

FIXING FUNDING | LOGGING FROM BELOW | ENDING 'FIRE-DROUGHT'

High Country News

For people who care about the West

SCORCHED EARTH

What this year's devastating fire season
means for the future of the West

A Special Report

The Eagle Creek Fire burns as golfers play at the Beacon Rock Golf Course in North Bonneville, Washington, in early September. The fire continues to burn, but became 100 percent contained Nov. 30, after consuming close to 50,000 acres.

KRISTI MCCLUER/REUTERS



Editor's note

In search of a fearless fire policy

In his 2004 book *Scorched Earth*, Idaho Statesman columnist Rocky Barker describes the desperate sprint he and a colleague made to escape a 1988 wildfire in Yellowstone National Park: "Coals were pelting his back and I could see fist-sized firebrands by my head. ... The entire area turned black as night and the howling wind sounded like a jet engine. ... The forest we had just left ... ignited as if someone had lit a match to gasoline."

Wildfire can be as terrifying as any natural force on Earth. If we needed a reminder of this, we got it with this year's dramatic season. But while 2017 may well be remembered mainly for its destructiveness, I hope it will also be remembered as the year that fear-based responses to fire began to lose some of their power.

Naturally, a few politicians stayed in character, simply reprising their old hits — castigating environmentalists for halting any and all logging projects. Mike Noel, a Republican lawmaker from Utah, for example, blamed a major fire in his state on the surrender of U.S. Forest Service policy to "the bird and bunny lovers and the tree huggers and the rock lickers." Environmentalists countered that climate change-denying politicians, by propping up the fossil fuel industry, are lighting the matches for future firestorms.

But neither side is doing much to create lasting solutions on the ground that could help overcome a century of fear-based management in the West. That culture of fear stems back to the summer of 1910, when drought, high winds and cinders from locomotive engines created wildfires that burned nearly 3 million acres in Montana and Idaho in a matter of days. The year after the Big Blowup, as it was called, Congress doubled the federal firefighting budget and passed legislation calling for federal cooperation with state and local agencies to snuff out wildfires.

The war on forest fire had begun, and it hasn't ever really stopped. Despite understanding as far back as the 1920s that wildfire has an essential ecological role in maintaining forest health, and despite the Forest Service's adoption of "let it burn" policies in the 1970s, we still snuff out 97 percent of all blazes under 300 acres, says Mark Finney, a Forest Service fire researcher based in Missoula, Montana. One hundred years of suppression has encouraged the growth of dense, even-aged forests that burn dangerously hot and fast, he says. Every time we put out small fires, we are unintentionally setting up the next major fire. "What type of fire do you want, and when?" he asks. "If you only want

the worst ones, then we are doing a pretty good job of it."

"Wildfire is the scariest thing in the world for a manager," says Lincoln Bramwell, who was a firefighter during the 1990s and is now the Forest Service's chief historian. "Your career can be on the line, even if the regional forester says, 'We've got your back.' So your answer is always, 'Go put it out.' "

One manager who has resisted the pressure is Mike Elson, a district ranger in Flagstaff, Arizona, for the past nine years. In the summer of 2016, Elson let the lightning-sparked Mormon Fire burn for several weeks, slowly charring more than 8,000 acres of ponderosa pine on the edge of town. He finally ordered his team to put it out when people down valley in Sedona complained about the smoke. The residents of Flagstaff, however, were mostly fine with the blaze.

That's because, Elson says, education and experience have taught them that their forests need to be thinned and burned. A major fire in 2010 resulted in post-fire floods that hit hundreds of homes, battered roads and utilities, and caused \$155 million in damage. With that memory fresh in mind, Flagstaff voters overwhelmingly passed a \$10 million bond measure in 2012 to thin forests around the city. The Mormon Fire was a mellow fire. Located in Flagstaff's municipal watershed, it helped reduce the fuels that would have driven the next major fire. Flagstaff, in other words, has created a fearless fire policy. "They just get it," Elson says.

Can the West as a whole get it now? Across the region, serious conversations are taking place over everything from managing spiraling firefighting costs to coping with wildfire smoke. And dozens of national forests are currently collaborating with loggers and conservationists to thin and intentionally burn forests, making them more resilient while providing jobs for rural communities.

We need more of this kind of work, and more funding to back it. We need a more nuanced social contract with fire; we have to, at long last, embrace the West's natural "pyrodiversity."

The 2017 fire season made one thing abundantly clear: Fire management is ultimately a social issue driven by humans and their emotions. Reactive moves by Congress to suspend environmental regulations and retreat to the good old days of logging are not the answer. Neither is just sitting back and letting the forests burn. We may never get over our fear of fire, but we can implement policies that will help us to better manage both our fears and the forests entrusted to us.

—Paul Larmer, executive director/publisher



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The wildfires that ravaged California's Sonoma and Napa counties in October burned lightly in this area of the Bouverie Preserve that had a prescribed burn in May. COURTESY OF SASHA BERLEMAN, BOUVERIE PRESERVE

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SCORCHED EARTH

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The human-caused Eagle Creek Fire, which burned for three months in and around the Columbia River Gorge National Scenic Area in Washington. CURTIS PERRY/CC VIA FLICKR

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Trending

Beset by drones

On a climbing expedition, author Nick McEachern loses his balance when a drone buzzes past him. This isn't the first time it's happened; McEachern says that in Utah, Oregon and on the Colorado River, "my friends and I find ourselves beset by drones." As drones have become less expensive, sales of the devices have surged. Although drones are already not allowed in wilderness areas, McEachern argues they should be better regulated to avoid impinging on people experiencing public lands. NICK MCEACHERN



A sign at the Piedras Blancas elephant seal rookery in San Simeon, California. DUNCAN SELBY / ALAMY STOCK PHOTO

You say

LORI CARPENTER: "Amateur and hobbyists can be annoying; professional pilots must pass a written test and pass other skills and performance requirements. A few bad apples should not prevent the good citizen scientists can do with these small quad-copters."

MIKE VIRGIN: "They are not allowed in wilderness or national parks. The forest and BLM land is for everyone. Endangering people and being rude is one thing but responsible use of drones is just another use of our open spaces."

TERESA JEAN TERRY: "I was one of several women camping alone on the North Rim of the Grand Canyon when a drone came flying over. ... I don't know if (the men in the nearby campsite) were trying to spy on us or just checking out the area, but I felt like our privacy was being very invaded."

MORE: hcne.ws/nuisance-drones and Facebook.com/highcountrynews

“There are 5.4 million American Indians and Alaska Natives (in the United States), and none of us look like Pocahontas.”

—Graham Brewer, new contributing editor on the HCN tribal affairs desk, describing the lack of understanding of — and reporting on — the unique histories and the multi-faceted legacy of sovereign nations. MORE: hcne.ws/tribal-affairs

150 Number of days southern resident killer whales could typically be seen in Washington's Salish Sea.

40 Number of days they were seen this year. This summer was the "worst year on record" for sightings of southern resident killer whales in the Salish Sea near Washington state. Whale researchers believe that record-low chinook salmon runs are the main culprit, causing the orcas to go elsewhere. The whale's population is currently at its lowest number in 30 years, as calves die from starvation and pregnant whales miscarry. Whale watcher Jeanne Hyde says of the low salmon numbers: "We have to fix it, because we broke it."

ALLEGRA ABRAMO/CROSSCUT
MORE: hcne.ws/disappearing-orcas

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BORDER LITE

Weaponized landscape or great place to drink Tecate? The tone of this piece is way out of whack with the story it purports to tell: how author Francisco Cantú transformed himself from a (brutal? we never find out) Border Patrol cop to a teacher, writer and (we are led to believe) sympathizer with those he (presumably) arrested (“The weaponized landscape,” *HCN*, 11/13/17). Instead, the interviewer treats us to flirty banter, foodie ruminations and romanticized tropes. (“His country’s border ... pulled at him. He came back to the desert.”) A pervasive odor of privilege ultimately ruins what might have been — with judicious editing — a salvageable story. To wit: “But the (border) line is surprisingly empty; we walk right through. We scan our passports, the Border Patrol agent takes a brief glance at them, and just like that, we cross the line into the United States — nonchalant, licking our popsicles, improbably powerful.” That phrase — “improbably powerful” — is exactly what needs unpacking here. We need to taste, smell, feel not the drippy taco juice running down one’s fingers, but the irony, inequality and ruthlessness of the border.

Meg Scherch-Peterson
Pilar, New Mexico

THE LENS OF TIME

The “books in the wild” theme brings back lovely memories (“Wild reading,” *HCN*, 11/13/17). What better companion than a book when weather locks you into a tent for hours by yourself? Books don’t take up much space, don’t smell or snore. I lean towards the classics: Plutarch, Livy, Thucydides, et al. Not only are they densely packed storytelling and cheaply available in any used-book store, they put the perspective of time on things. It is somehow comforting to know that the world was just as confusing and dangerous 2,000 years ago as it is today, yet somehow life went on, as it does now.

Livy died in 17 A.D., shortly after the death of Augustus, Rome’s first emperor. His life encompassed the decline of the Republic and the birth of the Empire. This paragraph from the preface to his *History of Rome* still brings tears to



my eyes and seems especially apropos now, 2,000 years later.

The subjects to which I would ask each of my readers to devote his earnest attention are these — the life and morals of the community; the men and the qualities by which through domestic policy and foreign war dominion was won and extended. Then as the standard of morality gradually lowers, let him follow the decay of the national character, observing how at first it slowly sinks, then slips downward more and more rapidly, and finally begins to plunge into headlong ruin, until he reaches these days, in which we can bear neither our diseases nor their remedies.

Camped in some lovely remote spot far from the media glare, I can view our current diseases through the lens of time. There’s something special about setting camp on a solo trip below a glorious spot like Stevens Arch on the Escalante, settling down with a whiskey as the stove hums, softly simmering, and the stars shine brighter and brighter as the sky goes from deep blue to black. I put on the headlamp, and reach into the drybag to pull out a classic.

Bryan T. Burke
Eloy, Arizona

SERVING — AND EARNING —
ON PUBLIC LANDS

In the recent article “The Changing Face of Woods Work” (*HCN*, 10/30/17), the author describes the challenge of putting young Americans to work in the woods. Though the article was well-written, the author did not mention that there is indeed a new generation of Americans

hungry to work outside, to rebuild and care for our public lands.

Nationwide, The Corps Network leads and supports more than 130 of America’s Service and Conservation Corps, which engage 25,000 diverse young people, ages 16 to 25. Projects include building and maintaining recreation and fire trails, planting trees, removing weeds, thinning forests to reduce the threat of wildfire, and improving parks and campgrounds to enhance the recreational infrastructure on which a large part of our region’s economy depends.

Here, the Northwest Youth Corps has provided job skills, education and outdoor experience to more than 20,000 youth since 1984. We operate in Oregon, Washington and Idaho, where we do business as the Idaho Conservation Corps. This year, 870 of our teens and young adults carried out 219,000 hours of conservation stewardship projects for 160 partners. The majority of our project sponsors are Forest Service districts but also include the Bureau of Land Management, U.S. Fish and Wildlife Service, National Park Service, Bureau of Reclamation and the Oregon and Idaho Parks and Reclamation departments, plus many other agencies.

Most participants camp out in tents for five weeks to five months near the job site, but an increasing number serve and learn in their own communities through a “day-program” format. In addition to earning money, these young people earn high school credit and job references, and develop a love of the outdoors. Crewmembers learn about resource management and earn professional certifications to help them land a related career after graduation.

For land managers interested in engaging the next generation on our public lands, we provide all needed support, including supervision, work tools, insurance, worker’s compensation and transportation. We would be happy to put you in touch with previous sponsors in your area. For more information, contact Keith Brown at keithb@nw-youth-corps.org, and for Idaho, Tom Helmer at tomh@idahocc.org.

Natalie Whitson
Development officer,
Northwest Youth Corps
Eugene, Oregon

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A typical fire season in the West could soon last more than 300 days.

Burning up the budget

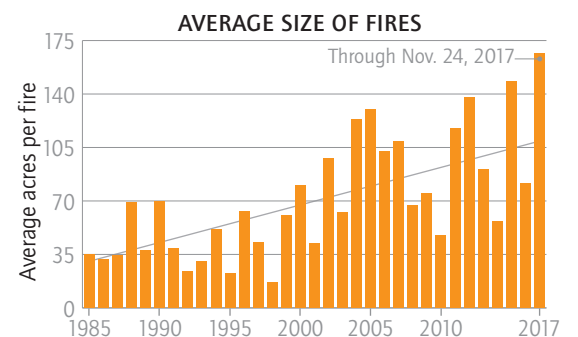
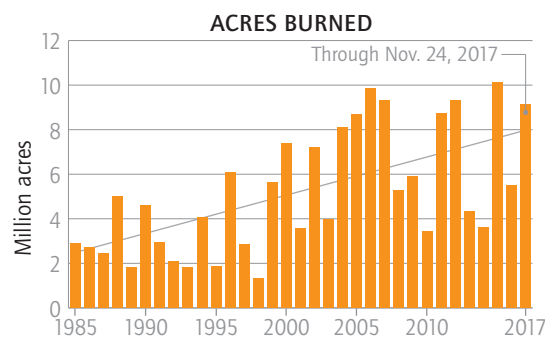
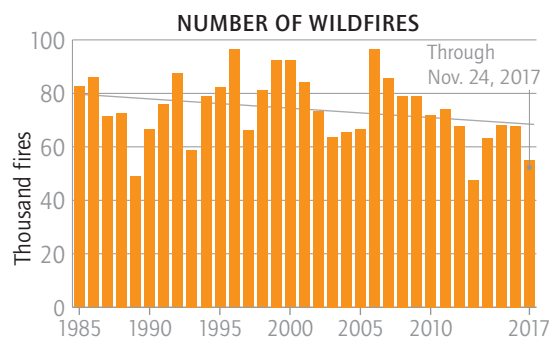
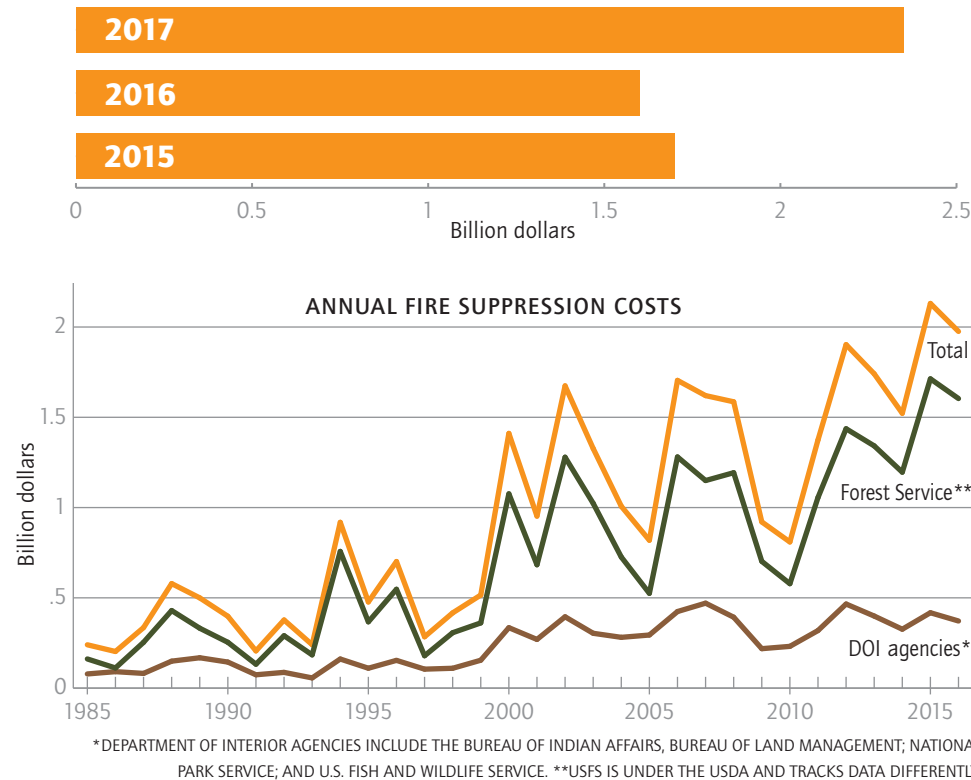
Wildfire costs continue to devour land-management budgets

BY PAIGE BLANKENBUEHLER

The 2017 fire season was the nation's costliest, according to the U.S. Department of Agriculture, which houses the Forest Service. That agency's annual budget is increasingly dedicated to suppressing and fighting wildland fires, as longer seasons and more destructive blazes require more resources. Millions of acres have burned in the West this year, mostly in California, Montana and Oregon. Some of the West's biggest fires began in September, at a time when the fire season is typically waning. But by mid-September, California had declared the first of several states of emergency, when

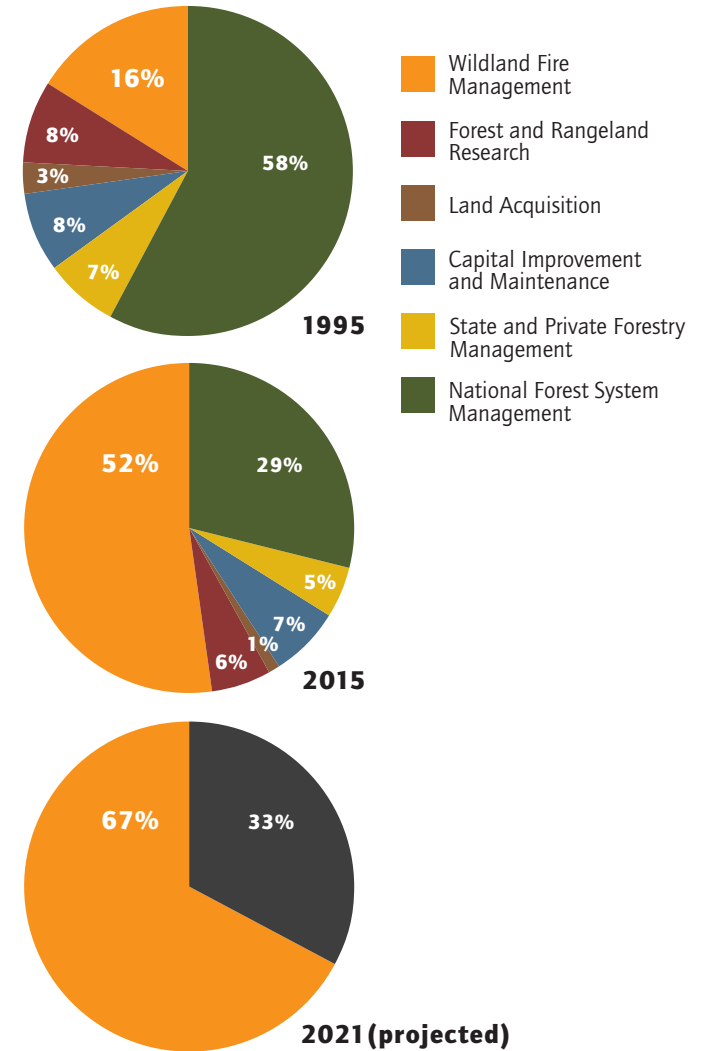
blazes threatened giant sequoias in Yosemite National Park. Nowhere were fires more intense than in Montana, where more than 1.2 million acres burned. In Oregon, the Eagle Creek Fire tore through the Columbia River Gorge. With long-term climate trends portending more frequent droughts, this kind of severe and expensive fire season is more likely to become the norm. According to the National Interagency Fire Center's most recent wildfire potential outlook report, it's not over, either: Southern California should see higher than normal wildfire activity well into 2018.

The 2017 fire season was the most expensive ever, with costs exceeding \$2 billion for the U.S. Forest Service.



DATA SOURCES (PAGES 5-9): U.S. FOREST SERVICE, NATIONAL INTERAGENCY FIRE CENTER, 2014 QUADRENNIAL FIRE REVIEW, PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA (P. 7)

Wildland firefighting now consumes more than half of the Forest Service's annual budget



Between Jan. 1 and Nov. 24, the U.S. had

54,858 wildfires, which burned **9,152,458** acres.

More than 33 percent of houses in the U.S. are in the wildland-urban interface. Such development increases the cost of wildfire protection.

Why a fire-funding solution has eluded Congress

Nearly everyone agrees it's important. So what's the hold-up?

BY REBECCA WORBY

On Sept. 14, Secretary of Agriculture Sonny Perdue officially declared that the 2017 fire season was the Forest Service's most expensive ever, with costs topping \$2 billion. Perdue noted that fire suppression, which accounted for just 16 percent of the agency's budget in 1995, now takes up over 55 percent. "We end up having to hoard all of the money that is intended for fire prevention," he wrote in a press release, "because we're afraid we're going to need it to actually fight fires."

The Forest Service's fire funding is subject to a budget cap based on the average cost of wildfire suppression over the last 10 years. But even as that average increases, the agency's overall budget remains relatively flat. So when costs go higher, the agency, in a practice known as "fire borrowing," must pull from funds intended for other programs — including those that help reduce fire danger, like prescribed burns, thinning and insect control. This vicious cycle has continued for years. "How can you run an agency when your single biggest cost is unknown?" asks Rep. Mike Simpson, R-Idaho, who has long pushed for a solution. Simpson and others hope that this year's intense sea-

son, which burned more than 8.5 million acres, will motivate fellow lawmakers to pass legislation.

In 2009, the Federal Land Assistance, Management and Enhancement (FLAME) Act, established emergency reserves for the Forest Service and the Interior Department for fighting major fires. But FLAME has been underfunded, and fire borrowing has continued. Since then, despite bipartisan, bicameral agreement that this increasingly urgent problem must be resolved, other efforts to do so have stalled out in Congress, mainly because lawmakers disagree about where the money should come from and what, if any, forest management provisions should be attached to the funding fix.

Congress has considered two main options: increasing the budget cap and using Federal Emergency Management Agency funds. The Wildfire Disaster Funding Act — introduced in the House by Simpson and Rep. Kurt Schrader, D-Ore., and in the Senate by Sen. Ron Wyden, D-Ore., and Sen. Mike Crapo, R-Idaho — takes the first approach. Currently, the Forest Service and the Interior Department are the only federal entities that must fund disasters through their discretionary budgets rather than from an emergency fund. This bill would let the Forest Service and

Interior Department adjust their caps upward, allowing them to access disaster funding rather than borrowing from other programs. First introduced in 2013, the bill has received wide congressional support this year.

"Coming to agreement on the right approach slowed things down," notes Cecilia Clavet, senior policy advisor at The Nature Conservancy. The problem for the Wildfire Disaster Funding Act, says Simpson, has always been that "the budget committee doesn't like cap adjustments." But FEMA funding has its problems, too: Those funds are typically used for single-event disasters. "A hurricane comes, you know what the damage is," he says. "The problem with wildfires is they happen all year." Pursuing FEMA funds on a case-by-case basis would also force wildfire to compete with other natural disasters. More and more legislators involved in this issue are now leaning toward the budget cap adjustment approach, Clavet says.

The issue of forest management is more complicated. Several Republican members of Congress "would like to see forest management wrapped up with fire funding," Clavet says. But even among those legislators, there is little agreement over what provisions to include. Logging provisions and attempts to streamline environmental laws prove particularly divisive. Many Democrats oppose the Resilient Federal Forests Act, a bill introduced by Rep. Bruce Westerman, R-Ark., which passed in the House on Nov. 1. It would increase the size of categorical exclusions that hasten the permitting process for thinning and logging projects.

Democrats are concerned that the legislation would use wildfire prevention to fast-track logging projects and limit environmental review. Mike Anderson, senior policy analyst at The Wilderness Society, says such bills face resistance from conservation groups due to what they see as "an attack on bedrock environmental laws" like the National Environmental Policy Act and the Endangered Species Act. Anderson expects there will be more pushback against bundling forest management provisions with fire funding in the Senate, where a companion bill to Westerman's has not been introduced.

Fire funding has received heightened attention from Western lawmakers in the wake of the California wine country fires, which killed more than 40 people. On Oct. 25, California Gov. Jerry Brown, D, and four other Western governors wrote to congressional leaders, urging them to "reform the federal wildfire suppression funding formula and provide stability for long-term planning and wildfire mitigation practices." The California fires "opened a lot of eyes" that this issue needs to be fixed, Simpson says. "I think we're going to get it done this year." □

A house that was spared from the Brianhead Fire in Utah, which started in June and covered more than 70,000 acres. Suppression efforts cost more than \$35 million. Fire agencies devote much of their resources to protecting structures, particularly as the wildland-urban interface gets more developed. Deploying aircraft is also a huge cost in fighting wildfires.

KARI GREER

Rebecca Worby is an HCN editorial fellow.

🐦 @beccaworby



On average, about 85 percent of wildfires in the United States are caused by people.

Water supplies fouled by fire

Wildfires can cause erosion that disrupts water treatment — but some communities are preparing for the problem

BY EMILY BENSON

The Fourmile Canyon Fire, sparked by a backyard burn west of Boulder, Colorado, in 2010, caused \$220 million in damage and destroyed 168 homes. It also scorched nearly a quarter of a watershed that supplies water to the nearby community of Pine Brook Hills. The problems didn't end there: Long after the blaze was put out, intense rainstorms periodically washed sediment and other particles downstream, disrupting water treatment and forcing the local water district to stop pulling water from Fourmile Creek, leaving it reliant upon water already collected in its reservoir.

"The water coming down Fourmile Creek would get so dirty that we simply would shut down moving any water (from the creek)," for days or even weeks, says district manager Robert de Haas. "If we hadn't built the reservoir" — in 2006 — "we'd have been in big trouble."

Now, new research suggests that such water-quality problems might become more frequent across the West. Climate change is already causing a surge in wildfire activity. As a result, scientists expect to see a rise in erosion in most of the region's watersheds in the coming decades. Sediment and ash running off burned hillsides into streams can clog reservoirs, smother fish and disrupt municipal water supplies.

In many places, however, water managers and other officials are already taking steps to prepare for both wildfire and its long-term aftereffects. For communities that rely on forested drainages for their water, "It is a key aspect of water supply and watershed protection to plan for a wildfire," says Kate Dunlap, who works on source water protection for the city of Boulder.

In forested watersheds — the source of 65 percent of the West's water supply — trees, soil and leaf litter soak up precipitation like a sponge, then slowly release it to aquifers, streams and rivers. But wildfires can sear the soil, making it water-repellant, and incinerate stabilizing plant roots. "Then, when it rains, all that water gets transported right off the surface," ferrying sediment, nutrients and debris downstream, says Jeff Writer, a hydrologist at the University of Colorado Boulder. Sometimes precipitation triggers deadly mudslides

that destroy homes and bury highways. Sediment can also shroud streambeds and reservoirs, forcing managers to dredge or conduct other costly fixes.

Floods of sediment and debris can also compromise water supplies. Spikes in nutrients can spark algae blooms, causing taste and odor problems. Small particles can clog filters. When organic matter reacts with treatment chemicals, it can create toxic compounds like chloroform. After the Fourmile Canyon Fire, Pine Brook Water District had to revamp its water treatment process to avert those noxious byproducts. "(These problems) can basically shut the whole plant down," Writer says, though typically only for short periods of time. Still, the problem highlights the importance of having more than one municipal water source.

One of the lessons of the Fourmile Fire, which Writer and other researchers studied at length, was that both vigilance and patience are required post-fire. The fire occurred in September, leaving a 10-month gap before summer monsoons hit, causing severe erosion. Water managers may need to monitor flood forecasts, rainfall intensity and water quality for months or even years after fires.

"Even though fire is a natural component of (many Western ecosystems), there is a concern about increases in erosion

and sedimentation, and increases in fire," says Joel Sankey, a research geologist with the U.S. Geological Survey in Flagstaff, Arizona. Research he carried out with colleagues suggests that more than a third of Western watersheds could see their sediment load double by 2050, due to climate change and post-fire erosion, putting surface water supply and quality at risk. "There's an opportunity for communities, watershed managers, to proactively respond to the information," he says. Many are already doing so. Cities like Flagstaff, Arizona, Boulder and Fort Collins in Colorado, and Santa Fe, New Mexico, are thinning forests, stepping up water monitoring and studying watersheds to identify which areas are most susceptible to erosion.

Federal and local agencies can also reduce the threats to water quality by responding quickly after wildfires occur. Strategies include protecting bare ground with mulch to reduce erosion and building retention ponds to capture sediment before it can clog intake pipes at treatment plants, says Stephanie Kampf, a hydrologist and professor at Colorado State University. When blazes blast through urban areas, as this year's deadly wildfires in Northern California did, toxic ash and remnants of paint and plastics add to the substances that can be swept downstream. Officials there are using sandbags to keep debris out of storm drains and taking other measures to protect water quality following the fires. "Wildfires are a natural part of the landscape — and they're inevitable in the Western U.S.," Kampf says. "I think that preparing for them, to minimize vulnerability to fire, is really the way to go." □

Water managers may need to monitor flood forecasts, rainfall intensity and water quality for months or even years after fires.



Fourmile Fire crewmembers clean branches and mud out of Colorado's Boulder Creek in 2011, after the Fourmile Canyon Fire scorched vegetation in the area in 2010 and subsequent summer monsoons washed sediment and debris downstream. CLIFF GRASSMICK/DAILY CAMERA

Emily Benson is an HCN editorial fellow.

🐦 @erbenson1

About 28,000 personnel, 1,900 engines, 250 aircraft and 200 active-duty military personnel were deployed during the peak of the 2017 fire season.

A new model for preventing megafire

In southern Oregon, a collaborative community-based project tackles overgrown forests

BY NICK DAVIDSON

A chainsaw whines as twigs hiss and smolder in the low-burning fire creeping through the Rogue River-Siskiyou National Forest outside Ashland, Oregon, this May morning. The 100-acre prescribed burn is a training ground; 42 people, from biologists to land managers to career wildfire fighters, are here to learn about fire behavior or gain certification.

Jeanne Pincha-Tulley, operations manager, heads into the fray, clad in fire-resistant Nomex. “The only thing better than smoke,” she tells the trees, “is the smell of avgas, ‘cause that means choppers” — and choppers mean serious thinning.

A century of overzealous fire suppression turned southern Oregon’s forests into dense stands of Douglas fir and madrone ripe for devastating blazes. Today, Ashland and other communities around the West are tackling the threat through selective thinning and controlled burns, all done with an eye to local biology and wildlife habitat.

Ashland represents a new approach to Western megafires; it’s not merely participating in but profoundly shaping forest restoration and fire management. Since 2011, the city has partnered with the U.S. Forest Service, The Nature Conservancy and Lomakatsi Restoration Project, a nonprofit

that restores watersheds in Oregon and Northern California, in the Ashland Forest Resiliency stewardship project (AFR).

AFR spans city, federal and private lands to reduce megafire risk, protect Ashland’s reservoir from ash and sediment, and diversify plant species, returning forests to healthier densities that can safely welcome milder, beneficial periodic fires. Its collaborative approach and shared funding make it easier for federal agencies and local governments to work together across jurisdictions. “AFR is a model for Forest Service projects across the country,” says Darren Borgias, The Nature Conservancy’s southwest Oregon conservation director. “Not just because of the need for restoration, but because we can get things done more effectively with partners.”

Ashland’s forest management used to be a lot more contentious. In the late ’90s, activists upset with what they saw as excessive logging chained themselves to trees; extremists even made bomb threats. Ultimately, a ski-masked contingent stormed the local Forest Service office to deliver a letter threatening uncompromising resistance “if one tree falls.”

The besieged and underfunded agency tried to meet the demand for better forest management — driven by ecology rather than economics — by establishing a new model, the Ashland Water Protection Plan. But the timber industry wasn’t interested

in the small trees being felled, and the model languished until the Healthy Forest Restoration Act of 2003 allowed Ashland to create its own management plan.

Five years of meetings among concerned citizens, environmentalists, and a slew of foresters and ecologists resulted in AFR as a restoration alternative that was acceptable to the Forest Service. It took time to educate the community about what the forest truly needed, but eventually, nearly everyone agreed it was time to thin the watershed and return fire to the landscape. “As a community, we have a culture and a value system that says, ‘There’s a problem here, what can we do to fix it?’” says Sandra Slattery, executive director of the Ashland Chamber of Commerce, who participated in the process.

In 2015, the city council voted to implement a residential water tax that kicks \$175,000 annually toward restoration work. The project’s partners match funds under a stewardship agreement, bolstered by an additional \$11 million from the Forest Service and from selling culled timber.

AFR hopes to treat 7,600 acres around the city over 10 years; since 2010, it’s treated more than 4,000. The project has trained some 200 workers in Ashland and generated 17 permanent local forestry jobs and 150 seasonal positions. Community outreach is integral to its success, in the belief that swaying public perception about fire’s natural role is crucial to solving the megafire crisis. Through Lomakatsi, 2,000 local students have had the chance to work with fire in the field. “This is the real product of AFR,” says Mayor John Stromberg, “these kids and the change in their consciousness.”

There’s been surprisingly little criticism; in fact, Borgias says, some want even more aggressive thinning, and the amount of treated acreage could increase tenfold. Other Western cities have taken notice: Communities like Flagstaff, Arizona, and Santa Fe, New Mexico, have also invested financially and philosophically in forest treatment, though in all cases the Forest Service retains the final say-so within federal boundaries.

Mild fire suppression in well-managed forests is considerably cheaper — about 125th the cost per acre — than battling huge blazes in untreated areas. The AFR says Ashland has already saved upwards of \$20 million by preventing big fires in its watershed.

The results are visible on the ground, too. On a May afternoon, Borgias and Chris Chambers, Ashland’s forestry division chief, survey a unit in the lower watershed that was burned in 2015. Today, the forest sprouts a new carpet of Lemmon’s needlegrass, lilies, reseeded black oak. The ponderosas remain vigorous. “That’s cool to see,” Chambers says. “When you put fire back in, fire does the work for you.” □

A Lomakatsi Restoration Project forestry crewmember thins the forest around Ashland, Oregon, to help improve forest health, reduce crowding of older trees and lessen the possibility of damaging wildfire in the watershed.

ASHLAND FOREST RESILIENCY STEWARDSHIP PROJECT



Since 1998, fire staffing within the Forest Service has increased 114 percent, from 5,700 employees in 1998 to over 12,000 in 2015.



A contract fire firefighter stands outside his truck in downtown Seeley Lake, Montana, in August. Scientists are studying the effects hazardous smoke had on residents in and around Seeley Lake due to nearby wildfires such as the Lolo Peak and Rice Ridge fires.

KURT WILSON/MISSOULIAN

Montana's tough summer

A record-breaking wildfire season brings public health into the spotlight

BY ANNA V. SMITH

On the first day of the school year, children in Lolo, Montana, woke to a smoke-filled sky. Ash fell on their parents' cars, and choking air, muted by the late-August sun, cast the world in sepia tones. A few miles away, the Lolo Peak Fire was still burning, one of 35 large fires in the state last summer, prompting evacuations in northwestern towns. "The air is bad, and it's bad pretty much everywhere," the Missoula County air report said. "The places that aren't bad will be bad soon."

Parents dropped their children off at school, glad to be finished with a miserable summer of long hot days spent inside the house, windows closed against the thick smoke. But the school was not a haven. The fires burned through the fall, and smoke seeped into the school, an acrid haze that hung in the hallways, the cafeteria, the gym. As the days wore on, more and more kids began visiting the school nurse, acting out or going home. This fire season, says Dale Olinger, superintendent

of the Lolo School District, was "like living inside the bad side of a campfire."

Montana has long experienced wildfire and smoke. But this season was notable for the number of large, intense fires near populated areas and the unrelenting length of the season. The long-term human health effects of breathing wildfire smoke daily are largely unknown. But it is clear from this year that the state is not prepared to respond to wildfire smoke as an annual public health threat.

Historically, Montana's fire season has stretched from July to September. Fires are mostly managed through suppression, primarily by the U.S. Forest Service and the state. Big fires aren't unusual; both 2007 and 2012 were notable for their wildfire seasons, when 778,000 acres and 1.2 million acres burned, respectively. This year saw 1.3 million acres burning into October, fires that cost up to \$1.5 million dollars a day to fight. The fires burned close to places like Hamilton, Seeley Lake and Frenchtown, filling them with smoke. By the end of the season in

mid-September, 53 of Montana's 56 counties had been declared disaster areas.

And this summer's fire season is unlikely to prove unique, thanks to the state's changing climate. The average temperature in Montana has warmed by 3 degrees since 1950. Last winter's snowpack was high, and the spring was wet, which should have meant a calmer wildfire season. But starting in July, Montana was hit by a so-called "flash drought," and the new growth swiftly dried into fuel. "That's exactly the kind of situation that's projected for the future," says Cathy Whitlock, professor of earth sciences at Montana State University. While individual fires can't be directly linked to climate change, the conditions that make them larger and hotter can be. Whitlock, who recently worked with a team of researchers to produce Montana's first climate assessment, says the state needs to be prepared for more seasons like the last one. "We're seeing more large, and often more severe, fires in the last few decades than we've seen in anybody's memory," Whitlock says. "Living with fire is something we really need to think about."

In Montana, that means learning to live with smoke as well. In northwestern Montana, a phenomenon called inversion occurs, where cold air becomes trapped between valleys under a cap of warm air. Cold air "acts like water, and will flow downhill and settle on the

Please see Air quality, page 23

Anna V. Smith is an assistant editor for HCN.

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OF GOD AND MORTAL MEN: T.C. CANNON

Edited by Ann E. Marshall & Diana F. Pardue.

136 pages, hardcover: \$39.95. Museum of New Mexico Press, 2017.

A painted self-portrait shows a figure wearing aviator sunglasses and sporting a red bandanna around his neck, seated in front of a large window looking out upon a stylized landscape of gold and purple hills, reminiscent of northern New Mexico. An African mask and a classic painting appear in the background, testament to the diverse sources from which the artist, T.C. Cannon, drew inspiration.

Of God and Mortal Men celebrates the work of Cannon (1946-1978), an artist of Kiowa and Caddo descent whose vibrant paintings blend traditional Native American and contemporary Southwestern imagery. Essays on his life and work accompany sketches, poems and color plates of his paintings. Cannon's art "asserts itself within the geography of the Southwest," writes museum curator Gilbert Vicario, "but more importantly, it offers a complex and nuanced definition of what it means to be an American artist in the twentieth century." **EMILY BENSON**

Self Portrait in the Studio, 1975.

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The season of celebrating begins

The holiday season is upon us, bringing festive meals, visits from family, twinkling lights and outdoor adventures in (at least slightly) crisper temperatures. Over Thanksgiving, all of us at *High Country News* headquarters in Paonia, Colorado, had much to be grateful for — including delicious, locally sourced food, purple-pink sunsets over the West Elk Mountains and quality time with friends old and new.

Development Director **Laurie Milford** welcomed Thanksgiving "stragglers," including editorial fellows **Emily Benson** and **Rebecca Worby** and their partners, into her family's beautiful new home outside Hotchkiss, Colorado, where they enjoyed a potluck feast and sweeping mountain vistas. Two more stragglers, Editor-in-Chief **Brian Calvert** and Assistant Editor **Anna V. Smith**, relished views of Mount Lamborn and Landsend Peak, along with eating, drinking and archery, while celebrating a "Friendsgiving" at the mesa-top home of former *HCN* intern **Adam Petry**.

Meanwhile, **Brooke Warren**, our associate photo editor, spent Thanksgiving weekend in the desert, enjoying four unplugged days in western Colorado's Dominguez-Escalante Canyon. Brooke also celebrated her birthday and gave *HCN* correspondent **Sarah Tory** some lessons in crack climbing. Those same sandstone formations,

Brooke notes, are also found in Indian Creek, a world-class climbing destination across the Utah border in the controversial Bears Ears National Monument.

In this season of giving thanks, we are especially grateful for our readers — who have the sharpest eyes and most encyclopedic brains around. One recently pointed out that we'd mixed up our rabbit breeds in our "Books & Authors" special issue. In the caption for a photo accompanying the Q&A "Rewriting the West," we incorrectly stated that Emily Ruskovich held her Flemish giant rabbit while a lionhead rabbit sniffed her hat. In fact, the hat-sniffer was the Flemish giant, while the other one was the lionhead. Sorry we fluffed that one up; there's apparently more than a hare's breadth of difference between bunnies.

Finally, it's time for a bitter-sweet goodbye from me, Becca, editorial fellow and trusty Dear Friends contributor. I've loved writing for and to you over the past year. I can't believe my time here is almost through, but I'm extremely grateful to have had this opportunity. My colleague, Emily, will continue her fellowship into the spring, so look out for more from her. I'm heading back to New York City for now, but I'm sure I'll be dreaming of — and writing about — the West.

—Rebecca Worby, for the staff



HCN correspondent Sarah Tory watches other climbers during Thanksgiving weekend. BROOKE WARREN



A controlled burn under starry skies
in the Jemez Mountains of New Mexico.

PANORAMIC IMAGES/GETTY

Once and

ON A HOT SUMMER AFTERNOON in 2011, a gust of wind blew an aspen into a power line in northern New Mexico's Jemez Mountains. Electrical sparks ignited the Las Conchas Fire, which burned more than an acre a second in its first 14 hours, eventually covering 245 square miles. The fire burned reservation land of four Pueblo tribes and much of Bandelier National Monument. It destroyed more than 60 homes in total and came frighteningly close to Los Alamos National Laboratory. Some 90 miles south in Albuquerque, the Rio Grande flowed black.

Las Conchas is the type of conflagration lawmakers point to when they talk of reforming wildfire management. Many agree that getting a handle on the West's wildfires means more logging on public lands, but they disagree on how to do it. Rep. Rob Bishop, R-Utah, who chairs the House Committee on Natural Resources, wrote in an op-ed that the West's wildfires could be "contained and even prevented" if environmental groups stopped litigating and logging continued unencumbered. But many Democrats blame factors such as climate change and growing fire fuel loads for the increasing length and severity of Western wildfires. Instead of overturning environmental protections, Rep. Raúl Grijalva, D-Ariz., said at a recent hearing, "Congress should fix the wildfire budget. That's the issue." Meanwhile, the West burns.

The best way forward from this impasse may be found, intriguingly, in New Mexico's past. For millennia, people thrived in northern New Mexico's fire-prone ecosystems. Their lessons could help resolve today's urgent debate over smart logging. As land managers try to resurrect logging practices very similar to the methods used for centuries by Ancestral Pueblo people, the state could serve as a model for creating fire-safe communities throughout the West.

FOR MORE THAN 12,000 YEARS, humans have inhabited the Jemez Plateau, a landscape of forested mountains, rolling grasslands and deep canyons. Beginning in the 13th century, ancestral Jemez people built villages of 50 to more than 1,000 rooms in the region's ponderosa pine forests. By 1600, between 5,000 and 8,000 people lived on the mesas, in approximately 10 large villages. They were the original inhabitants of what planners today would call a wildland-urban interface, or WUI. Yet even at the height of the Jemez Plateau's pre-European settlement, no communities burned down — a startling contrast to today's big Western burns. Over the past few years, archaeologists, fire ecologists and tribal members have traced the region's intertwined history of communities and conflagration.

Future Forest

How Ancestral Pueblo logging practices could save northern New Mexico's pinelands BY MAYA L. KAPOOR

grations, seeking to understand why.

What they have found is that the villagers' ancestral Jemez residents essentially practiced selective logging. Life on the Jemez Plateau required all the fine fuels that villagers could get their hands on. In roof construction alone, villagers cut hundreds of thousands of small-diameter timbers for supportive *vigas*, while understory growth went for fuelwood. Outside of villages, trails and agricultural fields acted as firebreaks.

"People really manipulated fuels just by living on the mesas," says fire ecologist Thomas Swetnam. More fires burned on the Jemez Plateau than today, but they were very small and rarely became destructive crown fires. A fire usually burned a single tree or agricultural field before burning out. In fact, studies of the fire scars on centuries-old living trees, as well as carbon remains from long-gone forests, suggest that megafires could not have burned: The combination of frequent small fires and selective logging used up too much fuel.

But the fire regime of the plateau depended on the people of the plateau, and the arrival of the Spanish devastated local communities. In just six decades — between 1620 and 1680 — Jemez Pueblo declined catastrophically, from about 6,500 people, to fewer than 850 survivors of famine, disease and warfare. During the Pueblo Revolt of 1680, Southwestern Pueblo tribes united to fight off the Spanish, after which surviving Jemez tribal members either relocated or were forcibly taken to Spanish missions. New tree growth crept into emptied villages as walls crumbled.

Fire suppression on the mesas began in earnest in the 1870s, when thousands of sheep and cattle were shipped in by rail. In the early 20th century, most of northern New Mexico's forests were logged, leaving only rare old-growth stands in wilderness areas and national parks. The U.S. Forest Service suppressed wildfires to support logging, increasing fuel loads even more. Even today, fires make Westerners in the WUI uneasy and tend to be suppressed quickly. And so fuels accumulate, and as the West becomes hotter and drier, megafires become more frequent. Nothing burns — until a hot, dry year, when everything does. Jemez Plateau fire-scar data tracks the shift in burn patterns from small, frequent blazes, to today's climate-linked scorcheders.

Released from fire, dense ponderosa stands have grown on the plateau's logged mesas. In some places, 5,000 to 10,000 ponderosa pines grow in just one acre; century-old trees are only a few inches thick. "They're very abnormal trees," Swetnam says. Nothing grows underneath them because the light can't get through. These

doghair stands produce the hottest crown fires. From the ashes, clonal shrublands of Gambel's oak and thorny New Mexico locust sprout, outcompeting ponderosas to dominate the landscape. More flammable shrublands appear with each big fire. Botanists don't yet know when — or if — anything else will replace them.

SOME NORTHERN NEW MEXICANS are trying to make their communities fire-safe once more, in part through forest management strategies similar to those of ancestral Jemez people. The Forest Stewards Guild, a Santa Fe-based forestry nonprofit, calls its method "ecological forestry." Working with land managers, crews selectively log a forest — for lumber that can be sold, if that is the landowner's preference — then follow with controlled burns. The goal is not to erase fires from fire-evolved landscapes. Instead, if all goes well, future fires will burn in ways that humans can abide, such as by moving slowly and burning low to the ground. Guild director Zander Evans says that such pre-burn treatments usually mean "the difference between saving a house or community or not."

"We thin the forest in a historically relevant way that is trying to restore (forest) structure and function, and we follow up with fire," Evans says. "Those treatments can change wildfire behavior." The aim is to re-create communities of large trees scattered within fuel-free understories, similar to what historically grew on the landscape. Because this would mean fewer trees competing for water, the forests will, ideally, be healthier overall, and better able to adapt to the drying conditions they will face in a warming climate.

Tying fire management to lumber profits is difficult at best in places like the Jemez Plateau. New Mexico's forests aren't lush enough to grow small-size timber as a renewable resource — and even in places where trees regrow quickly, the market for understory growth may not exist. "There are some people who have done some amazing things taking that small-diameter wood and figuring out ways to make it at least pay its way out of the woods," Evans says. "Around here (in Santa Fe) we make fences out of it, and you can use it for firewood, but it's tough." Because the guild's mission includes trying to help local economies, it will also log larger trees. But at the end of the day, to avoid the kind of big fires that lay waste to lumber of all sizes, the guild focuses on removing the small fuels. Fire-wary locals who pay for logging even when the wood is of no marketable value may simply burn the woodpiles on-site.

Swetnam supports "logging from below," or removing small-diameter

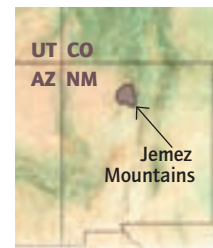


A ponderosa pine forest in the Jemez Mountains, top, before, left, and after a thinning project. Thomas Swetnam, former director of the University of Arizona's Laboratory of Tree-Ring Research, at the site of the 2003 Virgin Mesa Fire on the Jemez Plateau, above.

SUE HARRELSON, US FOREST SERVICE, TOP; PAT VASQUEZ-CUNNINGHAM/ALBUQUERQUE JOURNAL/ZUMAPRESS.COM, ABOVE

understory trees, followed by controlled burning. "We should keep the big trees as much as possible," he says. There are so few left after a century of logging, and they are seed sources for the forests of the future. When it's necessary to take large trees, Swetnam encourages using the wood to support the local economy, as the guild and Jemez Pueblo are doing: They are collaborating to restore fire resilience to the Jemez Plateau, in part by milling lumber on the tribe's land.

But Swetnam is less concerned about making money than he is about solving what he calls the region's "fire-drought." Perhaps that's because he thinks about the Jemez Plateau WUI on the scale of millennia, not months. "My own feeling is that we're long overdue for this investment," he says. "Whether or not we make a useable product is a secondary concern." □



Maya L. Kapoor is an associate editor with *High Country News*. She writes from Tucson.

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Fire is the Fix for



*In California,
land managers
push to use
fire as a land
management
tool*

**FEATURE BY
ELIZABETH
SHOGREN**

The acrid smell of charred wood still permeates the air as Sasha Berleman, a fire ecologist, and I walk along a dirt path up through the middle of a canyon in the Bouverie nature preserve in Sonoma Valley. On the left side, the earth is black as tar, and scorch marks as tall as a person scar the trunks of the mature oak trees scattered throughout the field. But on the right side, the ground is tan and brown, and you have to look hard at the still-green oaks to see any evidence of the fire that raged through here just a few weeks before. It's no mystery to Berleman why the fire behaved so differently on the two sides of the trail at Audubon Canyon Ranch's Bouverie Preserve. When flames hit the field on the left of the path, they met a dense wall of

thigh-high grass that hadn't been mowed, grazed or burned for 20 years. The flames must have been 5 or 6 feet tall. On the right side, however, Berleman had set a prescribed burn just this spring. So when the October wildfire hit, patches of fire blazed, but with so little fuel, the flames remained only inches high.

For more than a century, people have been snuffing out fire across the West. As a result, forests, grasslands and shrub lands like those in the Bouverie reserve are overgrown. That means that, when fire escapes suppression, it's more destructive. It kills more trees, torches more homes and sends far more carbon into the atmosphere, contributing to climate change.

The devastating fires that hit Bouverie and a large swath of Northern Cali-

fornia's wine country in October killed 42 people and destroyed nearly 7,000 buildings. In California's Sierra Nevada in recent years, megafires have burned at much greater severity than those forests ever saw in the past, killing trees across large landscapes and unleashing enormous quantities of carbon. The remedy, Berleman and many other scientists say, is to reintroduce fire to the landscape by allowing more natural fires to burn and setting controlled burns when weather conditions minimize the risk of a catastrophic blaze.

"We have 100 years of fire suppression that has led to this huge accumulation of fuel loads, just dead and downed debris from trees and plant material in our forests, and in our woodlands," says Berleman. "As a result of that, our forests

Fire



A prescribed burn at California's Bouverie Preserve last spring, left, cleared tall grasses and downed limbs from around the giant old oak trees. Below, Sasha Berleman in the preserve after the massive wildfire raged through in October.

JUSTIN SULLIVAN/GETTY IMAGES, TOP; ELIZABETH SHOGREN, BELOW

and woodlands are not healthy, and we're getting more catastrophic fire behavior than we would otherwise."

Addressing the problem will require a revolution in land management and in people's relationship with fire — and there are signs both may be beginning.

AS A CHILD IN SOUTHERN CALIFORNIA, Berleman was deeply afraid of wildfire. But at community college, she learned that Native Americans used fire for thousands of years to manage forests and grasslands and protect their villages. Tribes regularly burned California's oak woodlands, for instance, to remove underbrush and fight pests. It helped them spot prey more easily, keep weevils out of the acorns they gathered for food, and safeguard their homes from wildfire. In 2009, Berleman transferred to the University of California, Berkeley to study fire ecology. There, she worked on her first prescribed burn. "I instantly fell in love with the ability to use fire in a positive way to accomplish objectives," she says. She trained as a firefighter so she could put fire to use as a land-management tool.

Two years ago, while she was finishing her doctoral dissertation, she began working part-time at Bouverie. Last fall, she presented her boss with suggestions for using fire to restore overgrown landscapes, both at Bouverie and across the North Bay Area region. He approved, and Berleman, 28, started as a full-time fire ecologist in January, set her first burn in May and began organizing a taskforce to conduct burns and train local crews.

She knew how fire-prone the region is. Still, the big blazes in October caught her by surprise. "I thought I had more time to get work done," she says.

High winds played a big role in spreading the California wine country's deadly fires. But Berleman and other fire ecologists believe overgrown grasslands, forests and woodlands contributed as well. "I'm more certain than ever that there's a lot we can do between now and the next time this happens to make it so that the negative consequences to people are nowhere near as dramatic."

When fire hits overgrown wildlands, it burns hotter and is much more likely to kill stands of trees and threaten property and people's lives.

But it also unleashes the carbon held

"I'm more certain than ever that there's a lot we can do between now and the next time this happens to make it so that the negative consequences to people are nowhere near as dramatic."

—Sasha Berleman, fire ecologist at Audubon Canyon Ranch's Bouverie Preserve, speaking about the next big wildfire





Brandon Collins, a UC Berkeley forest ecologist, amid trees in the Blodgett research forest, where fire scars from past controlled burns can be seen on trees that stand fairly clear of grass and underbrush. Above right, an untreated area at greater risk of severe fire.

ELIZABETH SHOGREN

by trees, other plants and soil. Forests store enormous amounts of carbon — more than double the greenhouse gases in the atmosphere — and continuously soak up more, blunting the impact of all the greenhouse gases released by burning fossil fuels in power plants and cars. In recent decades, the size of fires, their intensity and the length of the fire season have all grown dramatically. The more destructive a fire, the more carbon it releases. In fact, largely because of fires, California's forests emitted more carbon than they soaked up between 2001 and 2010, according to a 2015 analysis by National Park Service and UC Berkeley scientists. "After 100-plus years of fire suppression in forests, we're seeing a lot more tree-killing wildfire," says Matthew Hurteau, University of New Mexico fire ecologist and associate professor. "That has substantial implications for the carbon put back into the atmosphere."

Further complicating the picture is climate change — the major factor behind the longer fire seasons and bigger fires. This creates a feedback loop, where megafires exacerbate climate change, which then encourages even bigger wildfires. One study found that from 1984 to 2015, climate change doubled the area burned by wildfires across the West, compared to what would have burned without climate change. As the globe keeps warming, scientists expect forests to continue getting warmer, drier and more flammable. Unless people reduce greenhouse gas emissions, climate change will significantly increase the frequency of wildfires. One study projected that if fossil fuels remain the dominant source of

global energy and greenhouse gas emissions keep rising, by 2085 the acreage burned by fire in California will increase one-third to three-fourths. Elsewhere in the West, the size and frequency of fire is expected to increase even more dramatically. Until recently, intense fires were rare in the Greater Yellowstone Ecosystem. But one study predicted that with climate change, fire likely would become so common and widespread there that by the middle of this century, the region's forests as we know them will vanish, replaced by other types of vegetation that may store far less carbon.

In California's Sierra Nevada, the combustible combination of climate change and overgrown forests already is transforming landscapes and unleashing massive amounts of carbon.

A FOUR-HOUR DRIVE WEST of wine country, gray trunks of dead incense cedar and white fir cover the steep slopes of the Eldorado National Forest. Deep into a canyon and up to a ridge in the distance, the trees are so close together that their branches touch. UC Berkeley fire ecologist Brandon Collins brought me here to show me the consequence of decades of fire suppression combined with climate change. This forest would usually burn nine times over the course of 100 years, but no fire had blazed here since at least 1908. "Without fire, you're going to have these dense stands no matter what," Collins says.

In 2014, the King Fire hit this unnaturally overgrown forest, leaping into the canopy and racing across a vast landscape. Limited patches of high-intensity



fire would be natural in these forests. But in 47 percent of the 97,717 acres burned in the King Fire, the blaze was so hot that it killed nearly all of the trees. This included 14 areas where rare California spotted owls were known to nest. Before people started suppressing fires, this kind of all-consuming blaze did not happen in this type of forest, according to tree-ring studies. "We have seen no evidence you could ever have gotten a mortality patch this big," Collins says.

The amount of carbon sent to the atmosphere from such an enormous fire is staggering. "It's ugly," says Collins. "It's not only a huge initial loss just from the direct emissions, but it's slow emission over time as these trees break and then fall to the ground and the decomposition process really gets underway. We're looking at 30 years or 40 years of pure emissions coming from this area with very little on the uptake side," Collins says.

Just the initial blaze released 5.2 million metric tons, roughly as much greenhouse gas emissions as 1.1 million passenger cars emit in a year, according to an estimate by Forest Service ecologist Leland Tarnay. It's too soon to analyze the fire's total carbon footprint.

It could take a long time for this landscape to start packing on carbon again. Though some trees' cones require fire to reseed, these particular types of conifers won't grow back because the fire burned their seeds. The silver lining is the native oaks, which are fire resilient and can resprout from roots or stumps, even after a trunk is killed by fire. Already, their seedlings are emerging from the sea of dead trunks.



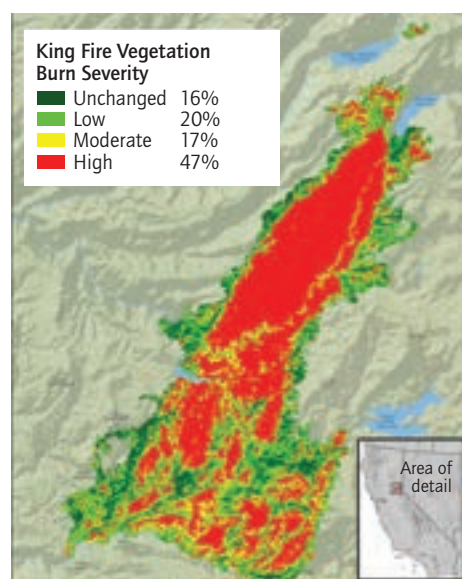
A former California spotted owl nesting site after the 2014 King Fire, which burned catastrophically hot. SHEILA WHITMORE/UWMADISON

Nearby, some strips of trees are still green. Their trunks are also more broadly spaced. In these areas, the Forest Service had set prescribed burns or thinned the forests by logging some trees. Forest Service surveys show the King Fire burned much less intensely in these areas. Flames were lower, staying on the forest floor rather than surging into the canopy of the trees. Firefighters used these areas to slow and stop the fire. More trees survived.

Just a few minutes' drive from where the King Fire raged, Collins shows me where he and other scientists have been studying how people can help restore forests to more natural conditions. Thanks to firefighters' efforts, UC Berkeley's Blodgett Research Forest narrowly escaped the King Fire. Blodgett was clear-cut in the early 1900s, before the university took it over. After 100 years, it's grown into a lush forest of incense cedar, ponderosa pine, white fir and oak trees.

The first patch of forest Collins shows me is the control forest, from which fire has long been banned. The understory is so thick with small trees and shrubs that it's difficult to walk; we have to step over tangles of dead trees and branches. If a fire were to strike this area, it would easily climb from the ground to the lower branches and up into the canopy. "And then it can really spread," Collins adds.

In the next patch of forest we visit, loggers cut down and sold some of the medium-sized trees in 2002. Then they shredded the small trees and underbrush using a big machine called a masticator, and spread the remnants on the forest floor. Now, the trees are widely spaced;



The King Fire of 2014 burned in an area that hadn't burned for more than a century. In almost half of the 97,000-plus acres affected, the fire burned with such intensity that it killed nearly all the trees.

USFS RAPID ASSESSMENT OF VEGETATION CONDITION AFTER WILDFIRE, COMPOSITE BURN INDEX

sunlight shines through the canopy. The High Sierras are visible in the distance. If a fire were to come through here, Collins says, it likely would stay on the ground, and wouldn't harm the trees or emit much carbon.

In another plot, crews set prescribed burns in 2002 and 2009. Scorch marks blacken the thick bark of some trees, but they're still healthy. The forest is open, but more variable than the thinned forest. In one patch of tall ponderosa pines,

the fire blazed hotter than in the rest of the forest. Several big trees were killed, leaving the kind of snags that woodpeckers love. This plot would also be likely to do well in a fire, Collins says.

A fourth plot shows some of the pitfalls of combining thinning and burning. Crews cut down some trees, shredded the noncommercial wood and scattered it on the forest floor. Shortly afterwards, they burned the forest. The fire burned so hot from all the wood on the ground that the remaining trees were injured. They haven't grown or soaked up much carbon since.

Overall, the experiments at Blodgett suggest that prescribed burns and thinning can have long-term carbon benefits. But in the short term, carbon emissions will increase. Neither the burned nor the thinned plot has caught up with the carbon stored in the forest that was left alone. But with less competition, the trees are growing faster in the thinned and burned plots, and Collins predicts that eventually they will store more carbon than the denser stand.

Scientists have seen a similar pattern in another experimental forest in the Sierra Nevada — Teakettle, an old-growth forest with giant sugar pines. As in Blodgett, the forests initially stored less carbon after being burned or thinned. But the forests at Teakettle recovered their carbon stocks more quickly than Blodgett did, in about seven years. "If you restore forests, you do knock down the total amount of carbon, but you prevent very large tree-killing fires. Over time, the carbon stored in the forest is much more stable because you've taken steps

5.2

Millions of tons of carbon released in the initial blaze of the King Fire

1.1

Millions of passenger cars that would emit that much carbon in a year of driving

60

Number of small-diameter trees (8-10 inches) it takes to hold as much carbon as one 6-foot-diameter sugar pine.

10,000

Historical average, in acres, the Forest Service has let burn as natural fires (those that aren't suppressed).

247,000

Acres allowed to burn in 2016 (down to 130,000 this year).

0.4

Percent of ignitions that were allowed to burn as managed wildfires in the decade ending in 2008.

Carbon losses and gains in California wildland ecosystems, 2001-2010

to prevent big hot fires from occurring,” says Hurteau.

The old-growth trees in Teakettle soaked up carbon faster than Blodgett’s younger trees. But in both types of forests, carbon should accumulate faster in fewer big trees. And the thinned and fire-opened stands make big trees healthier by reducing competition for water and nutrients. That improves their odds in both fire and drought. Big trees are generally more fire resistant, meaning they’re more likely to survive a fire and continue to soak up carbon afterward. “If we want to maintain this ecosystem service of removing carbon from the atmosphere that trees provide, we need to make investments in doing what we can to protect the big trees, because they’re doing a disproportionate amount of the work,” says Hurteau.

A single tree that is 6 feet in diameter, like one of the big sugar pines in Teakettle, holds as much carbon as 60 small trees, 8 to 10 inches in diameter, says Malcolm North, a leading Forest Service fire ecologist and Hurteau’s colleague and former teacher.

That’s a much more reliable way to store carbon. “The carbon in the big trees is a secure investment like gold,” North said, whereas

the carbon stored in overgrown forests is more like “junk bonds.”

DESPITE THE SCIENCE, however, forest managers continue to snuff out most fires. For the decade ending 2008, the most recent data collected, only 0.4 percent of ignitions were allowed to burn as managed wildfires, North, Collins and other fire ecologists wrote in 2015 in the journal *Science*. “Changing climate and decades of fuel accumulation make efforts to suppress every fire dangerous, expensive, and ill-advised,” they wrote.

North was reprimanded for the article and forbidden to talk with the media for a year. But he’s speaking out again, because the dire consequences of overgrown forests are becoming so clear.

North says thinning is not a solution for much of the Sierra Nevada. Only 28 percent of the landscape can be mechanically thinned, he calculated; the rest is too steep or remote. “You cannot thin your way out of the problem,” he says. “You’ve got to use fire.”

Official Forest Service policy has acknowledged this. The 2014 interagency

National Cohesive Wildland Fire Management Strategy calls for expanding the use of prescribed burns and letting more wildfires burn. “It’s just not being followed; that’s the real problem,” North says. “Everyone knows what we’ve got to do. But it’s not being done.”

Sasha Berlemen encountered that stubborn resistance to letting fires burn this summer, when she was on a Forest Service hotshot crew. She fought fires in Plumas, Six Rivers, Modoc and Klamath national forests. Fire managers were aggressive, often sending her crew to the fire’s edge to try to prevent it from spreading. That contradicted what she learned in her fire ecology classes about letting wildfires burn larger areas. “There’s this disconnect that I didn’t know about until summer — between what everyone is saying in academia and what’s actually happening on the ground,” she says.

Some forest managers have begun to accept more fire, however, as have national parks. The 2013 Rim Fire, the biggest fire in Sierra Nevada history, burned at lower intensity in parts of Yosemite and Sequoia national parks than it did in national forests, killing fewer trees and producing less air pollution. The parks had previously allowed wildfires to burn when weather conditions, such as light winds, minimized risks.

The Forest Service has been more reluctant to let natural fires burn, in part because of checkerboard land ownership and because houses have been built in many forests on private property inholdings. “Ecological benefits don’t have a huge voice,” Collin says. “No one will sue for not letting fire burn. If you let a fire burn and something bad happens, someone will sue you.”

Air-quality regulations play a role, too. Both North and Collins tried for weeks to schedule burns this fall. Air quality concerns and a lack of available personnel — the wine country fires were still raging — delayed their burns. Both finally were able to burn at the end of October. “The Forest Service is cursed with lands with houses in middle of them, wildland-urban interface where people don’t want to breathe smoke,” North says. “Almost everything works against trying to work with fire. The only way it’s going to change is to get public support.”

Craig Thomas, conservation director of Sierra Forest Legacy, has been calling for more natural and prescribed fire in the Sierra for two decades. He believes that after the Rim, Rough and King fires, the public and policymakers better understand the threat of unnaturally overgrown forests. “They jarred California society in a big way,” Thomas says. “This disaster is a human creation; climate change is making it even tougher.”

In 2015, the Sierra Forest Legacy, the Forest Service, CAL FIRE, the state fire agency, and other agencies and groups signed an agreement to use more fire in wildlands management and increase

training for fire managers and crews. Since then, the Forest Service has increased the total acreage where it has allowed natural fires to burn from an annual average of about 10,000 acres to 247,000 in 2016 and 130,000 this year. “That was a big jump,” says Rob Griffith, assistant director of the Forest Service Pacific Southwest region’s fire and aviation program.

Prescribed burns are up, too, from 20,000 acres on average before the agreement to about double that in 2015, 2016 and 2017. Some 96,000 acres of prescribed burns are scheduled for the next fiscal year, Griffith adds.

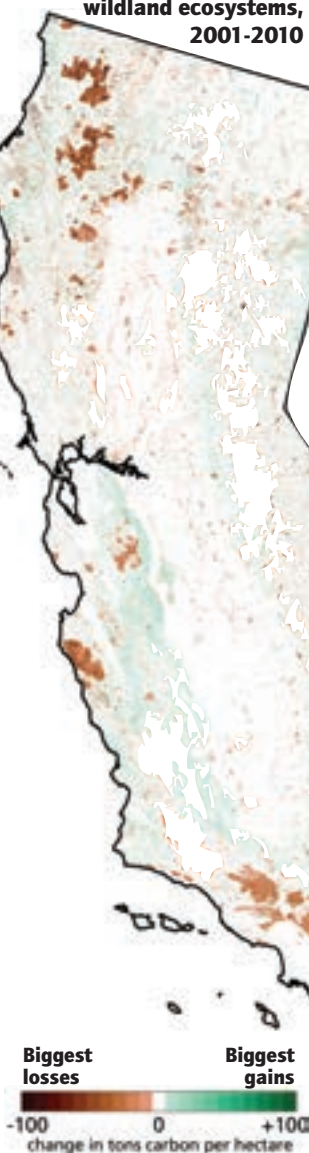
California’s commitment to tackling climate change is giving extra oomph to efforts to bring back fire. For instance, funding for the research at Teakettle and Blodgett comes from revenue from the state’s cap-and-trade program. The state auctions allowances, which big polluters buy to receive the right to pollute. California doesn’t want the progress it’s making from switching to electric vehicles and renewable energy to be nullified by giant pulses of carbon released by wildfires.

Still, Berleman thinks it will take a revolution to get people to overcome their primal fear of fire. She knows how hard it is. She grew up in Temecula, an inland city between Los Angeles and San Diego, in a valley surrounded by chaparral-covered hills that burned nearly every year. When she was 4, she stood in her yard and caught ash in her hand and watched ash cover her lawn like snow. “I was afraid of fire,” she says. “I remember having night terrors that I’d have to try to save my family from wildfire.”

But her view has changed since then, and she hopes others can change their minds, too. She thinks the October fires will be a catalyst for policymakers and the public to accept that fire is the best protection against megafires and all the carbon they emit. They already have emboldened her to move quickly than she had planned to introduce fire to parts of the North Bay Area that escaped the October fires.

“Now that this has happened, we’ve decided the wake-up call has already happened,” she says. “We need to scale up if we’re going to get through this; it’s going to take all hands and all lands.”

She now plans to apply fire in five counties instead of just two. And instead of burning just grasslands, which produce far less smoke, she’ll burn forests and woodlands as well. If people push back, she knows what she’ll say: “By being afraid, we’re making our problem worse. There’s another option. That fear can actually inform a positive movement; you can take a fear of fire and decide, ‘OK, we don’t want megafires; we’re afraid of them.’ Let’s take action instead. Fire could be our favorite tool on our landscape, and we could have more beautiful and healthy landscapes. And people wouldn’t have to live in as much fear.” □



SOURCE: GONZALEZ, P. J., BATTLES, B.M., COLLINS, T. ROARDS, AND D.S. SAAH. 2015. ABOVEGROUND LIVE CARBON STOCK CHANGES OF CALIFORNIA WILDLAND ECOSYSTEMS, 2001-2010. FOREST ECOLOGY AND MANAGEMENT 348: 68-77.



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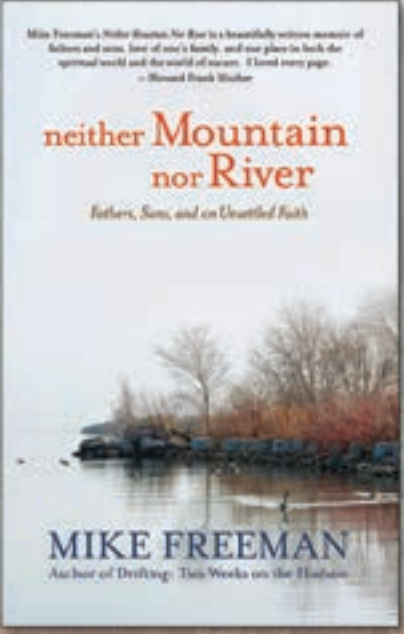
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Air quality *continued from page 9*

valley floor,” says Sarah Coefield, air quality specialist for Missoula County. Inversions that trap clouds and air pollutants in the valleys lift only when the sun is able to heat the ground enough to warm the air. Such inversions contributed to Missoula County’s “hazardous” air warning, the most extreme category, as wildfire smoke caught in the inversion hugged the valley floor. Seeley Lake, a small community hit hardest by smoke from the Rice Ridge Fire, had just five days in August that were not categorized as hazardous. “From a public health perspective, it’s: ‘Get out,’” Coefield says. “But the reality is some people don’t have anywhere to go, or don’t have the money to take off and leave. They have jobs, they have kids.”

Some days, the air monitors were unable to accurately read the air quality because it was beyond their measuring capacity. “It’s unprecedented, is my understanding,” says Paul Smith, one of just two pediatric lung specialists in Montana. Smith sees children with asthma and lung diseases whose conditions are further complicated by the formaldehyde, benzene and carbon monoxide in wildfire smoke. Lungs are akin to a “raw open wound,” easily harmed by smoke exposure, Smith says. Long after the smoke is gone, inflammation and scarring remain. Across Montana, emergency rooms saw an increase of respiratory-related problems this wildfire season compared to last year, which was calm. In Missoula and Powell counties, for example, ER visits more than doubled.

Anecdotal evidence aside, our understanding of the long-term health impacts of smoke is thin. A study led by researchers at the Georgia Institute of Technology this summer found that the Environmental Protection Agency has significantly underestimated the amount of noxious emissions wildfires create. It found that hazardous particulates released into the air by wildfires are three times higher than previously thought. The only way to truly protect people from smoke is to avoid it entirely. But for Montanans, as smoke infiltrates their daily lives, that’s not always feasible.

Two weeks into the school year, the Lolo School District got its first high-efficiency particulate air, or HEPA, purifiers, the only mechanisms capable of filtering out fine particulates from wildfire smoke. But there weren’t enough HEPA purifiers for every classroom. That left district officials with the task of choosing which children would get clean air. After consulting the county health department, the district decided to put the purifiers in classes with the youngest students. “Those tiny little lungs are working even harder to get the oxygen they need,” Olinger says. “It was



Students at Frenchtown Elementary in Montana stayed inside for recess for almost a week because poor air quality due to wildfire smoke prevented them from safely playing outside.

NORA SAKS/MTPR

the logical group to start with.” The school worked its way up through grade levels as more purifiers became available, but the triage system wasn’t enough to help all the classes and communal spaces. At night, teachers set the purifiers to their highest setting, and continued running them on low throughout the school day.

The purifiers came from a program put together by Climate Smart Missoula, a climate resiliency nonprofit, in cooperation with Missoula County’s health department. HEPA purifiers are the only air purifiers able to filter out the micro-particulate matter from smoke; bandannas or other facemasks do nothing. The program began last year, a relatively calm year for wildfires, and was originally meant for Meals on Wheels recipients: elderly residents with low incomes who often have respiratory illnesses. But this year, the program became an ad hoc emergency response. “It’s amazing how clean air isn’t something you think about until you don’t have it,” says Amy Cilimburg, executive director of Climate Smart Missoula.

Working with the American Lung Association, schools and other groups, Cilimburg and Coefield were able to place around 500 purifiers across western Montana. Both Cilimburg and Coefield fielded a surge of calls from families, health clinics and organizations — people who had heard of the program and desperately needed the filters. “It felt frantic,” Coefield says, her voice wavering as she describes how hard it was to turn people down when they ran out of air filters. “I can’t say how frustrating it was that there were not funds for this, that it hadn’t been looked at before.”

Climate Smart and Missoula County are continuing an education campaign to impress upon people the need for clean air, and how important it is to have purifiers and to avoid smoke inhalation. At this point, people should think of a HEPA

purifier as a necessary appliance, like a fridge, Coefield says. “Breathing is important.” But not everyone can afford filters, and a sustainable way forward to face the next season has yet to emerge.

Although nonprofits helped spackle the gaps in the public health emergency this summer, the fact is that federal, state and local governments lack the infrastructure to deal with acute wildfire smoke. Assistance is not available in the same way that it is for something like water pollution. The Federal Emergency Management Agency, for example, doesn’t have a dedicated program to distribute air purifiers, nor does Montana’s Department of Public Health and Human Services. Faced with another wildfire season like this one, spokesman Chuck Council said in an email that the department would work with partners and coordinate donations as it did this year. But that would come alongside department budget cuts impacting the entire state, in part because of the overwhelming \$74 million price tag that came with fighting this year’s fires. “Any potential cuts could impact our staffing levels and ability to respond to local needs,” Council wrote. This year’s fires are creating a feedback loop, and fires are now another public health issue added to the state’s management burden.

After the worst of the fires passed, the county health department put the HEPA purifiers in storage, for what Olinger calls the “inevitable next time” they’ll be needed. But the effects of the fires linger. In September, after the rains came, Olinger traveled to a conference in Bozeman, away from the northwestern fires. In his hotel room, Olinger opened his suitcase, and only then realized his clothes still reeked of smoke. “It really permeates everything, not just the air,” Olinger says. “It was here long enough it got inside homes, people’s carpets. And it takes a while for that to go away.” □

Our burning future



Firestorm: How Wildfire Will Shape Our Future
Edward Struzik
248 pages, hardcover: \$30.
Island Press, 2017.

At some point this past August in Montana, Missoula County's daily air quality updates — peppered with chatty jokes about the apocalyptic sky outside our windows and wry recommendations to avoid outdoor exercise — stopped being funny. The gray miasma that had covered the city lost its novelty, though the fantastic sunscapes — the sharp evening shadows by early afternoon and the ominous beauty that the poetically inclined find in destruction — lingered. Unfortunately, the blanket of gritty air did, too.

All the commiserating small talk with grocery store cashiers and detailed explanations of what we were breathing and where it came from could not lift the pall, figuratively or literally. Smoke — plumes of it streaking across satellite maps from Lolo and Glacier and Seeley Lake and unfurling seamlessly over state lines — became all too familiar, even as the fires that spouted it threatened evacuations and stressed state budgets to breaking. In Missoula County, Sarah Coefield, the air quality specialist, included mental health resources in every update.

Edward Struzik's new book, *Firestorm: How Wildfire Will Shape Our Future*, describes so many North American conflagrations that they, too, begin to seem almost ordinary, the fires that now burn bolder every day — just another of climate change's many Horsemen of the

Apocalypse. Struzik guides his readers through the ecological, social and political factors that led to the major fires of recent decades, including the century of fire suppression that built up fuel, the changing conditions that spin fires into furies and the inconsistent policy preparations across vast and varied fire-prone regions. The book is part prognosis, part play-by-play, and part resigned admission that as much as we know, or think we know, about how to live under perpetual threat of ever-greater disasters, nothing about future fires is guaranteed except that they will come galloping.

The far-flung points on Struzik's map deliver the book's most searing message: No forest, no fire, is isolated. Story after story delivers a similar account: the lucky turns of weather versus unexpected fire behavior, the constant complaints about inadequate resources. The research showing the global travels of smoke plumes makes the point on a molecular level, too. Mercury, arsenic, carbon, asbestos — what once was buried will be unearthed, and once it is unearthed there is no wall to stop its spread.

Firestorm opens with the Horse River Fire, nicknamed "the Beast," a 2016 runaway wildfire near Fort McMurray in Alberta that burned 2,800 homes and nearly 1.4 million acres. It consumed billions of dollars and surprised firefighters at nearly every turn, and the fact that almost everyone living nearby escaped was more miracle than management. Struzik compares the fire to a hurricane or a tornado — with the stark difference that people in a tornado's path rarely think they can stop it.

The contrast between the extraordinary power of megafires and people's belief in their own ability to contain them is striking. Arrogance, ignorance, careless

chance — people start fires and underestimate them, ignore humbling lessons and move closer to danger. Instead of being seen as a crucial part of integrated ecological cycles, wildfires become overwhelming, menacing, supernatural.

Struzik punctures much of the mystery by explaining soil cycles and water pollution, funding and smoke particulates. In chapters that connect science to history, he offers a clear view of what has happened and what's at stake. But his elaborate retellings of what happened during specific fire events over the last century lose clarity in all the chaotic play-by-plays of phone calls, weather patterns and evacuation orders. Timelines get tangled; contextual asides intrude at key moments and are then left dangling. For a reader intimately familiar with these fires, the level of detail may offer some insight. But those more interested in the future Struzik promises to forecast are left to make the larger connections on their own.

The thread that weaves through every chapter is clear, however. Megafires — whether seen as natural disasters, nightmarish calamities or policy mismanagement in action — will continue. They will become worse and more frequent. The wildland-urban interface will be more threatened. That thick summer air will return to block out sunlight and push us back indoors to clutch our air filters and grieve about stolen blue-sky days. Struzik reminds his readers again and again that whatever has happened already, no matter how severe and stunning, isn't done happening. It's clear how huge a role humans have had in getting us here. The question left unanswered is how we might cope with what happens next.

BY OLGA KREIMER



Like many other animals, grizzly bears do well in landscapes that have been burned by fire. Biologist Gordon Stenhouse studies G-16, a small bear he captured first in 1999 and then again more than a decade later. Soot from wildfires in the Arctic is darkening the surface of glaciers, like this one in the Canadian Arctic, right, accelerating the melting that is already taking place. EDWARD STRUZIK





The author keeps lookout while other firefighters work the Brown's Canyon Fire in Idaho's Sawtooth National Forest in 2006. COURTESY OF S.D. FILLMORE

Come spring

A firefighter contemplates the next fire season

Come fall, there is more time to linger over the morning coffee. Your boots, with dirt still clinging between their treads like forgotten food in un-brushed teeth, are tossed into the familiar corner. The grind of the rock and the hills still vaguely echo through your bones. Shorter days now, but the sun, drifting lower in the southern horizon, still squeezes water from the corner of your eyes. Waking up in the morning brings the phantom tendrils of sulfur-sweet diesel exhaust, existing in memory for a few long moments before your head clears.

Come winter, the old vulnerabilities that plague the summer are forgotten. Perhaps a few too many beers have dulled the aches, and you recover the weight that was shed on some line scratched across some hill in some place for some reason that seemed important at the time, existing out there still like a star you saw once but can't point to again.

During the holidays, your uncles want to hear a story about it. When you make up your missed appointments, your dentist asks if it was a bad fire season. At some point, someone saw a story on the news — were you there, on that one? Maybe you were, maybe you weren't, but you were somewhere doing the same thing anyway, so it doesn't really matter, and it's better to humor them, to make them feel a part of it in some small way.

They are the taxpayers, after all, so why not share a thrill or two? Vicarious living is all some people can manage.

Come spring, the trepidation hidden during the dark months resurfaces. Grim uncertainty arrives in your mind alongside the rising creeks outside, and it rushes you down in a tumult of doubt. Thoughts previously deflected return: Maybe this will be the year that your words out the door will turn into falsehood, and you will become an unwitting liar. Not that there is really a choice, if you can understand that.

And so I'm made to wonder how it will happen, if I will hear the crack of the rock as it spins from above, or feel the soft push of wind on my back as the branch approaches. Would I alert to the helicopter's master caution warning, and bravely resign myself for the ride to the ground? Or hear the leaves rustle with a falling chunk of wood and realize the danger? Would I notice the smoke that forewarns of oncoming fire, or know the screech of truck's tires before the crash? Would I feel my heart careen violently as I fell to my knees, feeling the tightness grip at my insides as the breath vanishes? Will there be time for "Shambhala" to tumble from my lips, or mere curses, or mute disbelief?

Will my family have to endure reluctant memories of me, clichés, and an honor guard of my friends? The drums that beat with puissant bitterness, and the pipes that always made me well up in sadness and pride?

Will the accompaniment have the poignancy of other fires, like Idaho's Mann Gulch, or hold the decadal remem-

brance of the Loop Fire, or offer a stern lesson like Colorado's South Canyon? Would the blaze prove as pointless as Arizona's Yarnell, become fable like the old Blowup, or have the seamless anonymity of Klone? Maybe the despair of the Dutch Creek Fire, the blame of the 30-Mile, or the hopelessness of the Esperanza?

During the long drives, I wonder if I will linger for days, or slip right through the gap? Will the grains of my flesh be burned into the earth, or be cast up into a towering column of smoke? Will my blood soak the roots and be transpired, will my tears cool the ash? Will my eyes see silver, blue or black? Maybe dirt, maybe water, maybe smoke or sky? Ears filled with silence or ringing, head gripped by panic or calm? Will there be air in my lungs, or will the heat burn from within? Last stand: flat on my back or my belly or my side, in pieces or in whole, in pain or in a trance?

I hope that my patience did not falter, that I was not insolent. That I was not hasty, nor ignorant, nor dramatic, nor vain. Just that I missed the signs, the directions, and the path to be followed. Most of all: I hope I fall for a reason that can stand the test of time. Will my widow be told it was for the accepted greater good, and will this be the truth of it — something that my son will believe in and be proud of for his days? Or will the end be pointless, as a man felled in battle against a firestorm whose sovereignty can never be challenged? □

S.D. Fillmore works as a professional wildland fire manager for a federal land management agency in the Western U.S., and has been a firefighter for almost 20 years. He is the editor of the recently published book: *Fire on the Land*.

A 'selfish' decision

An eyewitness account of the fires that ripped through Northern California

BY EDWARD DICK

I had a shovel in my hands, and I knew that I could try to defend his home, which was not yet burning — but only if I neglected my own.

Early on a Monday morning, my wife, Ina, and I woke to someone rapping on our door. Philo, our 8-month-old Westie pup, slept on, undisturbed. “Ed, you’d better get out here,” my neighbor yelled. I got a bathrobe and opened the door. I could see the night sky glowing red at the mountain rim horizon to the southeast, and also to the south. It was 1:30 a.m. “You have got to get out of here,” the neighbor said. “The fire is just over the ridge!”

For five years, we’ve lived on Tomki Road, near the head of the Russian River, about 30 minutes outside the small town of Willits. Steep, wooded mountains rise from either side of our property. I spent 10 years building our home from trees on our property. Now, my wife has advancing Alzheimer’s. Our adult son lives 1,000 feet to the south, in the cabin he grew up in. We went down and shared what news we had.

We knew that we were in a mandatory evacuation space, but we were loath to leave. Our son refused to go. Still, we loaded our Subaru Outback with our “one carload” of survival/save items and turned our goats loose. We left our elderly dog Woofie, and took Philo.

We drove over the canyon rim, passing 20 to 50 cars parked along the one-lane dirt road, abandoned by people evacuating. We drove through water holes, over and around the boulders of the non-maintained stream crossings and past a California Highway Patrol officer parked at the base of our road. We waved, and he waved back.

When we reached the evacuation center, there was coffee brewing, hot water for tea, and tables around which dozens of people sat or stood, many in shock. While we waited for news about our home, many more people arrived, including the 20 or so monks from the Abhayagiri Buddhist Monastery. Three generations from a family winery near our home arrived, too. We heard that the winery, the office and many surrounding residences had all burned, although the main house did not. At dawn, a trailer from Red Cross arrived with supplies, cots, blankets.

But we couldn’t stay. Our son was still on the mountain, and our irreplaceable home, with its historic Spanish Civil War posters and a piano I had learned to play after we moved in. We decided to return, despite the mandatory evacuation orders. When we passed the Highway Patrol officer, coming from an unexpected direction, we waved and he, again, waved back. In the morning light, we could see the fire line

advancing down the eastern side of the canyon and the glow to the south.

On that first day back, sheriff’s deputies visited, along with a friend from church, and told us we had to leave, that the fire was advancing over both ridges. We refused. Twice more they returned, telling us we had to leave, that we would be killed, and that I was “selfish.” They said we were using up their time, meaning that others’ homes would burn and people would die. All that would be on my head, they said. I confirmed that I was being selfish, that God had been good to me, that I thought I had been good to God, and that I was OK with meeting my maker. Our friend tried to convince my wife to leave, but she refused. Finally, they left us alone.

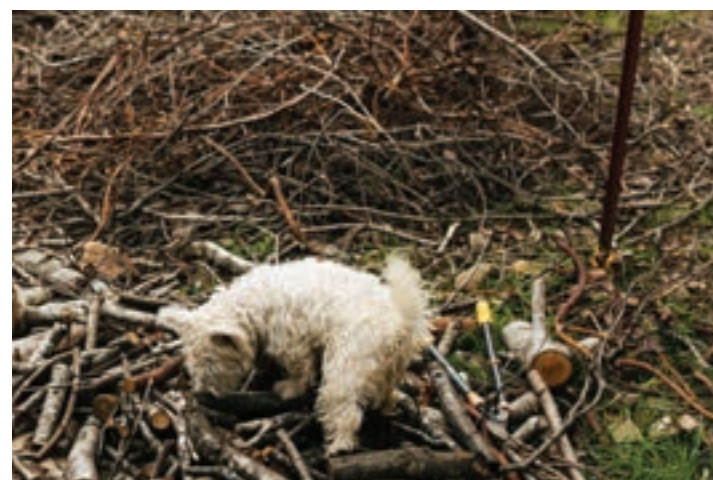
We began preparing to fight the fire, still slowly advancing, knowing we’d have to sustain our home absent electricity or any means of communicating with the outside world. The pipe that brought water from over the mountain had not yet burned, so Ina and I began filling garbage cans and five-gallon buckets and placing them around our home and barn. We’d built the home with some thought of protecting it from forest fire, so it was fairly defensible, but the barn, sided in old dry wood, would be a bigger problem. As Ina and the dogs retreated inside, I hosed down the sides of the barn until the water shut off. A fire technician suggested I start cutting some additional trees along the west side of our home. I got a generator operating to save our freezer and refrigerator, using only extension cords, so that firefighters would not be jeopardized by an unexpectedly alive electrical system. Meanwhile, my son looked after his own home.

Through Tuesday, there were few firefighters available to fight the blaze, just the local department, and a crew from Anderson Valley, 75 minutes away. The huge fire raging through Santa Rosa, a sizable city 75 miles to the south, had drawn all the available units. Eventually, a crew from Chamberlain Creek Conservation Camp, where inmates live and conduct fire and conservation work, arrived. They helped me continue the work I had begun, moving the forest an additional 15 feet from my home. We worried about a firestorm. One technician told me, “If you see us all driving out of here, take a hint.” We had the car ready to leave at a moment’s notice.

Tuesday evening, I saw a great red glow to the south, and I went to investigate on foot. About a quarter mile away, I saw a neighbor’s house ablaze on the mountainside. Walking

Edward Dick feeds one of his goats at his home, right, and his dog sniffs at vegetation removed from the perimeter of his property, far right. Edward used his goat to help maintain the undergrowth and vegetation on the hillside near his house, which helped mitigate the spread of the Redwood Valley Fire.

MASON TRINCA





up the driveway, I could see the joists in the wall still burning. The neighbor was a bookseller, and his thousands of books added to the inferno. I could see the slow-moving ground fire continuing toward our home. I walked up the long driveway to the house next door. The fire had curved around the west side of his home and was moving toward it. I had a shovel in my hands, and I knew that I could try to defend his home, which was not yet burning — but only if I neglected my own. As I walked home, I met a local engine with crew waiting, and I told them what I had seen. “I’m not taking this unit up that drive,” the driver said. The drive was 6 feet wide, sloped and had no turnaround for a vehicle the size of a fire truck.

I slept in fits, an hour or half hour here and there, as the fire crept closer. Late at night, I saw the burst of red that was my neighbor’s home catching fire. At about 3:30 Wednesday morning, the flames came gently down to our home, burning along the ground. I was concerned about a tanoak that had fallen a year ago. I had cut it up for its firewood, but many of the dry smaller limbs were still there. Fortunately, the inmate crew had pulled some of it out the previous day, and the over-story did not catch fire. The breeze was gentle and often seemed to be blowing back into the fire. I thanked God for its gentleness and thought about those who had lost so much.

The next days brought firefighters from throughout the West: crews from Oregon, Arizona, Utah, from all over California, the always-present CAL FIRE crews, U.S. Forest Service crews, supervised inmate crews from around Northern California, and heavy equipment contractors who brought bulldozers on flatbeds that occupied the open meadow to our north. At one point, there were several thousand firefighters in our several square miles. During the days, helicopters and planes, including large jets, dropped water and retardant, as the slow but stubborn fire continued to burn into, and around, the monastery

nearby. Because of that determined fight to save the monastery and the homes on the east side of the canyon, the mountain to our east never fully burned, which meant that our barn was not in significant jeopardy. Firefighters manned shovels and other tools to dig in fire lines, so I could stop. I kept an eye on the burned areas around our home and our neighbor’s. Fire pushed toward my neighbor’s home several times; I sounded the alarm so nearby crews could stop it. After the fire burned past our house, we had gentle days with full nights of sleep, and myriad opportunities to thank all the people coming our way. We have dozens of signatures of firefighters, including inmates, in our guestbook.

Late in the week, I saw a fire technician using a handheld device and asked him if I could call a family member. This was the first word our family had that we were there, our house was secure, and we were safe. Fire crews carried our gasoline can into town, and brought us gas for our generator. Mid-week, they brought us drinking water as well, as we had only the garbage cans we’d filled earlier to drink.

The sheriff’s deputy said that I was selfish for staying. But neither my friend’s house nor my son’s home would be here if we had not. Ina and I were able to care for each other with relatively little stress. We felt like we had a great deal of control over the immediate circumstances of our life, and we were not traumatized. In similar circumstances, I would do the same thing again.

Just before the evacuation order was lifted, I ventured to a burned area a mile and a half south of us. The devastation was incredible. It looked like a scene from a war: Chimneys, sheet metal, appliances, burned-out vehicles were all that remained for long stretches. The occasional house had survived, usually because of its landscaping. Black-and-white tree trunks spoke of a place that was once forest. The place I had driven past for 30 years was unrecognizable. □

Edward Dick, 69, and his wife, Ina Gordon, 75, with their dogs, Philo and Woofie, at their home in Redwood Valley, California, after they waited out wildfire despite a mandatory evacuation order.

MASON TRINCA



HEARD AROUND THE WEST | BY BETSY MARSTON

CALIFORNIA

If you visit the Mineral King area of Sequoia/Kings Canyon National Park, be prepared to see cars at the trailhead “wrapped up like big Christmas presents,” says Justin Housman in *Adventure Journal*. That’s because such parking lots are cafeterias for marmots, chubby rodents that devour the “delicious rubber and plastic bits” of vehicles. But marmots aren’t the only car-eaters. Housman failed to protect his car’s bottom while camping near California’s Los Padres National Forest, so rodents — probably mice — accompanied him home, stowing away in the engine and leaving telltale pellets on the garage floor. His car’s unhappy fate: 19 hours in a garage and a bill of — ouch — \$4,500.

ARIZONA

We all get forgetful, and most of us try to be tolerant of ourselves as well as others when the keys disappear or we leave trekking poles on the trail. Some things, though, should never be left behind, because they might be picked up by the wrong person. Prescott Valley, Arizona, Police Chief Bryan Jarrell was changing clothes after a town council meeting, reports *KTVR News*, “when he inadvertently left his department-issued firearm in the restroom stall and left.” Four days later, Jarrell realized that his Glock 19 handgun was missing and reported it. The chief would love to have his gun back; call 928-772-9261 if you can help.

COLORADO

The High Country Shopper in rural Delta County, Colorado, once ran a somewhat startling ad: “FREE kittens — big enough to eat.” Astute readers figured out that this merely meant that the felines in question had been weaned, but a more recent ad might have left folks wondering about a possible hidden meaning: “FREE HUNTING RIFLE with an engagement ring costing \$1,500 or more.” Now there’s an idea for a novel.

MONTANA

Twenty drivers in Billings, Montana, got pulled over by cops just before Thanksgiving, but



IDAHO Global warming-proof. RON SPIEWAK

instead of tickets for minor violations of the law, police officers handed them free frozen turkeys, compliments of a local businessman, according to the *Billings Gazette*. Not to be outdone, People for the Ethical Treatment of Animals wrote a letter to the police department offering a meatless alternative — free Tofurky roasts. “Thanksgiving is about appreciation and kindness,” said PETA staffer Tracy Reiman, urging the police to “gobble up our offer.” The police did just that, surprising another 20 or so motorists, this time with a cholesterol-free vegan roast.

WASHINGTON

Vanity, thy name is Facebook! A “culture of selfie sticks and social media” inspired hunters to record how they used hunting dogs to poach bear and wildcats in Washington’s Gifford Pinchot National Forest. The hunters, not interested in the meat or hides, showed off their gory — and illegal — kills on cellphones or video cameras, now evidence in an investigation of an alleged poaching network in southwest Washington. “Fish and Wildlife investigators say they’ve never seen a case this big, or this disturbing,” reports the *Seattle Times*. The Skamania County prosecutor has charged eight people with 191 criminal counts, including 33 felony charges. Investigators took nine months to build their case, knitting together text messages, videos, photographs and social media posts. A motion-

sensitive camera helped, and 20 kill sites were located in the forest, thanks to GPS coordinates attached to photos and videos on the suspects’ phones. The case began in Oregon when state troopers caught two men, Erik C. Martin and William J. Haynes, both 23-year-old Washington residents, using a spotlight to locate and illegally shoot deer in the dark. Twenty-seven deer heads were found at Martin’s house, but more importantly, phones there yielded four new suspects and over 50 illegal hunts. Washington wildlife officials say they’d never gotten a single tip about this poaching network, leading Sgt. Brad Rhoden, who managed the investigation, to wonder: “If I miss this, what else have I missed?” Poachers kill wildlife for a number of reasons, said Steve Eliason, sociology professor at Montana State University, including for trophies, thrills and money — even as an anti-government protest. Reporter Evan Bush suggests that in this case, though, “grisly photos and videos may have been the ultimate prize.”

COLORADO

Flight for Life helicopters usually transport accident victims or ferry sick patients from one hospital to another. These days, reports the *Colorado Springs Gazette*, they’re also out rescuing adventure-seeking daredevils. Last summer, a woman’s 83-foot jump off Guffey Gorge in Florissant “ended in a painful belly flop,” with a video showing her “flailing in the air before smacking the water.” The disoriented, bloody-nosed diver was airlifted to a Colorado Springs hospital. She wasn’t the first: “I think the record is transporting two or three patients in the same day from people jumping off Guffey Gorge,” said nurse Megan Hawbaker, who is stationed at St. Francis Medical Center. The state sees 80 million visitors every year, and sometimes, she said, “they try to take on more of Colorado than they’re physically able to handle.”

WEB EXTRA For more from Heard around the West, see hcn.org.

Tips and photos of Western oddities are appreciated and often shared in this column. Write betsym@hcn.org or tag photos #heardaroundthewest on Instagram.



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“ Trump’s offer to change the name of (Denali) may simply appear as another act of spite toward his predecessor, but it also bucks growing recognition that it matters a great deal what we decide to call places.”

Tim Lydon, in his essay, “What’s in a name? Everything,” from *Writers on the Range*, hcn.org/wotr