Final Examination Readings
WRC 1023: Environmental Issues (Ratcliffe)
Spring 2012

1) Please write your name on this packet of readings and bring the readings to the final exam. You may underline, highlight, and annotate the readings, but you may not bring thesis statements, outlines, or drafts in any form to the final.

2) As you read, be aware that you will be writing a persuasive essay, not an informative essay. Be sure to know all sides of the issue so you can respond to the opposition.

3) You may bring a dictionary (in print form, not electronic form) to the final.

4) Please use MLA in-text citation format on the final, and verify that the MLA Works Cited page has printed out along with this packet.

5) No class time will be allotted for discussion of the readings. You may, if you wish, discuss the readings outside of class with your classmates; however, you may not discuss them with your instructor.

6) Be sure you have submitted a blank test book to your instructor (or two test books if you think you may need more than one). You will write your final essay in this test book. Your instructor will return it to you on the day of the final.

7) Your final will be in the same room where your class has been held.

8) Be sure to confirm the date and time of your final. You can check your syllabus or the ASAP home page, ask your instructor, or check the postings outside the Writing Program office (NP 1.118).
Managing Wildfires

Can they be controlled in a warming world?

By Jennifer Weeks

November 2, 2012 • Volume 22, Issue 39

Introduction

Record-setting heat and intense drought have made 2012 one of the worst wildfire seasons in a decade of intense fires. Climate change, residential development in fire-prone rural areas and the impact of past firefighting policies have combined to put many areas of the United States at risk, especially in the West. Federal agencies spend more than $2.5 billion yearly to control wildfires, and the cost is rising. Scientists widely agree that fire plays an important ecological role, and federal land managers are working to reintroduce fire in controlled settings to regenerate forests and reduce combustible brush that can cause wildfires to burn out of control. Public officials are under heavy pressure to fight fires that threaten homes, but few are willing to make homeowners bear more of the costs to protect their property. Using fire-resistant building materials and clearing brush around homes can reduce fire risks. Some advocates want to go further and ban new development in fire-prone areas.

Overview

As temperatures cool and trees change colors in autumn, millions of Americans head outdoors to hike and camp or go fishing, hunting or bird-watching. But fall is less carefree in much of the United States this year. Across Washington state, for example, after an August without measurable rainfall and the third-driest September on record, the National Weather Service warned that conditions were ideal for wildfires.

“We have not seen wildfire conditions this bad in October in a lifetime,” said Peter Goldmark, Washington's commissioner of public lands.  

With four large, uncontained wildfires burning across the state, Washington's Department of Natural Resources issued rules in early October to prevent more fires on state-managed lands: no campfires, no smoking outside of an enclosed vehicle, no target shooting except on established ranges, no chainsaw use and no operating vehicles off-road, where heat from exhaust systems could ignite dry grass.

As of late October, wildfires had burned nearly 9 million acres across the United States in 2012 — the third highest total in a decade of large and intense fires. In the 1960s about 4.5 million acres on average burned each year; from 2002 through 2011 the yearly average was 7 million acres.
"When I first started fighting fires in California in 1970, we wouldn't get too gunned up until nearly the 4th of July, and we'd go through Thanksgiving," says Tom Harbour, director of fire and aviation management for the U.S. Forest Service. "Today the wildland fire season starts in the Southeast early in the spring and may last through New Year's Day or longer in Southern California."

The Forest Service, which is part of the U.S. Department of Agriculture, manages fire on 193 million acres of national forests and grasslands. It shares this mission with other agencies that manage public lands: the National Park Service, Bureau of Land Management, Bureau of Indian Affairs and the U.S. Fish and Wildlife Service, plus state forestry managers. In recent years the Forest Service has received about 70 percent of federal funding for wildfire control.

Experts say wildfires pose a growing threat to lives, property and natural resources in many parts of the United States, due to several factors:

- Climate change is making many parts of the nation hotter and drier.
- For most of the past century federal policy called for fighting every wildfire on public lands, instead of letting smaller and more isolated outbreaks burn naturally. This strategy allowed brush and dense stands of trees to accumulate, creating huge potential fuel stocks.
- Americans are moving from cities into fire-prone rural areas, where they expect firefighters to protect their homes and property from nearby wildfires.

Impacts are most severe in Western states, which have large expanses of public wildlands. But wildfires also occur regularly in the Plains and Southeast. "Fire was a very well known historic visitor in all of our trusts and territories. We think about it the most in the West, but it was very common in the East at the time of early settlement," says Harbour.

Several multiyear droughts have worsened fire conditions in the West and central Plains states over the past decade, extending fire seasons and increasing supplies of dry fuel. With more combustible material on the ground, and more people living near wild areas, the cost of suppressing wildfires has risen from $1.1 billion in 1994 to $2.7 billion in 2011. And since agencies cannot forecast precisely how much money they will need to fight fires in an upcoming year, federal land managers must shift funds from other accounts and seek reimbursement from Congress during intense fires seasons.
Wildfire Funding Down from Peak

U.S. Forest Service and Interior Department wildfire appropriations, which fluctuate year to year depending largely on the severity of the preceding fire season, peaked in 2008 before falling sharply as congressional Republicans pushed for cuts in federal spending. Wildfire funding trended upward over the past decade following efforts by President Bill Clinton in 1990 to increase funding.

Wildland Fire Management Appropriations, 1994-2012

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“There’s a real funding crisis. Firefighting is eating up a bigger and bigger share of the Forest Service’s total budget,” says Stephen Pyne, a professor of life sciences at Arizona State University and an expert on the history of fire. “You have to respond to fires, but nobody wants to pay for them. It’s similar to health care: We pay obscene amounts of money for emergency services, but we won’t fix the system.”

Led by the National Park Service, federal land agencies have been working since the 1970s to restore fire gradually to wild lands, both through planned burns and by letting some wildfires burn themselves out under careful supervision. Scientists and land managers say fire can produce many benefits, such as thinning dense undergrowth and making room for native plant species. “It’s the best way to make forests more resilient,” says Scott Stephens, an associate professor of fire sciences at the University of California at Berkeley.

Others, including timber industry leaders and some politicians from rural areas, argue that the way to reduce fire risks is to allow more logging and grazing on overgrown public lands — an approach sometimes referred to as “active management.” In their view, laws such as the Endangered Species Act that limit logging and grazing block land managers from taking steps that would generate revenues and make adjoining communities safer.

“Fire behavior is affected by weather, terrain and fuels. Fuels are the only piece of that equation that humans can modify in a short time through active management,” Gov. C. L. “Butch” Otter, R-Idaho, wrote in an October newspaper column, noting that 1.7 million acres had burned in his state in 2012, of which 93 percent was public land. “Removing fuel by logging or grazing isn’t the answer for every acre of public land, but it should certainly be considered where it’s needed,” Otter asserted.
But environmentalists strongly oppose this approach and say today's fire hazards are partly due to decades of fire suppression — not allowing wildfires to burn. "Fire suppression has removed 'good' fire that naturally thinned forests," says Andy Stahl, executive director of Forest Service Employees for Environmental Ethics (FSEEE), a watchdog group that promotes land stewardship in the national forest system.

"From an ecological perspective, we have too little fire on the landscape. The acres burning today are a tenth of what burned before fire suppression started," Stahl contends. Moreover, he argues, many large wildfires occur on non-federal lands not subject to federal environmental laws.

Federal, state, local and tribal governments and nongovernmental organizations are working together to develop a National Cohesive Wildland Fire Management Strategy that will set priorities for managing wildfire threats and costs. Pyne calls the initiative, which Congress mandated in 2009 after years of recommendations from the U.S. Government Accountability Office, an attempt to create a "fire constitution."

"We have to redefine the political structure for making these decisions," he says.

As federal land agencies, Congress and advocacy groups debate how to manage wildfire risks, here are some issues they are considering:

**Should some wildfires be allowed to burn?**

From the early 1900s through the 1960s, federal land managers sought to suppress wildfires on public lands as soon as the fires were detected. Today the policy is different. Agencies allow some wildfires to burn, or they control them in areas near homes and people but let them progress naturally in remoter zones.

"Fire protection requires an appropriate response to wildfire — not only suppression, but also, where safe and beneficial, the use of fire for management purposes," Forest Service chief Tom Tidwell said in September.  

Yet, the Forest Service had officially suspended that policy four months earlier for the 2012 fire season, based on forecasts that the costs of fighting full-scale wildfires during this year's intense drought could exceed the agency's budget. Wildfires could be allowed to burn only with approval at a senior level, Deputy Chief James E. Hubbard instructed regional foresters and directors on May 25. "I acknowledge that this is not a desirable approach in the long run," he added. 8
**West Is Wildfire Hotspot**

Wildfires burned more than 5 million acres in Texas, New Mexico, and Arizona combined in 2011. Wildfires occur more frequently in the West but are not uncommon in the Great Plains and Southeast.

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<th>Most Acres Burned by Wildfires by State, 2011</th>
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Many observers assumed that the order sought to control costs by stamping out small burns before they could explode into mega-fires. But Tidwell asserted that the order was issued because of unusually high fire risks. “It’s not a change of policy. It’s not about saving money. It’s about recognizing the conditions we have this year,” Tidwell said in August.

Stahl of Forest Service Employees for Environmental Ethics (FSEEE) suggests another motive. “It may be a political strategy, so that if suburbs are overrun by fire, the administration can argue that it didn’t happen because of a fire that was allowed to burn,” he says. FSEEE has criticized the Forest Service for putting too much emphasis on firefighting at the expense of other missions. The group also has successfully sued the agency to force it to assess environmental impacts of firefighting tactics, such as dumping flame retardant from airplanes.

“When the Forest Service attacks a fire in a wilderness area with bulldozers, there’s no environmental review or any post hoc assessment of whether it was worth it. Those impacts are just seen as a casualty of the campaign,” Stahl says.

Many scientists are studying the ecology of various wildland areas, particularly in Western states, seeking to measure what role fire played in those zones before government agencies began suppressing wildfires. By analyzing multiple sources — including historical records, fire scarring on older trees and charcoal deposits in soil — researchers can draw conclusions about how often and how intensely different areas burned.

Stephens at the University of California-Berkeley, for example, has analyzed Forest Service records
from 1911 that describe areas in the Sierra Nevada Mountains in and around what is now Yosemite National Park. "These forests used to burn about every seven to 15 years, but now they haven't burned for something like a century," he says.

Because they were more fire-prone before they came under human management, those forests looked very different in 1911 from today, Stephens says. "In 1911 the canopy [the area where crowns of trees meet] shaded about 27 percent of the forest floor. Now it ranges between 55 and 70 percent. If we walked through those 1911 forests, we'd need hats and sunscreen," he says. "Tree diameters used to be much bigger, and stands were dominated by more oaks and ponderosa pines, which are fire-tolerant species." In his view, Americans have significantly changed U.S. forests by suppressing fires for most of the past century. Many forests are less healthy and resilient today than they were in the past, Stephens says.

But other scientists contend that limited forest thinning (logging some trees) and prescribed low-level fires — the Forest Service's general strategy up to the 2012 fire season — may not be the right way to reduce fire risks across the West. A recent study at the University of Wyoming, based on records kept by 19th-century land surveyors, concluded that large, intense fires were more the norm in many parts of the West. According to this view, which is considered a minority position among fire researchers, thinning and prescribed burns may not actually help prevent mega-fires, and they could harm ecosystems.  

Forest managers know about the study but can point to areas where thinning and low-level prescribed burns have helped save homes from wildfires. Many factors determine whether low- or high-intensity fires are more suited to a given area, including local plant and tree species, elevation, topography and moisture levels. "I have to take it all into consideration," said Linda Wadleigh, a Forest Service fire ecologist in fire-prone northern Arizona.  

Should development be limited in fire-prone areas?

Over the past 50 years, residential development has dramatically increased in zones near wild areas — the so-called wildland-urban interface (WUI). Protecting homes in the WUI is a key factor driving up firefighting costs.

Nearly 17 million new homes were built in the United States between 1990 and 2008, of which 10 million were in the WUI, according to a recent study by CoreLogic, a California-based financial research company. The report estimates that more than 740,000 homes in Western states, valued at more than $136 billion, are in areas where the risk of wildfire is high.  

Official responsibility for fire protection on non-federal lands falls to states or, if states choose not to provide protection, to local governments or private landowners. However, federal agencies are responsible for preventing fires that start on federal lands from spreading onto private or state lands. And when agencies decide how to fight wildfires, they are required to consider whether buildings or other resources are at risk. "I have to treat a fire differently when I know there are people or structures on those acres then when they are uninhabited," says the Forest Service's Harbour.

Many experts, including economists and analysts at the Government Accountability Office, say the
The federal government pays a disproportionate share of fire-management costs. States can apply to the Federal Emergency Management Agency (FEMA) for grants that pay 75 percent of the costs of fighting major fires on public or private lands. The Forest Service provides about $100 million annually in fire protection support to state and local governments. And the Healthy Forest Restoration Act of 2003 requires that at least half of federal funds for fuel treatment (removing excess grasses, trees and brush to reduce fire risks) must be used in the WUI.

Critics want to shift more responsibility to state and local governments and landowners. “People who make decisions about land use aren’t directly accountable for the costs of their actions,” says Ray Rasker, executive director of Headwaters Economics, a nonprofit research group in Montana. Analyzing firefighting data from Montana, California and Oregon, Headwaters Economics has found that protecting a single home within one to six miles of a wildfire can cost hundreds of thousands of dollars, especially if the home is in an isolated area.

“Local officials should consider issues like road access and water hookups before they permit developments in wooded areas. But if it’s next to Forest Service or BLM land, they assume costs of firefighting will be borne by the feds,” says Rasker.

The Forest Service and Interior Department co-sponsor Firewise, an education program managed by the National Fire Protection Association that encourages homeowners, community leaders, planners and developers to take steps that will reduce wildfire risks. More than 800 neighborhoods and sites in 40 states have become “Firewise Communities” by encouraging members to limit flammable vegetation near homes and use fire-resistant building materials.

However, Firewise standards are voluntary in most communities that have adopted them. California, Oregon and Utah have adopted statewide codes for construction or vegetation management in WUI zones and either require or offer incentives to local governments to enforce those standards. Elsewhere, however, WUI development is regulated at the city or county level, and policies vary widely.

Rasker agrees that Firewise upgrades can help make existing houses in fire-prone areas less vulnerable, but he says regulators should have the power to bar new construction where fire risks are very high. “Firewise isn’t fire-proofing. We don’t tell people that it’s OK to build on river flood plains as long as they put their houses on stilts,” he contends. “Firewise is the easiest conversation to have because everyone can agree on it, but encouraging people to build in fire-prone areas is dangerous.”

But property-rights advocates say the choice should be up to individuals and that development in WUI zones does not need more regulation. “People already bear the full risk of their choices, except when the Forest Service comes in and puts fires out,” says Randal O’Toole, a senior fellow with the Cato...
Institute, a Washington-based think tank that promotes libertarian views on public policy issues. “If private landowners want to build on land near forests, they should recognize that it's not the Forest Service's responsibility to protect their homes.”

**Wildfires’ Deadly Toll**

More than 300 firefighters and other personnel died battling wildfires from 1990 to 2007. Common causes of death are burnovers, in which firefighters are overrun by flames, and falling trees, vehicle accidents and heat attacks. The most deadly year for wildfires was 1989, when 78 firefighters died in fires that swept across 5 million acres in Idaho and Montana. That so-called “Big Blowup” led to heightened government efforts to extinguish wildfires, improve preventive strategies and make firefighting safer.


Most regulations governing WUI development apply only to new construction projects, and sometimes to major renovations, but not to existing homes. “Broad-based initiatives to apply newer, safer standards to existing properties are extremely rare, not only because they are generally unpopular with voters, but because they tend to be expensive,” a 2011 review of community fire protection regulations observed. 21

Ironically, surviving a raging wildfire may be the biggest motivator to adopt stricter fire regulations. Diane Paton, a Colorado Springs resident, had been considering replacing her cedar roof with a fire-resistant version last June but had not scheduled the project. Then her home was destroyed in this summer’s Waldo Canyon fire, Colorado’s most-damaging wildfire on record. It burned 392 homes, killed two people and caused $350 million in property damage. “When you see your grand piano — something so solid and big — destroyed, you can’t believe how hot this fire must have burned,” she said. 22

**Can logging reduce fire hazards?**

Timber industry representatives and many officials from rural areas have long argued that logging lowers wildfire risks by reducing the amount of combustible fuel, especially when it targets dead or damaged trees (a method called salvage logging). Currently, logging advocates are particularly concerned about widespread outbreaks of bark beetles, tiny wood-boring insects, about the size of a grain of rice, that are native across the West and periodically spread in massive outbreaks. Since 1997 bark beetles have killed or damaged millions of pine, spruce, fir and other trees over more than 41 million acres in Western states. 23
Logging advocates and many Western politicians argue that large swaths of standing dead trees will burn readily and feed wildfires. In July, after two intense wildfires, six Western Republicans introduced a bill that would let state and local land managers log damaged trees in designated “high-risk” areas even if they are federal land.\(^{24}\) “I believe that local communities know their forests best and know what needs to be done to restore them to healthy conditions,” Rep. Scott Tipton, the bill’s main sponsor, said in October.\(^ {25}\)

But Forest Service and academic scientists say the relationship between bark beetle attacks and wildfires is complex and that beetle-killed trees are not always more flammable than healthy trees. When bark beetles kill pine or spruce trees, the trees turn reddish-brown and retain their dried-out needles for one or two years. Then, three to five years after the insect attack, needles turn gray and fall to the ground. Later, dead trees begin toppling. Fire dangers vary with each of these stages, researchers say.

“One big debate in fire science is whether red needles enhance crown fires” — hot, intense fires that can spread rapidly between treetops, says University of Wisconsin zoologist Monica Turner, who has conducted extensive research on ecosystems in the Greater Yellowstone region of the northern Rocky Mountains. “Red needles are drier and more flammable than green ones, so the issue is what relative effect they have. The question is not whether beetle-killed forests will burn, it’s how much more flammable they are compared to healthy forests.”

In a 2011 study Turner and her colleagues analyzed factors that affected fire risk, such as fuel quantities, moisture levels and soil surface temperatures, in Rocky Mountain lodgepole pine forests severely affected by mountain pine beetles.\(^ {26}\) “Our results suggested that beetle kills don’t increase risks of crown fire, and in some cases they may actually reduce it by thinning out the canopies,” Turner says.
Separately, Forest Service scientists and others recently reviewed several dozen studies on bark beetle kills and wildfires and found that while beetle outbreaks increased some fire factors, the outbreaks decreased or did not affect others. Moreover, the researchers pointed out, time passage between beetle outbreaks and fire mattered because risks were different in red-needle and grey-needle phases. The scientists concluded that more study in different types of forests was needed and warned against generalizing about the relationship between beetle attacks and fire risks.  

Another longstanding controversy centers on the impacts of logging after large-scale fires. Forest managers have many concerns after fires: They want to ensure that trees will regenerate; preserve enough growth for animals and birds that return to the burned area reduce the likelihood that insects will infest fire-damaged trees; and minimize chances that the forests will burn again. They also want to recover valuable timber before it begins to rot.

President George W. Bush's administration (2001-2009) approved salvage logging after the 2002 Biscuit Fire in Oregon's Siskiyou National Forest, including in old-growth and roadless areas that previously had been protected from logging. Opponents demonstrated against the plan, and timber companies were less enthusiastic about logging in the burned areas than advocates had expected because many of the trees had been damaged by fire. 

A study later found that trees regenerated more slowly in areas that had been logged after the Biscuit Fire than in non-logged areas. Logging disturbed the soil and smothered seedlings. Another study concluded that the Biscuit Fire caused more severe damage in areas that had been logged after an earlier major wildfire, the 1987 Silver Fire, than in areas that had not been logged. 

Forest Service research suggests that the length of time since a forest last burned has more influence on the risk of future fires than post-fire logging. Fires can reach from the surface to crowns of trees if “fuel ladders” are present — fallen branches or young trees that the fire can climb. “A one-size-fits-all story of how fire behaves in the forests is not possible,” said Forest Service researcher Tom Spies, an author of the study comparing impacts from the Silver and Biscuit fires. 

*The figures are not adjusted for inflation.*
Pro/Con

Should Congress allow more logging to reduce wildfire threats?

**Pro**

From testimony before House Subcommittee on National Parks, Forests and Public Lands, July 20, 2012

Last year, our communities were victims [of] some of the largest forest fires in recorded history. The Wallow Fire grew to over 800 square miles, over just a few short weeks, charring in its wake some of the most treasured parts of our Ponderosa Pine country. The Horseshoe Fire, the Murphy Complex, the Stanley Fire and the Monument Fire blackened another 200,000-plus acres. This year’s fire season has not been any better. Over 900 fires have charred nearly 6,000 square miles in Arizona, California, Colorado, Nevada, New Mexico, Oregon and Utah. Over 50,000 of those acres are in Arizona alone.... Our ecosystems are suffocating. Where we once had 10 to 25 trees per acre, we now have hundreds. Roughly 80 million acres of forests across the West are overgrown and ripe for catastrophic wildfire, according to the [federal] Landfire multiagency database. Our forests have been mismanaged for a long time, and it is way past due to change our strategy.

The current federal system continues to prioritize fighting fires. Although the need to suppress fires is never going to go away, we must shift priority towards pro-active management.

We simply cannot afford to do otherwise.

Catastrophic wildfires are difficult to control and cost the federal government millions of dollars in immediate fire response and many millions more in restoration and rehabilitation.

**Con**

Andy Stahl
Executive Director, Forest Service Employees for Environmental Ethics.
Written for *CQ Researcher*, October 2012

Would repealing federal environmental laws to allow increased logging reduce wildfire size, intensity and home losses, as some in Congress suggest? Consider Texas. In 2011, 27,976 fires burned 3.9 million acres, destroying 2,862 homes. All of these destructive fires were on private land, where federal environmental laws do not regulate land practices. In 1991, California’s Oakland Hills Fire, the most destructive fire in dollar value of property damage in U.S. history, burned on private, municipal and state-owned land not subject to federal environmental laws. The firestorm was fueled by non-native eucalyptus trees planted after unregulated private-land logging had removed the original fire-resistant forests.

The relevant federal environmental laws — the National Environmental Policy Act, Endangered Species Act and National Forest Management Act — were enacted in the 1970s. If these laws are the cause of destructive fires or have contributed to them, one would expect few such fires in the decades preceding these laws. Not so. In 1970, the Laguna Fire in San Diego County, Calif., burned over 280,000 acres as it swept 30 miles through the Cleveland National Forest, destroying 382 homes and killing eight people. Between World War II and 1970, the Cleveland National Forest alone saw major fires in 1944, 1947, 1950, 1956, 1958, 1967 and 1969.

In every case cited above — and for every other
The Western Forestry Leadership Coalition, a state and federal government partnership, estimates the costs [of post-fire rehabilitation and restoration] are two to 30 times the reported [fire] suppression costs. Last year, the Forest Service spent a record ... $48 million on burned-area recovery work, [and] $25 million has already been spent to prepare for the immediate aftermath of this year's wildfires, putting the U.S. Forest Service on track for another possible record year of spending on burned-area recovery efforts.

Forest thinning works! In eastern Arizona, the areas that were treated as part of the White Mountain Stewardship Project, a contract designed to thin the Apache-Sitgreaves National Forest and White Mountain Apache tribal lands, and the areas managed locally by the Apache Tribe and the state of Arizona, were properly cleared. Today there are still healthy trees with burned underbrush. In the lands that were untouched by thinning practices — the majority of the U.S. Forest Service-administered land in the state — fire has left only scorched earth behind. We simply need to make ecological restoration easier.

major wildland fire — the conditions that led to the conflagration are unaffected by federal environmental laws. Firefighters throughout the world know these conditions well. They are drought and wind. Alone, drought or wind is manageable. Ignition on a windy day during damp conditions poses little catastrophic risk. Under calm conditions, fire burning through tinder-dry vegetation creeps along slowly and is easily contained. Combined, however, drought and wind create fire conditions that are deadly and uncontrollable.

Blaming destructive wildfires on environmental laws risks overlooking real policy solutions. Forest Service research shows that 90 percent of homes lost to wildland fires could have been saved by lessening flammable vegetation within 150 feet of the house and building homes with a fire-resistant design and materials. These “Firewise” policies are being adopted by local and state governments throughout the nation because they work. The federal government and Congress should support these efforts instead of seeking to use fire to burn away environmental laws that have protected our nation’s water, fish, wildlife and recreation for a generation.
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**The Washington Post**

Wildfire management: a costly oxymoron

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**Abstract (summary)**

[...]the western United States now suffers from what Marlon calls a "fire deficit. The 2003 wildfire season in California caused such a substantial increase in particulate matter, carbon monoxide and nitrous oxide that many experts now doubt that the typical advice in such situations - stay indoors - made much of a difference, since the fires polluted the air inside homes as well.

**Full Text**

The worst wildfire season in decades is not only blackening tens of thousands of acres in Western states; it is also creating significant environmental damage.

Water quality, for example, is being compromised up to 100 miles from burn sites.

Although forest fires are a natural occurrence, recent fires are more extreme, and humans can take much of the blame.

"Natural communities are adapted to routine fires," says Scott Anderson, a professor of environmental sciences at Northern Arizona University in Flagstaff. "But the catastrophic fires
that used to be uncommon are now occurring regularly. Instead of burning bark and needles, the fires are killing large, well-established trees."

And while the number of wildfires naturally varied during periods of history, the arrival of European settlers in the West brought a changed relationship between fires and the ecosystem.

In a study published this year, Yale University paleoecologist Jennifer Marlon built a comprehensive fire record for the western United States for the past 3,000 years. She found that hot, dry weather led to increased wildfire activity, while cold, wet weather suppressed fire. During the medieval warm period, for example, wildfires surged. Between 1500 and 1800, an era that researchers call the Little Ice Age, fires subsided.

That intuitive relationship, which held up for nearly three millenniums, was severed more than 150 years ago.

The arrival of settlers in large numbers in the mid-19th century led to a surge in wildfires in the West - more than would be expected given the climatic conditions. Those settlers made campfires and burned brush to clear the land for farming. Sparks from trains led to countless fires.

Eventually, human activity had an opposite effect and wildfires were suppressed. Logging and other land-use changes eliminated fuel. A few massive wildfires - including the Peshtigo wildfire of 1871, which killed between 1,200 and 2,400 people in Wisconsin and Michigan - terrified settlers.

In response, Americans embarked on a new era of active fire suppression: Railroads were required to clear trees within 100 feet of the track. The government built fire-lookout towers and cut fire roads through the forest. Eventually, modern machines, such as aircraft, were employed to put down fires wherever they sprang up.

For the first time since we learned to use fire hundreds of thousands of years ago, humans partially de-linked wildfire frequency and climate changes.

A 'fire deficit'

Although the 20th century was a relatively warm and dry period, Marlon’s study showed that until the end of the century approached, wildfire activity fell to around the levels last seen during the Little Ice Age. As a result, the western United States now suffers from what Marlon calls a "fire deficit."

"A fire deficit is a gap between how much fire you would expect to have given current levels of drought and temperature" and the amount of fire that actually takes place, she explained.

The 20th-century fire deficit has led to a complicated ecological situation for the 21st century: a massive buildup of brush, leaves and twigs - what fire experts call "understory fuels" - that can turn small wildfires into conflagrations. The warmer temperatures and altered precipitation
patterns associated with climate change can also contribute to the problem.

Big fires have big consequences, especially for air quality. A series of large wildfires in Canada in 1995, for example, created massive plumes of carbon monoxide that drifted south through Boston, New York and Washington.

The 2003 wildfire season in California caused such a substantial increase in particulate matter, carbon monoxide and nitrous oxide that many experts now doubt that the typical advice in such situations - stay indoors - made much of a difference, since the fires polluted the air inside homes as well.

Forest fires also result in large releases of sediment into rivers and streams, with effects felt as much as 100 miles from the site of the burn. Sediment can clog reservoirs and undermine the quality of drinking water.

Broader implications

In extreme cases - and there are more every year - federal wildlife managers have to rescue members of endangered and threatened species from their natural habitats.

The fire deficit also has implications for climate change - the biggest environmental issue of them all. All of the brush, wood, grass and foliage in the forests of North America makes them enormous carbon-storage facilities. Ordinary burn-and-growth cycles are carbon-neutral, but allowing a century's worth of built-up understory fuel to burn away would release massive amounts of carbon dioxide into the atmosphere.

Ironically, there was one benefit of the buildup of understory fuel: It allowed native plants to grow tall and thick, blocking sunlight from light-hungry invasive species - also introduced by humans - on the ground level. Falling leaves and brush from native plants also suppresses the growth of weeds. As a result, the Western forests have more successfully resisted the invasion of nonnative plants than most other areas.

This presents a conundrum for fire management officials. For the past couple of decades, they have started controlled fires to burn away the excess fuel and prevent catastrophic wildfires. In the late 1990s, however, officials called off controlled burns in parts of California after noticing the alarmingly rapid growth of cheatgrass, an invasive weed. Officials now have to balance between the risk of destructive wildfires and the effects of invasive plants.

The upshot is that wildfire management is another example of the false hope of returning to a state of nature. The Western forests, in a sense, are a perfect manifestation of the famous but apocryphal Pottery Barn rule: "You break it, you own it."

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Otter says no logging puts state at risk; Idaho governor tells Congress lack of logging increases chance of devastating wildfire

Lewiston Morning Tribune (ID) - Wednesday, February 29, 2012

Author: Sean Cockerham

WASHINGTON - Idaho is at big risk for a catastrophic wildfire because of the lack of logging, Gov. C.L. (Butch) Otter told members of Congress on Tuesday.

Otter said a disaster along the lines of the devastating 1910 wildfires could be coming, as the trees that came in after those fires are reaching the end of their natural life. That leaves plenty of decaying material on federal lands to burn.

"We've got a devastating fire coming at us ... because of natural death of that forest and its coming at us," Otter told a group of sympathetic Republican lawmakers from the West who are members of the Congressional Western Caucus on Capitol Hill.

Idaho Republican Rep. Raul Labrador, a member of the caucus, agreed with Otter. "Eventually it's going to catch fire and it's going to be devastating to Idaho and to the American economy," Labrador said.

The 1910 fires, also known as the Big Burn, scorched about 3 million acres in Idaho, Montana and Washington.

Labrador and Otter want the state to take over management of federal timberlands. But both Idaho environmentalists and the timber industry say the federal government is working with them in collaborative efforts to manage Idaho's forests and reduce the fire risk.

The Forest Service has recognized that targeted logging near developed areas is helpful, said Bill Higgins, the resource manager of the Idaho Forest Group in Grangeville, one of the larger timber companies in the state.

"We are behind but we are starting to see a change in course to more active forest management," Higgins said in a Tuesday interview.

Higgins said fire suppression efforts for the past 50 years, as well as lack of thinning from timber harvest, does increase the risk of a big, uncontrolled fire.

Idaho Conservation League Executive Director Rick Johnson agreed there is a fire risk, but said it's a huge oversimplification to suggest logging will fix that. The Wilderness Society responded to the criticism at Tuesday's Western Caucus hearing by noting the Forest Service last month announced Idaho would receive $5.7 million for three efforts to improve the health of national forests.

Johnson criticized Tuesday's event and said cooperative efforts involving the federal government, the timber industry, environmentalists, local officials and others are better than what he called anti-federal "theater" and the state trying to manage federal lands.

"The state has different goals, whether it is cutting more trees or providing more jobs or what have you. It's different than the longer term, bigger, higher-profile goals of the federal
government - protecting watersheds, long-term recreation opportunities, wildlife habitat," Johnson said.

Otter told the Congressional Western Caucus on Tuesday that Idaho is unfairly treated among states because the federal government owns 63 percent of all lands in Idaho and manages nearly three-quarters of the forests.

"I'd hope there would be some discussion of letting the states be the stewards and reap benefits for local schools and communities off those forests," Otter said.

It's become an issue in the presidential campaign. Republican candidates Rick Santorum and Ron Paul proposed selling or transferring federal lands such as national forests to private interests or to the state. Presidential hopeful Mitt Romney proposed transferring management of national forests to states to increase the revenues they generate.

Labrador said Tuesday that he's pushing a measure aimed at trying to allow Idaho to take over management of federal timberlands.
Climate Change to Alter Global Fire Risk

ScienceDaily (June 12, 2012) — Climate change is widely expected to disrupt future fire patterns around the world, with some regions, such as the western United States, seeing more frequent fires within the next 30 years, according to a new analysis led by researchers at the University of California, Berkeley, in collaboration with an international team of scientists.

By the end of the century, almost all of North America and most of Europe is projected to see a jump in the frequency of wildfires, primarily because of increasing temperature trends. At the same time, fire activity could actually decrease around equatorial regions, particularly among the tropical rainforests, because of increased rainfall.

The study, published June 12 in *Ecosphere*, an open-access, peer-reviewed journal of the Ecological Society of America, used 16 different climate change models to generate what the researchers said is one of the most comprehensive projections to date of how climate change might affect global fire patterns.

"In the long run, we found what most fear -- increasing fire activity across large parts of the planet," said study lead author Max Moritz, fire specialist in UC Cooperative Extension. "But the speed and extent to which some of these changes may happen is surprising."

"These abrupt changes in fire patterns not only affect people's livelihoods," Moritz added, "but they add stress to native plants and animals that are already struggling to adapt to habitat loss."

The projections emphasize how important it is for experts in conservation and urban development to include fire in long-term planning and risk analysis, added Moritz, who is based at UC Berkeley's College of Natural Resources.

UC Berkeley researchers worked with an atmospheric scientist from Texas Tech University to combine over a decade of satellite-based fire records with historical climate observations and model simulations of future change. The authors documented gradients between fire-prone and fire-free areas of Earth, and quantified the environmental factors responsible for these patterns. They then used...
these relationships to simulate how future climate change would drive future fire activity through the coming century as projected by a range of global climate models.

"Most of the previous wildfire projection studies focused on specific regions of the world, or relied upon only a handful of climate models," said study co-author Katharine Hayhoe, associate professor and director of the Climate Science Center at Texas Tech University. "Our study is unique in that we build a forecast for fire based upon consistent projections across 16 different climate models combined with satellite data, which gives a global perspective on recent fire patterns and their relationship to climate."

The fire models in this study are based on climate averages that include mean annual precipitation and mean temperature of the warmest month. These variables tend to control long-term biomass productivity and how flammable that fuel can get during the fire season, the researchers said.

Variables that reflect more ephemeral fluctuations in climate, such as annual rainfall shifts due to El Niño cycles, were not included because they vary over shorter periods of time, and future climate projections are only considered representative for averages over time periods of 20-30 years or longer, the authors said.

The study found that the greatest disagreements among models occur for the next few decades, with uncertainty across more than half the planet about whether fire activity will increase or decrease. However, some areas of the world, such as the western United States, show a high level of agreement in climate models both near-term and long-term, resulting in a stronger conclusion that those regions should brace themselves for more fire.

"When many different models paint the same picture, that gives us confidence that the results of our study reflect a robust fire frequency projection for that region," said Hayhoe. "What is clear is that the choices we are making as a society right now and in the next few decades will determine what Earth’s climate will look like over this century and beyond."

"We need to learn how to coexist with fire," said Moritz.

Study co-author David Ganz, who was director of forest carbon science at The Nature Conservancy at the time of the study, noted the significance of the findings for populations that rely upon fire-sensitive ecosystems.

"In Southeast Asia alone, there are millions of people that depend on forested ecosystems for their livelihoods," he said. "Knowing how climate and fire interact are important factors that one needs to consider when managing landscapes to maintain these ecosystem goods and services."

The researchers noted that the models they developed focused on fire frequencies, and that linking these to other models of fire intensity and vegetation change are important next steps.

The Natural Sciences and Engineering Research Council of Canada, the U.S. Forest Service, the National Science Foundation and The Nature Conservancy helped support this study.

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Reflections on 50 Years of Burning in The Nature Conservancy

Blane Heumann

April 26th, 2012

Blane Heumann is The Nature Conservancy’s director of fire management. He’s worked for the Conservancy for 20 years, and he has been pursuing excellence in burning for conservation for the past 27 years.

On April 26, 1962, at the Helen Allison Savanna Preserve north of Minneapolis, Dr. Don Lawrence set out to do what never had been done before in The Nature Conservancy: he was going to burn nature to save it.

After many months of planning and collaboration with other conservationists, Dr. Lawrence led a team that took a match to the preserve, sending flames sweeping across 20 acres of grasses and oak woodlands in a “controlled burn.” It was hoped that restoring fire to the preserve would help the prairie grasses and wildflowers to recover, and drive back invading hardwood brush that was degrading conditions for birds and other wildlife.

The Conservancy’s first controlled burn, taken April 26, 1962, at Helen Allison Savanna Preserve by Dr. Don Lawrence.

A life-long conservationist and a professor of botany and ecology, Dr. Lawrence advised the Conservancy on scientific matters and helped raise funds to protect special places in Minnesota, including Helen Allison Savanna. Dr. Lawrence was part of a small network of biologists in the Midwest who were among the first to notice that our country’s decades-old practice of putting out nearly all fires was leading to dramatic changes on many of our lands. Certain plant species were struggling to survive, or even disappearing, and Dr. Lawrence surmised that burning might just turn things around.

A radical concept? Not really.

For millions of years fire had shaped America’s forests and grasslands, to the point where many of our landscapes came to depend on fire almost as much as they depended on water.

Dr. Lawrence knew his natural history and sought to bring this natural process back to the preserve. In doing so he pioneered a cost effective land restoration tool that is safely and methodically applied across Conservancy lands today. Just last year we applied controlled burns to 130,000 acres of conservation lands.

What’s more, the use of fire as a conservation tool is needed today more than ever; the USDA Forest Service believes that nearly 82 million acres of National Forest System lands are in need of restoration. Adding in other federal, state, private and tribal lands, the Conservancy further estimates the restoration backlog is around 120 million acres (an area the size of California and West Virginia combined).

Keeping our forests and prairies healthy is essential. Forests provide half our nation’s water supply, support more than million jobs in the wood products industry and generate $14.5 billion annually in
recreation income for surrounding communities. Our prairies are among the most endangered habitats in the U.S. and around the world, and support the majority of U.S. beef production.

Since 1988 the Conservancy has burned more than 1.5 million acres in more than 1,000 different places in an effort to spur the growth of native plants and wildlife, and reduce the spread of foreign invasive species. Some of our most notable results include:

Increasing the number of endangered red-cockaded woodpeckers at longleaf pine forests in the Southeast; restoring hundreds of highly diverse prairie grasslands throughout the Great Plains, from small nature reserves within the urban landscapes of Chicago to vast rolling ranch landscapes of Oklahoma and Kansas; and enhancing and restoring coastal habitats in Florida and Texas, improving critical habitat for the endangered Florida Scrub Jay and in Texas the Attwater’s prairie chicken.

Controlled burns also offer very real safety benefits for people. Today many of our forests in the West, for example, are choked with brush and an overabundance of small trees. These unhealthy conditions fuel unnaturally severe fires that threaten forests and people alike. By cutting and removing woody fire fuel and with controlled burning, we can reduce the impacts of dangerous “mega-fires.” (Unfortunately these extremely dangerous and damaging fires have become more common in the last decade).

Dr. Lawrence designed that first controlled burn as an experiment to test the effects of different frequencies of fire on the plants and wildlife. Our staff has maintained this tradition of learning from our fire work, and practitioners regularly exchange knowledge within the Conservancy, with our peers in local, state and federal agencies, and with private landowners. Staff from The Nature Conservancy also helps train agency and other partners in how to achieve good ecological outcomes using fire, which really is the Conservancy’s specialty.

Over the past 10 years much of this learning and training has been accomplished with help from the Fire Learning Network, a cooperative program of the Forest Service, Department of the Interior agencies — Bureau of Indian Affairs, Bureau of Land Management, Fish and Wildlife Service and National Park Service — and The Nature Conservancy. The partnership has a 10-year proven track record of helping to restore our nation’s forests and grasslands and to make communities safer from fire.

But a visit to the Helen Allison Savanna today is all one needs to be convinced of the effectiveness of applying controlled burns to restore forests and grasslands. Fifty years after Dr. Lawrence’s first burn, the preserve is a pleasant rolling landscape of high grasses mixed with oak trees, eerily like the mixed savanna-woodlands where humans first evolved in Africa. This may not be a coincidence — because it is believed early humans likely used fire to kick-start the growth of new grasses to attract prey species.

So, while Dr. Lawrence was not the first person to use fire to restore a natural landscape, he certainly was a pioneer within the Conservancy.
Works Cited


