FOREST NEWS

Forest Service Employees for Environmental Ethics

Winter 2026

Mt. Baker-Snoqualmie

National Forest

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POST-FIRE WATERSHED HEALTH / PASADENA EMPLOYS GOATS AGAINST FIRE / FS RAMPS UP PRESCRIBED FIRE / GROUNDWATER CONTAMINATION FOLLOWS RETARDANT DROPS

A New Era for FSEEE

For over 30 years Andy Stahl served as FSEEE's executive director, carefully watching the U.S. Forest Service to ensure they were faithfully following our nation's environmental laws. Andy's ferocity in this endeavor never faltered. Our long-tenured board offers Andy our heartfelt gratitude for his service.

We are pleased to announce that Kevin Hood, a recently retired Forest Service employee and former FSEEE board member, has accepted the executive director role. We know Kevin will succeed Andy well.

We look forward to FSEEE continuing as the champion for our national forests and as the vigilant watchdog over the agency entrusted with their management and care.

Dave Iverson
Board President
Forest Service Employees for Environmental Ethics

Dear FSEEE Members,

I am writing to share important news about the future of Forest Service Employees for Environmental Ethics.

After more than 30 years as FSEEE's executive director, I am retiring. It has been an honor to work with Forest Service employees and citizen members who believe that our national forests must be managed lawfully, ethically, and in the public interest.

Together we built FSEEE to ensure that Forest Service employees can speak up — without fear of retaliation — when the law, science, or professional integrity are at risk. With your support, FSEEE has defended whistleblowers, enforced environmental laws in court, and held the agency accountable when it strayed from its mission to care for the land and serve people. That work remains as essential today as ever.

I am pleased to report that the FSEEE Board of Directors has selected Kevin Hood as my successor. Kevin started as executive director on January 1, and he is excited for this new role. You may reach him at kevin@fseee.org.

Kevin has valued public lands throughout his life. He worked for the Forest Service from 1995 until 2025 and brings substantial experience in public lands management, conservation policy, and federal-tribal relations. Most recently, he served as the USDA Forest Service's Alaska Region Tribal Relations program manager, working closely with Tribal Nations, Alaska Native Corporations, and agency leadership on conservation, co-stewardship, and public-lands governance. He understands the Forest Service from the inside, values ethical public service, and brings the judgment and credibility this role demands.

I have great confidence in Kevin's ability to lead FSEEE forward. The pressures facing Forest Service employees — and the nation's forests — are intensifying, not diminishing. FSEEE's mission remains critical, and it is in capable hands.

Thank you for your steadfast support over the years. It has been a privilege to serve you and to stand with those striving to protect national forests and promote responsible stewardship.

Sincerely,
Andy Stahl
Executive Director (retired)
Forest Service Employees for Environmental Ethics

Cover: Snowshoeing the Mount Baker-Snoqualmie National Forest.

Inside

Forest News is published by Forest Service Employees for Environmental Ethics, a 501(c)(3) nonprofit organization.
www.nationalforestadvocates.org

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I would like to begin by thanking Andy Stahl for his many years serving as the Executive Director of Forest Service Employees for Environmental Ethics. With Andy at the helm, FSEEE has brought together civil servants, concerned citizens, and community advocates to elevate responsible stewardship of our national forests. I am honored and excited to continue FSEEE's invaluable work and to carry on Andy's legacy. Thank you, Andy, for all you've done, and we wish you an enjoyable and well-earned retirement!

I would also like to thank our members and donors. Your support has been FSEEE's lifeblood, helping protect our national forests and perpetuate our public lands heritage. We will continue working hard to earn your support.

I also thank Forest Service employees who embrace good stewardship and good governance through all circumstances.

Public lands have always been near and dear to my heart. My earliest memories include camping trips where family and friends bonded in the mountains, forests, and deserts of the western U.S. These childhood trips instilled in me a lifelong love of wild places that manifested in a 31-year career with the Forest Service from 1995 to 2025. I started in Southeast Arizona as a Wilderness and Trails crew leader and ended in Southeast Alaska as a Tribal Relations program manager. My life highlights include striving with dedicated Forest Service colleagues to care for our amazing public lands.

Now, I'm ready for the newest chapter in my career. As executive director, I pledge to continue endeavors central to FSEEE's identity and success. FSEEE has always listened to Forest Service employees, including whistleblowers concerned the agency was skirting the law. We will continue to engage with these folks who know the land and the issues best. We will always be forthright with whistleblowers regarding options and repercussions. This role is essential now more than ever with the demonizing and downsizing of the federal workforce and the everything-is-an-emergency push to expedite resource extraction with minimal environmental review.

FSEEE will continue to hold the Forest Service accountable to the law.

Grassroots advocacy is one of FSEEE's superpowers, thanks to our supporters. Grassroots advocacy includes stopping efforts to weaken environmental laws as well as positive actions, such as supporting wilderness designation, protecting roadless areas, or thanking a politician or agency leader for making a courageous decision that protects our public lands.

Education is another hallmark of FSEEE. We strive to connect our members to their public lands by writing about how places and people interconnect. We showcase the unique ecology and culture of our national forests by telling the story of a special forest (they're all special!) in each issue of Forest News. We break down complex issues, note government shortcomings and present responsible management alternatives.

We celebrate success stories such as tribal-federal co-stewardship agreements that honor traditional territories underlying our national forests or watersheds restored to health with the reintroduction of beavers. With bleak environmental news often in the headlines, we think it is critical to share good news to bolster spirits and affirm that we can affect positive change.

Our national forests are a shared trust. With your support, we will uphold FSEEE's mission to protect national forests, promote environmental ethics, and bring people together to elevate responsible public land stewardship. By championing sound management, we work toward a future in which healthy forests support thriving communities and resilient ecosystems.

Onward and upward!
Kevin Hood
Executive Director
Forest Service Employees for Environmental Ethics

Clouds refract the light of a winter sunrise into vibrant colors in this view of Mt. Baker-Snoqualmie National Forest.

Featured Forest

Mount Baker-Snoqualmie National Forest

The administrative history of the Mount Baker-Snoqualmie is complex, beginning with large multi-million acre forest reserves created in the late 1800s that were parceled in the 1900s into national parks (North Cascades and Rainier) and national forests (Mt. Baker, Snoqualmie, and Rainier). The Mt. Baker and Snoqualmie national forests, along with the northern part of Rainier National Forest, were ultimately consolidated into today's 1.72 million-acre Mt. Baker-Snoqualmie National Forest.

When adjacent conservation areas are considered, the Mt. Baker-Snoqualmie National Forest is part of over 4 million acres of protected land extending from the Canadian border to Mount Rainier National Park. This complex supports recreation opportunities and conservation values unique to the Lower 48. The Forest offers world-class downhill-skiing and snowboarding opportunities at four resorts: Crystal Mountain, The Summit at Snoqualmie/Alpental, Stevens Pass, and Mount Baker Ski Area. The Forest also features seven "Sno-Parks," winter recreation sites managed by Washington State Parks.

Beyond winter sports, visitors can enjoy hiking and backpacking along scenic sections of the Pacific Crest Trail, the Pacific Northwest National Scenic Trail and countless other trails. The Mt. Baker-Snoqualmie includes nine wilderness areas totaling 834,000 acres — almost half of the Forest. Daunting peaks of the North Cascades challenge climbers and mountaineers. A spectrum of landscapes — rugged high country, alpine lakes, dense forests, and lowland river deltas — provide a wide diversity of hunting and fishing opportunities. For recreational boating, the Forest offers Class V whitewater, mellow family outings, and everything in between.

A part of the largest contiguous conservation complex in the Lower 48, the Forest supports keystone species like grizzly bears and gray wolves as well as reclusive mammals such as Canada lynx and wolverines. The high country is home to mountain goats, hoary marmots, and pikas. The Skagit River hosts bull and steelhead trout as well as all five Pacific salmon species — pink, chum, coho, sockeye and king. Watersheds on the Mt. Baker-Snoqualmie National Forest support the water supply needs of the eastern Puget Sound. The old-growth forest sequesters carbon and contains some of the densest biomass on earth.

Beetle-Kill Trees and Wildfire

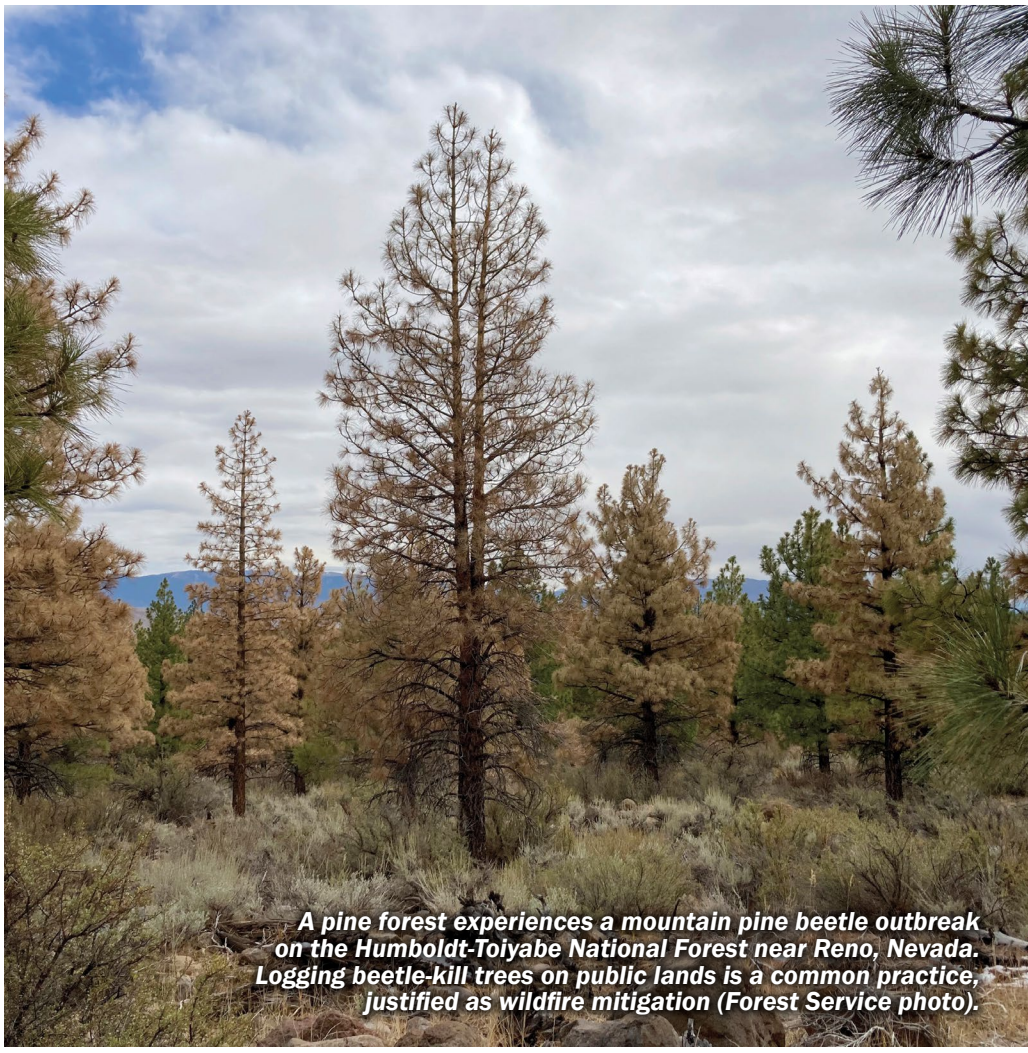
Beetle-kill trees make an easy target in the rush to defend our forests and communities from wildfire. The trees are dead and brown, so they must be a fire hazard, especially in today's unnaturally dense forests. Therefore, we need to cut the trees and salvage valuable timber before it rots.

That's the basic reasoning behind wildfire-mitigation logging projects following native insect outbreaks on our national forests. These projects, along with other fire-mitigation projects, are receiving unprecedented levels of government funding. While the justification for logging beetle-kill trees may at first seem reasonable, questions arise when this presumed connection is scrutinized. It doesn't take a scientist to notice that the most destructive U.S. fires in recent years did not start in stands of dead trees and were not fueled by dead trees. In fact, several of the worst fires were not fueled by dead or live trees — e.g., 2021, Boulder County, Colorado, grassfire; 2023, Lahaina, Hawai'i, brushfire; 2024, Texas Panhandle, grassfire; 2025, Los Angeles, California, brushfire.

Five researchers, including Dr. Garrett Meigs (Washington Department of Natural Resources) and Dr. Harold Zald (U.S. Forest Service) studied wildfire severity in the aftermath of mountain pine beetle and western spruce budworm outbreaks across the Pacific Northwest. The researchers determined, "In contrast to common assumptions of positive [wildfire] feedbacks, we find that insects generally reduce the severity of subsequent wildfires.... Both insects decrease the abundance of live vegetation susceptible to wildfire at multiple time lags."

Meigs and his fellow researchers embarked on this large-scale research project after several smaller, localized studies reached similar conclusions. For example, researchers led by Scott Black, executive director, Xerces Society for Invertebrate Conservation, reviewed the scientific literature on "fire risk following bark beetle outbreaks" in several Central Rocky Mountain forest types. Their findings, published in 2013, reveal, "Most available evidence indicates that bark beetle outbreaks do not substantially increase the risk of active crown fire in lodgepole pine and spruce-fir forests under most conditions." Instead, crown fires in these forests "are primarily contingent on dry conditions."

The 2013 study also indicates preemptive thinning "is unlikely to reduce susceptibility to large, landscape-scale [bark beetle] epidemics." These forest treatments could also "have substantial, unintended short- and long-term ecological costs" — i.e., degradation of natural areas. The authors recommend concentrating fuel



A pine forest experiences a mountain pine beetle outbreak on the Humboldt-Toiyabe National Forest near Reno, Nevada. Logging beetle-kill trees on public lands is a common practice, justified as wildfire mitigation (Forest Service photo).

Spruce beetles killed these Engelmann spruce trees in Idaho. Ample scientific consensus that wildfire burns less intensely in beetle-kill trees, especially after their needles have dropped.

reduction measures on creating defensible space around homes and communities — "to be effective at reducing fire hazard to communities, tree-cutting can be directed at removing all flammable material in the immediate vicinity of homes and settlements."

A 2014 paper by Diana Six, Eric Biber, and Elisabeth Long analyzed the issue from a policy perspective. Noting "a widespread belief in the policy arena that timber harvesting is an effective and necessary tool to address beetle infestations," the authors point to "a dearth of monitoring to assess outcomes" and failure to report unsuccessful outcomes. In spite of these shortcomings, a belief in the effectiveness of logging has led to "significant changes in federal environmental laws to encourage more timber harvests for beetle control."

Widespread acceptance of logging as a good response to bark beetle outbreaks (by policymakers) "raises a number of red flags." One red flag identified in this analysis is the political motivation behind policies advancing logging activities — revenue for the commercial timber industry. Given the lack of post-logging monitoring and the absence of long-term studies, the authors suggest that beetle-kill logging projects are likely "producing more harm than good." They conclude that policymakers need a better understanding of existing science and additional scientific data to support forest management that best ensures long-term ecosystem function "while wisely using limited financial resources."

A study conducted by University of Colorado researchers in 2014 examines the effects of mountain pine beetle outbreaks on the extent of areas that burned in the West between 2002 and 2013. The study focused on peak wildfire years, which account for 46% of area burned during that 11-year span. "Contrary to the expectation of increased wildfire activity in recently infested red-stage stands," the researchers "found no difference between observed area and expected area burned in red-stage or subsequent gray-stage stands." The authors conclude, "Despite the widespread public perception that forests affected by recent mountain pine beetle outbreaks are more likely to burn, we find that the annual area burned across the western United States is unaffected by mountain pine beetle infestation."

Meigs and Zald, prior to publishing their 2016 report, worked with an Oregon State University research team to compile 28 years of data on wildfires and 42 years of data on insect outbreaks (mountain pine beetle and western spruce budworm) across approximately 100 million acres in Oregon and Washington. Their study, published in 2015, is one of the most comprehensive to date and addresses the limitations of previous computer-simulation studies and small-scale data-driven studies. They found

Beetle-kill Engelmann spruce logs await processing at Timberline Wood Products in Sanpete County, Utah. Timberline produces only firewood, the value of which is a fraction of the cost of logging the dead trees, not to mention the damage to the forest ecosystem (Forest Service photo).

"no clear associations between fire likelihood and fire size," and their "central finding" is, "Wildfire likelihood does not consistently increase or decrease in areas affected by recent insect outbreaks;" in fact, "western spruce budworm outbreaks are associated with decreased fire likelihood."

These findings have important implications for forest management. For one, the decreased likelihood of wildfire associated with spruce budworm outbreaks suggests that these insects "function as forest thinning agents, potentially benefiting ecosystem restoration and fuel-reduction strategies." Since both insects addressed by the study are native to Western forests, they "likely contribute to the pyrodiversity inherent to mixed-severity fire regimes," making it unlikely that they represent a forest health crisis. "These findings suggest that strategic plans should recognize (1) the relative rarity of insect-fire interactions and (2) the potential ecosystem restoration benefits of native insect outbreaks, when they do occur."

Another study from the University of Colorado, published in 2015, reports on-the-ground findings in the aftermath of the West Fork Complex Fire. "Our study is unique because we were actually out in the forest peeling bark off of the burned trees, looking for evidence of the [spruce] beetle," said Robert Andrus, a graduate researcher and lead author of the study. "We were interested in the ecological effects of the interaction between these two disturbances."

The researchers collected extensive field data in subalpine forests in the eastern San Juan Mountains of southwestern Colorado "to investigate whether a gray-stage (<5 years from outbreak to time of fire) spruce beetle infestation affected fire severity." Based on this direct, empirical evidence, Andrus' team found, "Contrary to the expectation that bark beetle infestation alters subsequent fire severity ... analysis revealed no influence of pre-fire spruce beetle severity on nearly all ... measurements of fire severity." They concluded that "higher levels of spruce beetle infestation did not lead to more ecologically severe fires."

In 2025, a team led by Dominick DellaSala with the Conservation Biology Institute in Oregon notes that beetle-kill logging projects have widespread support by the Forest Service, western governors, and members of Congress as a means of stopping fast-spreading wildfires. But DellaSala et al. determined, "Logging trees that have been damaged or killed by natural disturbances but remain standing" is a "fundamentally flawed" approach to "mitigating fast-moving wildfires." These catastrophic fires burn "grasslands, shrublands, logging debris, and parched (but still-green) forests under weather anomalies that produce high winds, fuel aridity, and extreme temperatures."

In other words, the most destructive wildfires have little, if anything, to do with standing dead trees and everything to do with climate and weather conditions, especially wind and drought. Under these circumstances, fires are impossible to extinguish or contain, allowing them to spread into communities, where homes and other buildings become the primary source of fuel.

The comprehensive work by Meigs et al. reinforces the conclusions of other studies and sums up the best available science: "In contrast to common assumptions ... we find that insects generally reduce the severity of subsequent wildfires." In other words, wildfire mitigation is not a legitimate reason to log trees killed by bark beetles and other insects like western spruce budworm. Officials should not rely on unsupported rationale to propose projects that may actually be counterproductive to the stated goal of mitigating wildfire severity.

A view of the Coconino National Forest in Arizona where the Tinder Fire burned 16,000 acres in 2018. The mosaic of green, brown, and blackened trees illustrates a wide range of fire severity (Forest Service photo by Brady Smith).

Guest Column

Recovery After Wildland Fire

by Rebecca Biglow

Traveling in the West, you're likely to pass by areas that have burned, noticeable for their dead, blackened trees or, in the case of older burned areas, scattered gray snags and thick brush — smaller deciduous trees, grasses, and forbs — covering most of the landscape. If a fire has burned in the past year, the burned area often has patches of land where the ground is a dark gray with little or no living vegetation.

National forests often close public access to recently burned areas. These areas often remain closed for a year or more, particularly roads that enter the burned area along with trailheads, campgrounds, and campsites. The inability for the public to access burned areas can cause us to wonder: what does the landscape look like and how is it recovering?

The first very large forest fire I experienced was the Hayman Fire, which burned 137,760 acres in Colorado in 2002. I was not eager to work in the realm of wildland fire because I was and still am afraid of fire. However, my supervisor at the time urged me to take an assignment at the Hayman Fire, as other superiors at my office were doing. On my first day of my first fire assignment, I witnessed the immense expanse of freshly burned, blackened forest as far as the eye could see from a high vantage point and the inescapable, intense smell of charred forest.

The scene made me nauseous. This experience of working in a vast, freshly burned landscape allowed me to see the extraordinary acceleration of soil erosion, sedimentation, and rain runoff processes that are unique to burned areas. Working as a member of the post-fire recovery team, I came to care a great deal about the needs of the ecosystems and communities affected by the fire, and I have continued working in post-fire recovery ever since.

FIRE IN WESTERN FORESTS

Wildland fire is a natural process that has occurred extensively throughout recorded history as well as pre-European occupation of North America. The forest fires of 1910 — aka, The Big Blowup — occurred in the early years of the Forest Service and illustrate the extensive possibility of fire magnitude in forests prior to the present-day extent of human alteration of forests. The study of regional fire frequency provides further and greater evidence of the occurrence and probability of fire in wildland, forest, and wildland-urban interface environments.

Prior to European occupation of North America, many Native American peoples used wildland fire to maintain wildlife habitat and cultural-use plants. The more that people accept, rather than deny, the likelihood of fire, the easier it will be for people and communities to recover from fire.

Wildland fires burn with variable intensity. Fire intensity and heat generated typically correlate with resulting soil-burn severity. Soil-burn severity determines the pace of vegetation recovery after a fire. Fire intensity is greatest where forest fuels are most dense and are comprised of forest fuels that fuel high-intensity fire.

Burned areas often contain substantial areas that experience light or low burn intensity and low soil-burn severity as well as moderate fire intensity and soil-burn severity. Low soil-burn severity is characterized by intact vegetation, which often remains alive and partially green and regenerates very quickly. Recovery can be accelerated if a fire increases available soil nutrients, such as potassium, phosphorous and carbon, which occurs after fire in many (but not all) soils and ecosystems. Fire, however, also reduces soil nutrients, such as nitrogen and other medium and trace elements of soil nutrition, affecting recovery.

Areas that experience high and moderate fire intensity and soil-burn severity are characterized by fire consumption of all or nearly all vegetation on the ground, including grasses and forbs. Classifying an area of high soil-burn severity considers the fire consumption of tree and shrub foliage, where no foliage is left to fall upon the ground and add organic matter back to the soil. High soil-burn severity is also characterized by consumption of all soil organic matter as well as fine root material of grasses and forbs. Temperatures hot enough to alter and reduce soil structure to an easily erodible fine dust also characterize high soil-burn severity.

When rain falls upon post-fire areas of high and moderate soil-burn severity, vegetation and organic matter of soil that once captured and absorbed most of the rain are no longer present. This condition causes dramatic increases in precipitation runoff,

resulting in erosion, stream sedimentation, and markedly higher peak streamflows.

Some unburned soils have a slight degree of hydrophobicity, or water-repellency, causing reduced infiltration of water. Soils that have experienced high-severity burning often have pronounced hydrophobicity, which results from the physical and chemical changes of organic matter in soil from high-intensity fire. This post-fire soil hydrophobicity, caused by the formation of a waxy layer slightly below the ash-soil surface, can further add to the amount of rain runoff and stream flooding in and downstream from burned areas.

Burned areas in mountainous terrain with high-moderate soil-burn severity, where high-intensity rainstorms occur, are prone to debris flows, which are generally rare but commonly occur within burned areas that experience high-intensity rainfall on recently burned landscapes. Debris flows can entrain and carry very large boulders, trees, cars, and structures. The volume transported and deposited can reach hundreds of thousands of cubic yards of sediment, rocks, and forest debris. Debris flows can flow slowly or very rapidly (over 100 miles per hour) and result in downstream flooding, affecting areas at significant distances from the burned area.

POST-FIRE RECOVERY

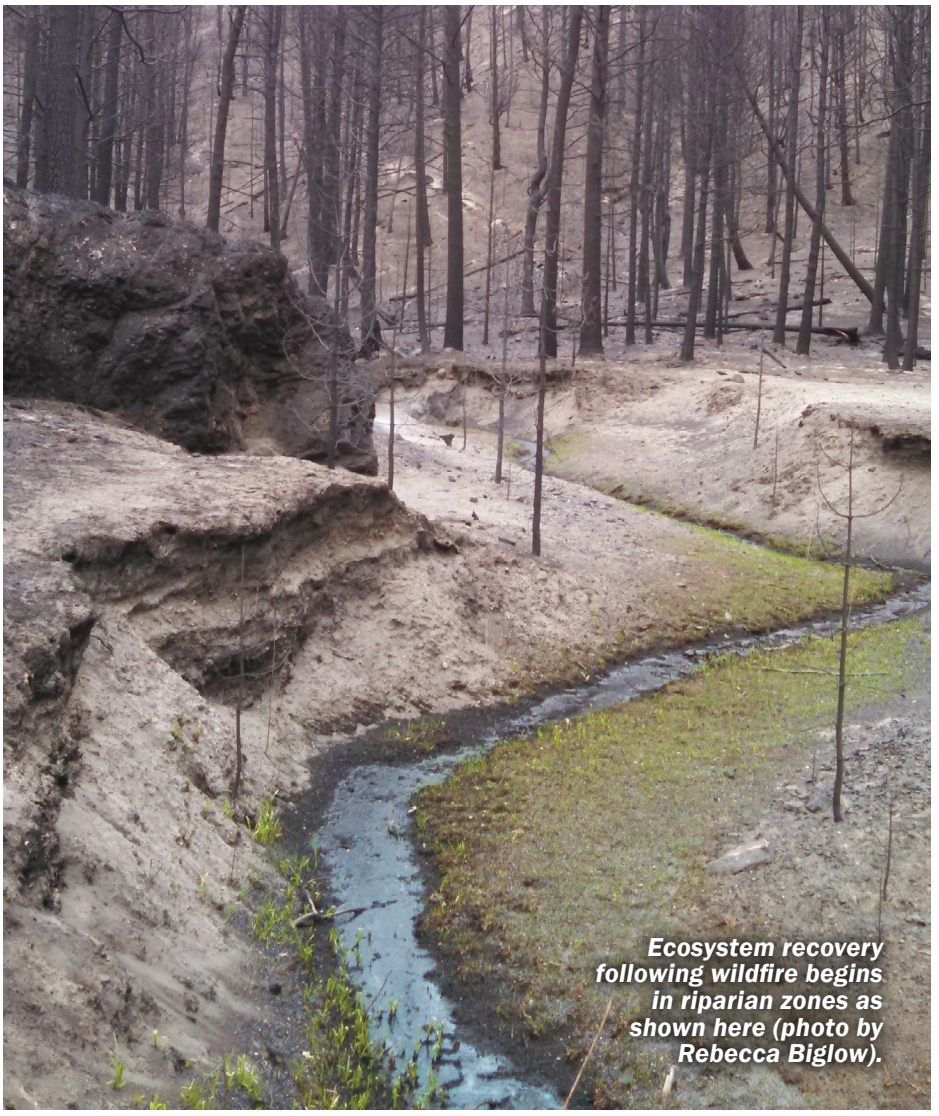
Recovery from fire is enhanced by ensuring awareness of the potential for post-fire flooding and debris flows. enabling communities, agencies, and utility companies to be informed and respond to protect people and infrastructure. Available prediction methodologies can accurately estimate the probability and magnitude of flooding and debris flows after a wildland fire. Also, the technology exists to provide rapid quantified prediction of post-fire flooding and debris flows so that people can be informed, injuries and fatalities can be prevented, and communities and infrastructure can be protected.

However, government and private-sector offices responsible for managing post-fire responses increasingly do not employ personnel able to perform field analysis in burned areas. This lack of proficiency with post-fire quantitative flood and debris-flow prediction is problematic. Additionally, offices responsible for managing burned areas have resisted providing quantitative estimates of flood and debris-flow probability and magnitude.

Consequently, hazard assessment of burned areas on federal lands needs to be conducted. Subsequent findings need to be communicated by entities with personnel proficient in working in burned areas to:

- Identify fluvial and geomorphic hazards.
- Perform watershed-response calculations.
- Communicate the relevant findings to local community members.

Generally, local and regional national forest offices do not employee these types of scientists. Nonetheless, these specialists are



Ecosystem recovery following wildfire begins in riparian zones as shown here (photo by Rebecca Biglow).

needed to ensure that critical infrastructure managers receive information essential to public safety and ongoing function of transportation and utility infrastructure — energy, water, and communications — as well as emergency management operations.

Recovery from wildfire in the aspect of protecting human life and safety is best achieved with effective communication of predicted precipitation events on burned areas likely to cause significant flooding and debris flows. Federal land management agencies have demonstrated varying degrees of willingness to share information about post-fire flood and debris-flow hazards with members of affected communities and cooperating agencies. Federal land management agencies that have engaged the National Weather Service (NWS) in post-fire response to coordinate flood prediction and flash-flood warning thresholds have had the greatest success in mitigating risks to human life and safety from post-fire flood and debris-flow hazards.

Watershed recovery, including soils and streams, is affected by the degree of ground disturbance on sensitive soils that have experienced high- and moderate-severity burning. Enhancing recovery requires minimizing human disturbance of and livestock grazing on these soils. Effective treatments for watersheds and streams include minimizing (1) the concentration of precipitation runoff from roads within burned areas and (2) ground disturbance of high and moderate soil-burn severity areas.

VEGETATION REGROWTH

Vegetation regrowth stabilizes soil and reduces runoff after a fire, and the risk of flooding and debris flows is reduced with time, typically with a marked stabilization after three years, according to studies compiled in 2009 by the Forest Service Rocky Mountain Research Station (GTR-228). Riparian areas are first to sprout new growth after a fire, even in areas of high-severity fires. Deep-rooted willows, aspens, and perennial native grasses and forbs are the first green plants to emerge in a blackened landscape. The presence of riparian vegetation reduces sediment transport down streams and mitigates post-fire flooding. The rapid regrowth of riparian vegetation after a fire also provides critical nourishment to wildlife in a burned forest.

Fire-adapted tree species like ponderosa pine produce serotinous cones that open and release seeds in response to wildfire (photo by Rebecca Biglow).

Various adaptations allow vegetation to survive fire and recover. Many coniferous tree species develop thick bark with age, which is fire-resistant in low- and moderate-intensity fire. Species such as ponderosa and lodgepole pine have serotinous cones — i.e., the cones open when exposed to flames, allowing the seeds to be released. The seedlings of serotinous species thrive in the increased sunlight available after a fire has opened the forest canopy. Trees like aspen, cottonwood, and birch thrive after disturbance of land, including fire. Stands of aspen or birch indicate recent disturbance, most likely fire, as they are considered early-successional tree species and provide important habitat for wildlife. In areas of high-intensity burning, the Department of Interior has adopted post-fire tree-planting practices to replace exact tree species and varieties adapted to specific locations.

INVASIVE SPECIES THREATS

Burned areas are easily overtaken by invasive plants, which propagate more rapidly than native plants and most commonly consist of annual and biennial grasses and forbs. Invasive grasses and forbs are comparatively taller and grow more rapidly than native grasses and forbs. The annual and biennial nature of invasive species, combined with rapid growth and seed maturity, causes these plants to have an early life cycle, creating

dead, dry, readily combustible fine fuels coinciding with the season of greatest fire activity. Non-native invasive grasses and forbs ignite and carry fire easily, increasing both fire frequency and intensity.

Mitigation of invasive plants within burned areas is important for recovery of native vegetation, forage for wildlife, and reduced likelihood of subsequent fire in burned areas. The best method of preventing the consequences of invasive plants is preventing their spread into burned areas and physically removing them as soon as possible. Consideration of herbicide application should be tempered by detrimental effects, not only to soil and water quality, but also to wildlife.

Burned and logged areas are more likely to experience high-intensity wildland fire where there is accumulation of grasses, forbs, shrubs, and early-stage successional vegetation — this is particularly the case if non-native vegetation is present. Burned areas that experience repeated fires are common and extensive. Increased fire frequency in these areas produces erosion-prone soil conditions, which generate the most ecologically damaging rain-induced runoff resulting from wildfire. These areas also exhibit the slowest rate of vegetation and watershed recovery.

WHAT WORKS, WHAT DOESN'T

Much study has been conducted of the effectiveness of burned-area land and vegetation treatments for recovery from fire and fire-mitigation treatments to forests for prevention of fire. Ongoing scientific study of these topics is needed. Many burned areas, including my first fire, the Hayman, were subjected to a great variety of landscape recovery treatments. Hill-slope stabilization treatments that were once popular with the Forest Service Burned Area Emergency Response (BAER) — mainly to demonstrate a public (visible) response — included scattering hay straw, placement of logs along a slope's contour, installation of strawbale check-dams, installation of silt fences, installation of straw wattles, and hydromulching.

All of these treatments have been extensively studied by the Forest Service Rocky Mountain Research Station and many academic institutions, and they have found the above treatments to be ineffective or detrimental. Notable negative consequences include introduction of non-native vegetation via straw and seed mixes in hydromulch as well as increased erosion around log erosion barriers, straw check dams, and silt fences. Seeding was also a popular post-fire treatment; however, applying seed often provided a vector for invasive plants, proved effective only on very low slopes, and tended to be removed by wind and birds.

Burned-area treatments that have proven effective include scattering slash already present in a burned area. Scattering light wood straw mulch can also be beneficial as long as the mulch is not over-applied, which suppresses vegetation regrowth. Effective vegetation treatments that benefit burned areas include planting critical native plants of specific species and varieties. Planting sagebrush (*Artemis tridentata*) in areas threatened by extensive presence of the highly invasive cheatgrass (*Bromus tectorum*) is one example.

Structures and other elements of the human environment leave a post-fire mélange of hazards. Some represent airborne respiratory threats; others pollute water and soil. Recovery from fire, addressing burned structures and other items, such as automobiles, requires stabilization and removal of hazardous materials.

HUMAN INTERVENTION

Our modern human existence is relatively new to North America, and the ecosystems, forests, fires, and watershed processes here are well-established. Most certainly, we have much more to learn about natural processes of land, forests, streams, and all that live within them.

Recovery from fire does occur and has been occurring since time immemorial, yet the inclination of modern humans is to intervene in those natural processes. Understanding forest recovery from fire warrants continued scientific study. To date, science has convincingly demonstrated that human recovery from fire is best achieved by:

- Accepting fire as an essential part of our environment.
- Being properly prepared.
- Having open communication between community members and government agencies.

Rebecca Biglow is a hydrologist, geologist, and public information specialist who has worked in post-fire response since 2002. She began her work in wildland fire and post-fire response as a hydrologist with the Forest Service and physical scientist with the National Park Service. She founded Earth Design Analysis and Innovation in 2013 to provide hydrologic and geologic consulting services in support of hazard-mitigation planning, community and land use planning, and design for construction and landscapes. Rebecca has designed many buildings and created many art pieces of sculpture, multi-media illustration, painting, and fabric quilts influenced by her knowledge of geology and hydrology. Rebecca also enjoys spending time with her family and friends, hiking, skiing, mountain and road cycling, and river paddling in a raft or canoe.

Briefly

Can Green Firebreaks Protect Homes From Wildfire?

Strategically-planted strips of fire-resistant vegetation show promise for mitigating the spread of fire, especially near structures in the built environment.

Known as "green firebreaks," this use of fire-resistant vegetation to protect homes from wildfires offers a stark contrast to the standard fire-mitigation practice of employing mechanical forest treatments to create fuel breaks, which focuses on removal of "all organic material."

Traditional fuel breaks present fundamental, unresolved dilemmas.

At best, removal of all organic material is a temporary solution. Seeds sprout. Plants grow. Organic material returns. To be effective, traditional fuel breaks require costly regular maintenance in perpetuity.

Also, equipment used to create traditional fuel breaks causes damaging ground disturbance, destroys native soil ecology, creates seedbeds for fire-prone invasive species, and often introduces seeds of those invasive species.

There is no silver bullet for wildfire resilience, but in most contexts, the trade-offs seem to favor green firebreaks over traditional practices.

Pasadena Deploys Wildfire Mitigation Goats

The Pasadena, California, City Council recently approved a plan to use sustainable goat grazing for wildfire mitigation in the Arroyo Seco.

Carlos Javelera of the West Pasadena Residents Association said the Association "supports the exploration and use of sustainable methods such as goat grazing in the Arroyo Seco, which has proven effective in other communities for controlling non-native growth while maintaining ecological balance."

The City Council vote authorizes a sponsorship agreement with the California Conservation Corps to assist with invasive vegetation removal and habitat restoration.

The Pasadena City Council also authorizes City Manager Miguel Márquez to accept an $84,500 donation from the One Arroyo Foundation to fund goat-grazing services. The donation will fund goat grazing as an eco-friendly tactic to control brush and invasive weeds, especially in steep or difficult terrain.

Goat grazing is proving to be an effective solution for mitigating wildfire by controlling invasive species and other readily combustible fine fuels.

More Prescribed Fire in Sequoia, Sierra National Forests

The Sierra and Sequoia national forests released a finding of no significant impact (FONSI) for the Sequoia and Sierra national forests to implement an ambitious prescribed fire project.

A Department of Agriculture press release indicates, "The project aims to reduce wildfire risk, protect communities, and restore forest health through the strategic use of prescribed fire as an active management tool."

The project area includes approximately 2.4 million acres across both forests:

- 811,000 acres on the Sequoia National Forest.
- 1.3 million acres on the Sierra National Forest.
- 328,000 acres within the Giant Sequoia National Monument.

The FONSI authorizes a significant expansion of prescribed fire operations in California. For example, the Sierra National Forest, which has historically treated 3,000–4,000 acres per year, can now implement up to 10,000 acres annually, or 50,000 acres over five years.

The decision includes land in designated wilderness areas where mechanical thinning is prohibited.

A Forest Service firefighter monitors a prescribed fire.

A slurry bomber drops aerial fire retardant during the Taylor Fire on the Coconino National Forest, Arizona (Forest Service photo by Mike Chaveas).

Dispatch

Retardant Suspected in Groundwater Pollution

During New Mexico's largest-ever wildfire — the 2022 Hermits Peak/Calf Canyon Fire, slurry bombers made nearly 2,500 retardant drops, primarily Phos-Chek, to combat the blaze. Phos-Chek s the bright red fire retardant featured on news reels to convey a visually dramatic example of agencies "doing something" to protect communities from wildfire . As FSEEE's lawsuits demonstrate, we oppose aerial fire retardant as not only ineffective, but also as detrimental to the health and resiliency of our forests and watersheds. Data collected from wells near the fire prompted New Mexico to adopt a similar stance.

Cathy Cook with the *Albuquerque Journal* reports that an independent study found heavy metals in private wells near retardant drop zones. Hired by Mora County to check post-fire water quality in 2023, Zeigler Geologic Consulting documented an abrupt increase in heavy-metal groundwater contamination in 2025. Based on a 2024 study conducted by scientists at the University of Southern California's (USC's) Department of Civil and Environmental Engineering, the Ziegler report states, "The sudden appearance of high levels of antimony and manganese in these wells and surface water sites in 2025 suggests a connection to the use of fire suppressant materials." Increases in antimony and manganese "were unexpected for the area's geology," according to Ziegler's October 2025 report.

Four of the toxic metals detected in wells in the vicinity of the burned area — antimony, arsenic, cadmium and uranium — exceeded federal safe drinking-water limits. Ziegler also documented elevated levels of manganese, barium, chromium, copper, lead, thallium, and vanadium. The discovery of toxic metals in Mora County prompted the New Mexico Environment Department to offer free private well testing within one mile of the Hermits Peak/Calf Canyon Fire, including includes parts of Mora, San Miguel, and Taos counties.

Daniel McCurry, one of the USC study's authors, said, "I think it's very, very plausible" that the spike in heavy-metal contamination is connected to the use of aerial fire retardant. Efforts to contain the 2022 Hermits Peak-Calf Canyon Fire included 2,500 retardant drops.

The 2003 Healthy Forests Restoration Act

The Healthy Forests Restoration Act of 2003 (HFRA) establishes a legal framework ostensibly designed to protect communities and watersheds from catastrophic wildfire. The legislation authorizes "hazardous fuels reduction projects" across National Forest and BLM lands. While the law's stated intentions are rooted in community safety and watershed health, it fails to incorporate a significant body of relevant science, and its implementation can produce undesired consequences that often increase wildfire risk.

A generally positive fuels-reduction tactic promoted by the law is prescribed fire. A preponderance of public lands lie in the West, and fire is a key element of ecosystems supported by these lands. After a century of misguided wildfire suppression, the Forest Service now recognizes that fire is a vital tool for restoring and maintaining healthy landscapes. But prescribed burning requires careful planning to ensure beneficial results. For example, highly combustible invasive plants like cheatgrass produce seeds that can survive fire and then outcompete native species. In such cases, fire ultimately produces a plant monoculture.

The law promotes other hazardous fuels reduction projects that seek to enhance forest health through taxpayer-subsidized logging. To promote this particular flavor of logging as a means to protect communities and watersheds is to ignore the best available science, including research by fire scientist Jack Cohen. His work demonstrates that removing vegetation further than 100 feet from a home does not protect that home from wildfire. Additionally, the U.S. Fire Administration estimates that 90% of home losses are caused by wind-borne embers rather than direct flame contact. The HFRA's focus on distant forest "treatments" misses the mark when it comes to effective community protection — i.e., hardening homes against fire.

The emphasis on forest treatments places communities at greater wildfire risk by (1) encouraging fire-prone invasive species propagation and (2) altering forest microclimates. Specifically, ground disturbance from heavy machinery frequently introduces and spreads readily combustible invasive grasses and forbs. Also, removing trees eliminates shade, creating a hotter, drier, more wind-exposed landscape. This increased risk to our communities is induced through the HFRA's financial incentives for counties and municipalities to adopt community wildfire protection plans (CWPPs).

The legislation defines CWPPs, thereby establishing parameters for these plans. These parameters are required for communities to qualify for federal and state fire-resilience funding. But because these plans tend to measure success by "acres treated," they prioritize industrial ecosystem manipulation over proven community protection measures.

A forwarder collects logs cut as part of a forest health/fire mitigation project on steep, erosion-prone slopes near the Continental Divide, San Isabel National Forest, Colorado.

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PERMIT NO. 679

P.O. Box 11615
Eugene, OR 97440
541-484-2692
fseee.org

Forest News is a publication of Forest Service Employees for Environmental Ethics. Our mission is to protect National Forests and to reform the U.S. Forest Service by advocating for environmental ethics, educating citizens, and defending whistleblowers. FSEEE is a 501(c)(3) nonprofit organization.

Forest News is printed on post-consumer, recycled paper with vegetable-based ink.

Call Your U.S. Senators!

The House of Representatives passed HR 3898, which seeks to allow toxic fire retardant to be dumped into our nation's streams and rivers. Most of our nation's drinking water comes from these water sources.

If this bill becomes law, it will dilute the Clean Water Act, allowing heavy metals and other toxins to pollute the water we drink — water that nurtures fish and wildlife — without oversight.

No one should be allowed to pollute our water with toxic aerial fire retardant. Please call your U.S. Senators today and tell them:

- **Protect our water from aerial fire retardant pollution.**
- **Oppose the PERMIT Act, HR 3898.**