderness areas until fire management plans were revised to conform to new, stricter rules. In the 1990s, the agencies slowly resumed allowing some natural fires to burn.²²

In 2000, managers on the Bandelier National Monument in New Mexico set a prescribed fire that, due to high winds and drought, escaped into the adjacent Santa Fe National Forest and ultimately into the town of Los Alamos. It became one of the worst fires in New Mexico history. As a result, a moratorium on prescribed burns was declared for that summer “until reforms could be installed,” said historian Stephen J. Pyne. Meanwhile, wildfires in the northern Rockies burned out of control.²³

Wildfire seasons today last 78 days longer, on average, than in the 1970s. Human-caused climate change and the resulting droughts and drying of flammable forest materials are a major factor, according to scientists. The Forest Service devotes half its budget to fighting wildfires, according to the National Association of State Foresters. Starting in fiscal 2020, which began in October 2019, Congress appropriated an extra \$2.25 billion annually to the Departments of Agriculture and the Interior for wildfire suppression. The amount increases every year until fiscal 2027, when it will reach \$2.95 billion.²⁴

CURRENT SITUATION

Latest Fires

The largest wildfire in California history is still burning, and dozens of wildfires continue to rage across the Western states.²⁵

In early October, several wildfires in Northern California merged to form the August Complex “gigafire,” a name given to a fire that burns more than 1 million acres. The fire has been burning since Aug. 16 and is over 93 percent contained. The last million-acre fire in the United States occurred in Alaska in 2004.²⁶

High winds and temperatures continue to fan ongoing fires and set the stage for more blazes this season. As a result of the extreme weather conditions, Pacific Gas & Electric (PG&E) began to shut off power for tens of thousands of customers in mid-October to reduce the risk of strong winds blowing trees into live power lines and sparking a fire, a situation that has triggered major fires in the past. Such outages have been shorter on average this year than last, says the company, which plans to restore power to customers within 12 daylight hours after the extreme weather has passed.²⁷

“I want to remind people of the importance and the imperative of being even more vigilant in these dry and hot conditions where we start to see these winds whip back up,” Gov. Newsom said on Oct. 12 in an update on the response to the fires. October and November, he pointed out, are normally the peak of the state’s wildfire season.²⁸

In Colorado, the Cameron Peak Fire—the largest in the state’s history—has burned more than 200,000 acres and is still burning in the northern part of the state. Over 1,500 firefighters have battled the flames, which are being fanned by strong winds and dry weather.²⁹

Do forests damaged by wildfire need human help to regenerate?

YES

John Buckley
Executive Director, Central Sierra
Environmental Resource Center

Written for *CQ Researcher*, November 2020

A blackened landscape after a fire can often be viewed as a temporary condition.

With my background as a wildland firefighter and director of an environmental organization in the Sierra Nevada, I have seen that most wildfires do not extensively damage forests. They generally burn with low to moderate severity—providing ecological conditions that conifer forests have evolved with for centuries. Widespread reforestation is not normally needed.

However, major severe wildfires, such as California's 2013 Rim Fire that burned 257,000 acres, can leave broad areas with few surviving conifers. Hardwoods and brush resprout and thrive in the burned landscape, but without surviving mature conifers to disseminate seeds, few young conifers grow to create a restored forest.

Dormant seeds in the soil are often scarified by the fire, resulting in a pulse of brush species that can completely shade out young conifers. Forest managers must decide whether to reforest—to intervene by jump-starting growth of sufficient numbers of conifers to meet recreation, wildlife habitat, wood production or other goals.

Without reforestation, forest areas with few surviving conifers often convert to oak/brush landscapes. As an example, across the central Sierra Nevada, large, intense wildfires have already converted vast areas of conifer forest to brush fields. Reforestation can spur the recovery of conifer forest habitat that benefits spotted owls, goshawks, northern flying squirrels and other species that depend on mature forests and patches of dense tree cover.

The choice of reforestation methods obviously matters.

Some promote aggressive bulldozing of post-fire brush fields, and endorse herbicide use to kill competing vegetation to ensure that rows of planted young conifers grow higher than their competition. Others advocate the far less controversial process of removing competing vegetation by hand and then planting clumps and patches of young conifer seedlings in a more natural mosaic pattern.

In the big picture, the majority of burned forest areas normally do not require extensive reforestation. But given climate change and so many recent giant, extreme conflagrations, reforestation treatments within incinerated forest landscapes can help to restore depleted conifer stands.

Readers should be cautious about accepting any claim that high-severity wildfires have not increased in recent years. Here in California, the six largest wildfires in the state's history have all burned in the last three years. Record-setting fires are causing large areas to burn intensely. Active reforestation can be one tool to restore forests—for all their benefits.

NO

Chad Hanson
Research Ecologist, John Muir Project; Co-editor
and Co-author, *The Ecological Importance of
Mixed-Severity Fires: Nature's Phoenix*

Written for *CQ Researcher*, November 2020

Fires have burned forests in North America and around the world for tens of millions of years, and those forests have naturally regenerated for countless millennia. Forests do not need our assistance to regrow after wildfires, even big ones.

First, a bit of scientific background and context are in order. Scientists agree that we currently have significantly less fire in U.S. forests than we had historically (before fire suppression policies were adopted), and very large fires—as big or bigger than anything we are seeing currently—occurred historically as well. Fires have always had a mix of intensities, including small and large patches where fires burn hot and kill most or all of the trees.

Currently, even the largest forest fires are mostly comprised of lower-intensity fire effects, where the mature trees survive and thrive, along with many smaller trees, and only about 15 percent to 25 percent of forests experience high-intensity fire. Large, high-intensity fire patches increased from the 1980s to the 1990s but have not become more frequent over the past two decades. Moreover, where high-intensity fire occurs, it creates a unique post-fire habitat known as “snag forest”—filled with burned, dead, decomposing trees that, like an old-growth forest, promotes native biodiversity and wildlife abundance.

But what about large high-intensity fire patches where surviving trees are several hundred feet or more away from each other? While there are limits to how far wind can blow seeds from surviving conifers, birds and small mammals distribute seeds all over the forest after fires—at any distance from live trees. This allows forests, such as ponderosa pine and mixed conifer, to naturally regenerate with a rich mix of native tree and shrub species.

Some studies by agency and university scientists funded by the Trump administration have claimed that some high-intensity fire patches lack conifer regeneration. However, these studies have been discredited because they used field plots that were far too small, essentially guaranteeing that many plots would not contain regenerating tree seedlings.

Forests do not need our help to regenerate after fires, and proposed “interventions” based on biased studies are really just smokescreens for commercial logging and destructive logging bills, such as the Emergency Wildfire and Public Safety Act of 2020, which would destroy forests and increase fire intensity. This bill would allow, among other things, the export of unprocessed timber of dead and dying trees from federal land in California.

State Action

California, where the most acreage has burned in recent years, has passed more wildfire mitigation laws than any other state, according to the National Conference of State Legislatures. In October 2019, Gov. Newsom signed 22 laws covering a range of wildfire-related issues.³⁰

Among other things, the measures created a wildfire warning center, updated building standards, required state agencies to pursue aid to property owners to protect their structures and prohibited mobile data service providers from limiting internet access for first responders during an emergency.

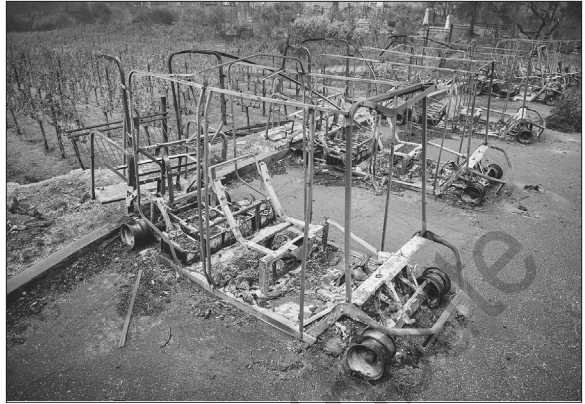
Several of the new laws addressed the role of PG&E in wildfire mitigation. One measure authorized the California Public Utilities Commission to oversee the company's tree-trimming efforts around their lines. Another required utilities to deploy backup generators or provide financial assistance for customers to acquire backup generators if they use a medical device that requires power.³¹ A third measure required that PG&E notify all public safety agencies, health care facilities and telecommunications providers before their power is preemptively shut off.³²

No legislation has been enacted this year to "address the massive wildfires we've seen on the West Coast," says Lucia Bragg, an emergency management policy specialist at the National Conference of State Legislatures. The policy response to this year's record wildfire season will probably not come until next year. Legislatures normally do not pass "major legislation, like policy reform or major appropriations packages, typically until well into the recovery stage," says Bragg.

However, the Oregon Legislature in October allocated more than \$21 million to state agencies to help communities recover from wildfire destruction, with most of those funds set aside for schools.³³

Federal Action

In August, Sen. Dianne Feinstein, D-Calif., introduced the Emergency Wildfire and Public Safety Act, which calls for the Interior Department to expedite the deployment of wildfire detection equipment and establish a wildfire risk mitigation training center. It would exempt some forest management activities from environmental review requirements and provide grants to make the



SAMUEL CORUM/APP via Getty Images

Golf carts lay in ruins after the Glass Fire burned through in Calistoga, Calif., in late September 2020. A bill in Congress would establish a wildfire risk mitigation training center and help homeowners fireproof their homes.

harvesting of dead trees more commercially viable. In addition, the legislation would expand a program that helps retrofit homes with fireproofing material. An identical bill was introduced in the House by Rep. Jimmy Panetta, D-Calif.³⁴

Four Republican senators from Western states co-sponsored the Feinstein bill, and Gov. Newsom endorsed it. The Senate Energy and Natural Resources Committee's Subcommittee on Public Lands, Forests and Mining held a hearing on the measure in September.

"Climate change is making these fires worse by the year, and we've got to address it," said Feinstein, who testified at the hearing. "Our bill takes aim at the direct, most immediate causes of this unprecedented series of wildfires."³⁵

In September, Sen. Ron Wyden, D-Ore., introduced the National Prescribed Fire Act, which would appropriate \$300 million for the Forest Service and Interior Department to conduct controlled burns on federal, state and private lands. The bill would provide a \$100,000 incentive to any state, county or federal agency for any controlled burn larger than 50,000 acres and establishes a \$10 million, competitive, cost-sharing program to complete controlled burns in high-risk areas, especially where it would be difficult for firefighters to stop a wildfire. It also authorizes a national education campaign about controlled burns featuring a quail named "Burner Bob."³⁶

On the House side, the Committee on Transportation and Infrastructure recently approved the FEMA (Federal Emergency Management Agency) Assistance Relief Act, which would shift more of the financial burden of disaster assistance, including for wildfires, to the federal government. The bill was introduced by Rep. Peter DeFazio, D-Ore., and co-sponsored by 40 Democrats and one Republican. A similar bill has been introduced in the Senate by Oregon's two senators, Jeff Merkley and Wyden, both Democrats.³⁷

On Oct. 16, after a phone call with Gov. Newsom, President Trump approved California's emergency declaration, which would make millions of dollars in federal funds available for areas destroyed by six fires, including the Creek Fire. Trump did so a few hours after first rejecting the state's application for the funds, saying it did not meet the criteria for federal aid. The president had already provided emergency funds to California earlier in the summer for other fires.³⁸

OUTLOOK

Preventing Wildfires

Stanford University's Field says he expects California to allocate more resources to reduce the risk of deadly and devastating wildfires over the next five to 10 years.

"I hope that includes more investment in emergency preparation, things like evacuation planning . . . and investment in things like ignition risk reduction, [such as] paying attention to power lines," Field says.

Westerling, of the University of California, Merced, expects state and federal governments to spend more money to expand the number of prescribed burns over the coming decade but says there are growing constraints on setting such fires. "The fire season itself is getting longer and longer every year and the conditions more extreme," he says. "So, the windows of opportunity where it is dry enough to burn but not so bad that you have a difficult time controlling that fire is shrinking on average."

Gordon of the Central Oregon Landwatch notes that current building standards to harden structures against wildfires are local. But he says he expects the Oregon Legislature to consider statewide standards in the next year or two and to possibly offer monetary incentives to developers and homeowners to retrofit existing properties to make them more fire-resistant.

"Obviously, we've got some budgetary shortfalls as a result of COVID-19, so the idea of passing anything that has . . . an additional cost is going to be tricky," says Gordon. "But they will look at the balance between having to pay to fix the aftermath of what fire causes versus paying upfront to control the effects the fire will have."

Yet none of these government actions takes on human-caused climate change, says Mietkiewicz of the National Ecological Observatory Network. "We're not doing anything to curtail climate change, and that's the main issue here," he says. As a result, he expects many more large fires over the next decade, large amounts of property damage and continued poor air quality from the resulting smoke. "It's a dark outlook," says Mietkiewicz.

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THE NEXT STEP

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For More Information

California Department of Forestry and Fire Protection, PO Box 944246, Sacramento, CA 94244-2460; 916-651-FIRE (3473); fire.ca.gov. A state agency that protects people, property and resources from wildfires.

Central Oregon Landwatch, 2843 Northwest Lolo Drive, Suite 200, Bend, OR 97703; 541-647-2930; centraloregonlandwatch.org. A nonprofit dedicated to protecting and conserving the region's ecosystem and wildlife.

Climate Prediction Center, National Oceanic and Atmospheric Administration, 5830 University Research Court, College Park, MD 20740; 301-683-1327; cpc.ncep.noaa.gov. A federal project that predicts short- and long-term climate variations and promotes risk management.

National Conference of State Legislatures, 444 N. Capitol St., N.W., Suite 515, Washington, DC 20001; 202-624-5400; www.ncsl.org. A national organization that tracks state legislative action.

National Ecological Observatory Network, 1685 38th St., Suite 100, Boulder, CO 80301; 720-746-4844; neonscience.org. An ecological observation facility that provides public data on ecosystems from 81 field sites in the United States.

National Interagency Fire Center, 3833 Development Ave., Boise, ID 83705-5354; 208-387-5512; nifc.gov. A physical facility for sharing firefighting supplies, equipment and personnel among federal agencies.

National Park Service, 3833 S. Development Ave., Boise, ID 83705-5354; 208-387-5200; nps.gov. A federal agency that manages national parks and monuments and develops wildfire prevention policies.

U.S. Forest Service, 1400 Independence Ave., S.W., Washington, DC 20250-0003; 800-832-1355; fs.usda.gov. A federal agency that administers the nation's forests and grasslands and manages the response to wildfires.