



Wildland Fire Use: An Essential Fire Management Tool

Key Points

- Federal land agencies' ongoing fire suppression policy has created a situation in which a number of the nation's forests have become dangerously overgrown, producing increasingly intense fires and escalating suppression costs.
- Wildland Fire Use (WFU) — using naturally-burning fires in designated, remote sections of forests — is widely accepted by scientists, policymakers and land managers as an important tool for helping to restore forest health and mitigating the escalating costs of fire suppression.
- Good fire management often involves a mix of approaches, from full suppression action to WFU; managers must follow a complex series of steps when they make the choice to allow a fire to burn in a given area.
- Before WFU can be expanded, Congress must reform incentive structures and institutional pressures that encourage unnecessary fire suppression; the public must also be educated about the ecological benefits of fire.

Background

In the 1930s, the U.S. Forest Service directed firefighters to extinguish all blazes by 10 a.m. the day after their ignition. The assumption that all wildfire should be aggressively suppressed persists in public land management today; with well-trained, well-funded professional firefighters and new technology like aerial assaults and flame retardants, our fire-fighting force succeeds in suppressing over 99 percent of all wildland fires during initial attack.¹



PHOTO BY KARI K. BROWN

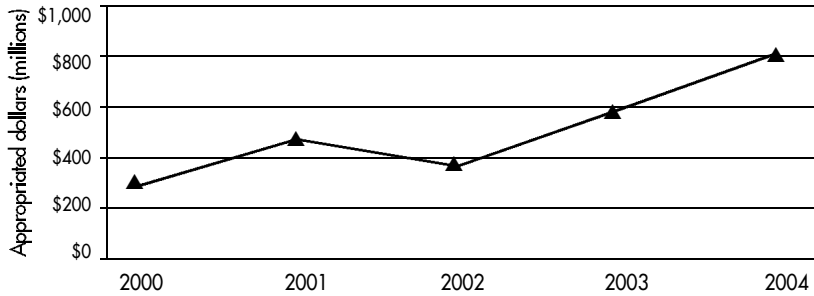
If allowed to burn freely, frequent low intensity fires maintain an open understory and prevent the build-up of excessive fuel that can feed unnaturally intense wildland fire.

Ironically though, the absence of fire has allowed the unnatural growth of dense vegetation in some forests, resulting in more intense fires that require ever more aggressive attack. The increasing number of homes in and adjacent to wildlands also adds to the demand for aggressive fire suppression. The result is a fire management system facing unhealthy, fire-dependent forests and ballooning costs: in 2003, the National Interagency Fire Center reported that the federal government spent \$1.6 billion fighting fires on 6.9 million acres, or an average of \$231/acre (Figure 1).

It is clear now that the Forest Service's early suppression policies were based on a misguided set of assumptions, and scientists and land managers now recognize the dire unintended consequences of indiscriminate suppression. Even so, the default response to fires, even those

¹ 2002. USDA & DOI. FY 2002 Performance Report: National Fire Plan.

FIGURE 1.
Federal Funding for Fire Suppression 2000-2004



The cost to taxpayers from funding wildfire suppression has increased dramatically in recent years.

burning in the most remote areas, is to fight them.

There is a better way. Today, increasing numbers of fire experts, recognizing the important role fire plays in many ecosystems, have begun to advocate the idea that some fires should be allowed to burn. Recent federal policy initiatives, including the National Fire Plan, the 10-year Comprehensive Strategy, the Federal Wildland Fire Policy and the Healthy Forests Restoration Act, have endorsed the use of fire to improve ecosystem health. By carefully choosing which fires to fight and which to monitor as they burn naturally in remote terrain, fire managers can reduce suppression costs while maintaining natural fire regimes in fire-

dependent ecosystems. This practice is officially called Wildland Fire Use for Resource Benefit — or, more simply, Wildland Fire Use (WFU).

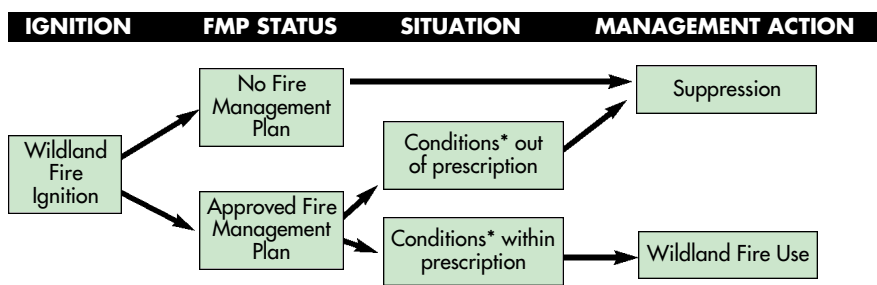
This Science and Policy Brief examines the benefits associated with Wildland Fire Use and explores the challenges that policy makers and land managers face when making the decision to use wildland fire to help restore forest health.

What is Wildland Fire Use?

The National Fire Plan defines Wildland Fire Use as “a naturally ignited wildland fire managed to accomplish specific pre-stated resource management objectives in predefined geographic areas outlined in Fire Management Plans”² — in other words, using naturally-burning fires in specific, remote sections of forests for the purposes of ecological health. WFU is considered appropriate in many designated wilderness areas, large national parks, roadless areas, and other remote wildlands where a naturally ignited fire may safely be used to improve forest health. Resource benefits associated with WFU include improved long-term watershed conditions, enhanced wildlife habitat and more resilient forested ecosystems.

When a fire starts on public land, federal policy requires that managers follow a complex series of decisions (Figure 2). Before a manager can even consider WFU in a given area, the area must have a Fire Management Plan (FMP) — a planning document that provides guidance for all fire-related management activities in that area. Without an FMP, all fire must be suppressed. Even with a plan authorizing the use of fire, however, weather conditions, personnel availability, and other variables must be considered before a manager can make a decision to manage a wildland fire in the interest of forest health. Once the initial decision is made, fire managers must constantly

FIGURE 2.
Decision Tree for Management Response to Wildland Fire



Fire managers cannot decide to manage an ignition with Wildland Fire Use unless several environmental conditions are met and a Fire Management Plan has been approved.

* Conditions include: location, winds, temperature, fire perimeter.

² National Fire Plan glossary of terms: www.fireplan.gov/resources/glossary/w.html

monitor and re-assess conditions to see if the fire moves from the designated WFU zone into higher-risk locations. At that point, suppression will be ordered.

Identifying locations where the use of fire might be appropriate requires detailed scientific and spatial analyses. Remote tracts of land large enough for fire to safely perform its ecological function are best; even in those areas, however, forest conditions, weather and wind factors may preclude the safe use of fire. WFU is only appropriate where the results of fire are likely to produce resource *benefits*. Generally, this requires a determination that fire behavior will be natural or historically typical for the location.

While Figure 2 suggests that fire managers make a straightforward choice between either suppression or WFU, the reality is more complex. Good fire management often involves a mix of approaches, and the many potential responses to fire are better conceptualized as a continuum (Figure 3). At one extreme, full suppression action may be immediately ordered for a fire that threatens homes or “critical resource values” such as water quality, air quality or endangered species habitat (or occurs in a unit that lacks a Fire Management Plan). At the other extreme, fire managers may choose to manage a very remote fire with zero interference, although even in that situation ongoing monitoring allows them to ensure the fire remains safe and within its prescription. In the middle of the continuum, fires may be contained along predetermined boundaries but not aggressively suppressed within them.

Indeed, a single fire may be managed differently in different locations, with suppression to protect structures on one flank, for example, while another more remote edge of the fire is permitted to burn for resource benefit. In this continuum of choices, WFU is an invaluable tool

FIGURE 3.

Management Responses to Wildland Fire



This figure illustrates the continuum of the choices available to fire managers, ranging from monitoring to full fire suppression.

at land managers’ disposal when considered as part of a comprehensive approach that also includes fuels management, community protection and suppression.

Benefits of Wildland Fire Use

Ecological Benefits

Ecologists and fire experts unanimously agree that fire has served an essential role in certain ecosystems for millennia. The ecological benefits of fire include: the creation of critical wildlife habitat in standing dead trees, increased nutrients and productivity in soil systems when burned material decomposes, improved conditions for surviving old growth trees when a surface fire moves through a system, and the regeneration of some fire dependent trees like lodgepole pine (*Pinus contorta*). Fire also increases availability of other fundamental building blocks of ecosystems such as moisture and sunshine by opening up the canopy and returning nutrients to the soil. Natural fire cycles maintain the diversity of habitats available to all the species in the ecosystem, from wildlife to wildflowers to fungi.

Environmental Costs Avoided

WFU can also mitigate the negative environmental impacts associated with fire suppression. A forest dense with an unnatural build-up of surface and ladder fuels may be at increased risk for unnaturally severe fire when suppression fails. The chemical retardants, bulldozed fire lines, and other heavy-handed tactics associated with unnecessary fire suppression³ can harm wildlife habitat, water

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A single fire may be managed differently in different locations, with suppression to protect structures on one flank, while a more remote edge of the fire is permitted to burn for resource benefit.
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³ In 2000, over 120 miles of fire lines were bulldozed in an attempt to control the Jasper Fire on the Black Hills National Forest, in spite of having more than 500 miles of existing road within the 84,000 acre fire boundary (Forest Service, 2000. Jasper Fire Rapid Assessment).

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quality and air quality.⁴ Increased use of fire as a management tool will help reduce those negative impacts of fire suppression, while improving ecological conditions in the forests where fires are allowed to burn.

Suppression Costs Avoided

Fire suppression is extremely expensive, and the potential for reducing those costs through increased WFU is substantial. In 2003, the National Interagency Fire Center reported that WFU fires cost an average of just \$43/acre to manage, a fraction of the \$150-250/acre average suppression cost.⁵ In the aggregate, the cost numbers are also striking: one northern Idaho forest estimates that it saved a

minimum of \$25 million by “employing less than full control suppression strategies” on a number of blazes over the course of the 2003 fire season.⁶

Managing some fires to improve forest health thus has the potential to save significant taxpayer money in the immediate future.

Unnecessary fire suppression, by fostering the development of higher fuel loads, can be expected to generate even higher firefighting costs in the long term. These costs are not only monetary ones: as firefighting becomes more difficult, it also becomes more dangerous; the loss of life is indeed the gravest cost of suppression.

In addition to these direct costs, the opportunity costs of fire suppression are high: when scarce dollars are spent on suppression, other land management and fire planning needs go unmet. The Forest Service regularly spends its allocated suppression dollars well before the fire season is over. Congress then directs the agency to “borrow” needed funds for suppression from other fire and forest management programs. Money that is borrowed from other programs such as recreation and wildlife protection is rarely repaid in full, resulting in disrupted projects and a backlog of essential work on public lands.⁷

Perhaps most significantly, the money borrowed for suppression all too often comes from budgets earmarked for fuels reduction work in unnaturally dense forests to reduce future fire risk. Investigators at the GAO note that this spending pattern has mired agencies responsible for managing public land in a cycle of



PHOTO BY JOHN CARR

The use of fire to reduce fine fuels and ground vegetation helps to maintain forest health and reduces the risk of more extreme fire behavior.

⁴ While research on the ecological effects of fire retardant chemicals is still in its infancy, preliminary results suggest widespread negative impacts. For example, see www.enn.com/news/enn-stories/2000/08/08112000/firechemicals_30424.asp

⁵ <http://www.nifc.gov/stats/index.html>

⁶ Clearwater/Nez Perce Fire Zone. October 2003. 2003 Fire Season Summary Report (Draft).

⁷ The Forest Service has a growing backlog of campgrounds and trails that need maintenance and monitoring. For example, Colorado’s Routt National Forest has an \$11 million backlog of recreational infrastructure needs.

reacting to fire, rather than *proactively* managing fire.⁸

Increased WFU offers an alternative to this expensive spiral, avoiding both the high short-term costs of suppression and its long-term consequences.

Treatment Costs Avoided

Using mechanical thinning and prescribed fire to treat fuels prior to fires is also extremely expensive. While funding for this work has increased, the cost of treating acres still far exceeds budgetary allocations. Costs for reducing fuels vary widely, depending on the method and location of the treatment, the type of forest, the size of the project, and the way costs are calculated; recent estimates go as high as \$1,200/acre,⁹ and estimates of the amount of federal land in need of treatment have been as high as 90-200 million acres.¹⁰

In addition to direct treatment costs, treated acres will need ongoing and indefinite maintenance to keep fuels low. Congressional appropriations for fuel treatment have already reached \$400 million; treatment needs can be expected to increase with continued fire suppression. WFU can help prevent fuel build-up over large areas, reducing the need for expensive fuel treatments in the future.

Challenges to Increased WFU

Inadequate Fire Management Plans

Fire Management Plans (FMPs) provide the strategic foundation for all fire-related management activities and are required by federal policy for every acre with burnable vegetation. An FMP is produced in a pre-crisis environment,



PHOTO BY CHRIS FIGENSHAU

and as such provides well-reasoned and comprehensive direction during the oftentimes frenetic atmosphere of a wildland fire.

After an especially bad fire season in 1994, federal land management agencies conducted a systemic evaluation of federal fire policy and practice. The resultant 1995 Federal Wildland Fire Management Policy and Program Review called on land managers to better integrate fire planning into overall forest management and concluded that FMPs were critical to ensuring sound fire management. A 2001 update to this policy reminded agencies that "FMPs that implement Federal Fire Policy must be completed *as soon as possible*" (emphasis added). Despite this strong policy direction, however, many units have failed to complete adequate FMPs.

Estimates of the degree to which the Forest Service and the Bureau of Land Management have complied with FMP

Prescribed burn in Alaska. Fire has served an essential role in certain ecosystems for millennia.

Managers have long used prescribed fire for forest health benefit. The challenge now is to expand the use of wildland fire.

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⁸ Wildfire Suppression: Funding Transfers Cause Project Cancellations and Delays, Strained Relationships, and Management Disruptions, GAO-04-612. June 2004.

⁹ Lynch, Dennis L. & Kurt Mackes. 2003. Costs for Reducing Fuels in Colorado Forest Restoration Projects. USDA FS Proceedings RMRS-P-29; also, Wildland Fire Management: Additional Actions Required to Better Identify and Prioritized Land Needing Fuels Reduction, GAO-03-805. August 2003.

¹⁰ GAO-03-805 (see above).



PHOTO BY KARI K. BROWN

Natural fire regimes create a diverse mosaic of patches across the landscape. The vagaries of topography and fuel moisture work in unison to enhance ecosystem heterogeneity, benefiting a wide variety of wildlife species.

planning requirements vary considerably. The 2001 Policy makes clear that while FMPs can and should consider WFU for remote tracts of forest, all fires that occur in areas that *lack* compliant FMPs “must be suppressed.” This means that units that haven’t completed their FMPs are forced to respond to every fire with expensive suppression action.

For WFU to be expanded, land managers must devote substantial time and resources to updating their FMP analyses, making safety considerations their highest

priority, working collaboratively with local stakeholders, and using the best available science to determine ecologically-appropriate, site-specific responses to fire in their forests.

Lack of Institutional Support

Land management agencies are required as part of their budget and appropriation processes to report annually on a series of “performance measures” designed to improve agency accountability, strengthen data collection and provide planners with clear targets for their work. Because of the increasing emphasis on hazardous fuels reduction work after the severe fires of recent years, one of these performance measures now encourages agencies to treat a high number of acres. At one time, units that successfully managed a wildland fire for

resource benefit were permitted to report those burned acres as “treated,” thereby creating a powerful incentive for the use of fire as a management tool. Recently, however, the Office of Management and Budget rescinded that regulation, and while agencies are still required to report their use of fire, WFU no longer counts as a measure of agency performance. If the agency is to be encouraged to use fire productively, then policies like this one must be reformed.

Other institutional challenges exist. For example, when a fire is managed as WFU, any damage that results is ineligible for federal Burned Area Emergency Rehabilitation (BAER) funds. Thus, fire managers concerned about possible short-term impacts from a blaze that is not immediately suppressed, including erosion and poor water quality, might be hesitant to consider WFU in an area knowing that no “clean-up” funds will be forthcoming.

In addition, state permitting requirements that are designed to minimize short-term declines in air quality during fires can also discourage WFU. Recently, an interagency group of experts has been working on a set of air quality protocols specifically geared to reduce restrictions on burning, both prescribed and wild.¹¹

Even when a forest unit has done the necessary planning and a wildfire erupts in a designated WFU zone, too often the required qualified agency personnel are unavailable. Without a Fire Behavior Analyst on site, for example, an agency cannot proceed with a WFU management decision. Finally, the complexity of decision-tree protocols and paperwork requirements for WFU can be daunting for fire managers operating in a short time window. Choosing a suppression response is so well-charted and relatively straightforward that it is naturally

¹¹ DOI, USDA, et. al. Finding Solutions Together: Wildland Fire Use & Air Quality. June 2004.

appealing, especially for managers without significant WFU experience on the fire line.

The bottom line: if land management agencies want their fire line officers to consider using fire, they must match that ideal with professional incentive structures and qualified personnel.

Lack of Public Support

People, particularly those who live within forested landscapes, are understandably fearful of fire. Prescribed fire, long used for treating fuels following logging, now frequently meets with local opposition because communities fear the fire's escape from its managed boundaries. Concerns about smoke and compromised air quality also contribute to public reluctance to embrace fire. Images of scarred forests and hillsides denuded from severe fires make their way into the

mainstream media and powerfully shape public opinion. Indeed, the short-term effects of fire tend to be seen as quite damaging to the ecosystem. But what may seem devastating in the short term is often part of the long-term healing process.

If naturally-ignited fire is to see more frequent use as a management tool, the public will have to understand the role of fire in local forests more clearly. The media has an important role to play here, as it can help shape public perception of fire. A rise in public appreciation of the ecosystem benefits associated with wildland fire should be considered a goal in and of itself, to help alleviate the fear that currently shapes the public dialogue. This, in turn, will further increase public support for the use of fire, both prescribed and wild, in forest management.

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Looking Ahead

- Land management agencies must complete high-quality Fire Management Plans for every "burnable acre."
- Agencies must revisit existing institutional incentive structures that indirectly discourage fire managers from considering using fire for resource benefit.
- Fire officers must be trained about the importance of WFU and made comfortable with its implementation in appropriate locations.
- The public must be educated about the ecological benefits of fire.

Suggested Reading

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