

September 2009

WILDLAND FIRE MANAGEMENT

Federal Agencies
Have Taken Important
Steps Forward, but
Additional, Strategic
Action Is Needed to
Capitalize on Those
Steps



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Highlights of [GAO-09-877](#), a report to congressional addressees

Why GAO Did This Study

The nation's wildland fire problems have worsened dramatically over the past decade, with more than a doubling of average annual acreage burned and federal appropriations for wildland fire management. The deteriorating fire situation has led the agencies responsible for managing wildland fires on federal lands—the Forest Service in the Department of Agriculture and four agencies in the Department of the Interior—to reassess how they respond to wildland fire and to take steps to improve their fire management programs. GAO reviewed (1) progress the agencies have made in managing wildland fire and (2) key actions GAO previously recommended and believes are still necessary to improve wildland fire management. GAO reviewed previous GAO reports and agency documents and interviewed agency officials. GAO prepared this report under the Comptroller General's authority to conduct evaluations on his own initiative.

What GAO Recommends

GAO is making no new recommendations at this time. The agencies have generally agreed with GAO's previous recommendations but have yet to implement several key recommendations GAO believes could, if implemented, substantially assist them in capitalizing on the important progress they have made to date. In commenting on a draft of this report, both the Forest Service and the Department of the Interior generally agreed with its findings.

View [GAO-09-877](#) or [key components](#). For more information, contact Robin Nazzaro at (202) 512-3841 or nazzaror@gao.gov.

WILDLAND FIRE MANAGEMENT

Federal Agencies Have Taken Important Steps Forward, but Additional, Strategic Action Is Needed to Capitalize on Those Steps

What GAO Found

The Forest Service and the Interior agencies have improved their understanding of wildland fire's ecological role on the landscape and have taken important steps toward enhancing their ability to cost-effectively protect communities and resources by seeking to (1) make communities and resources less susceptible to being damaged by wildland fire and (2) respond to fire so as to protect communities and important resources at risk but to also consider both the cost and long-term effects of that response. To help them do so, the agencies in recent years have reduced hazardous fuels, in an effort to keep wildland fires from spreading into the wildland-urban interface and to help protect important resources by lessening a fire's intensity; sponsored efforts to educate homeowners about steps they can take to protect their homes from wildland fire; and provided grants to help homeowners carry out these steps. The agencies have also made improvements that lay important groundwork for enhancing their response to wildland fire, including adopting new guidance on how managers in the field are to select firefighting strategies, improving the analytical tools that assist managers in selecting a strategy, and improving how they acquire and use expensive firefighting assets.

Despite the agencies' efforts, much work remains. GAO has recommended several key actions—including development of an overarching fire management strategy—that, if completed, would substantially improve the agencies' management of wildland fire. Nonetheless, the agencies have yet to:

- Develop a cohesive strategy laying out various potential approaches for addressing the growing wildland fire threat, estimated costs associated with each approach, and the trade-offs involved. Such information would help the agencies and Congress make fundamental decisions about an effective and affordable approach to responding to fires.
- Establish a cost-containment strategy that clarifies the importance of containing costs relative to other, often-competing objectives. Without such clarification, GAO believes managers in the field lack a clear understanding of the relative importance that the agencies' leadership places on containing costs and are therefore likely to continue to select firefighting strategies without duly considering the costs of suppression.
- Clarify financial responsibilities for fires that cross federal, state, and local jurisdictions. Unless the financial responsibilities for multijurisdictional fires are clarified, concerns that the existing framework insulates nonfederal entities from the cost of protecting the wildland-urban interface—and that the federal government would therefore continue to bear more than its share of the cost—are unlikely to be addressed.
- Take action to mitigate the effects of rising fire costs on other agency programs. The sharply rising costs of managing wildland fires have led the agencies to transfer funds from other programs to help pay for fire suppression, disrupting or delaying activities in these other programs. Better methods of predicting needed suppression funding could reduce the need to transfer funds from other programs.

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Abbreviation

FPA fire program analysis

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United States Government Accountability Office
Washington, DC 20548

September 9, 2009

Congressional Addressees

The nation's wildland fire problems have worsened dramatically over the past decade, threatening communities as well as important natural and cultural resources. Both the average acreage burned annually and federal appropriations for wildland fire management activities have more than doubled, with appropriations reaching more than \$2.9 billion annually, on average, during fiscal years 2001 through 2007. State and local governments have likewise spent hundreds of millions of dollars to suppress fires during severe fire years. A number of factors have contributed to these increases. Uncharacteristically dense, continuous accumulations of vegetation, due in part to past fire suppression policies and land management practices, and severe regional weather and drought have led to higher-intensity fires and longer fire seasons. At the same time, continued development in and near wildlands, an area often called the wildland-urban interface, has placed more homes at risk. Five federal agencies—the Forest Service within the Department of Agriculture and the Bureau of Indian Affairs, Bureau of Land Management, Fish and Wildlife Service, and National Park Service within the Department of the Interior—are responsible for managing wildland fires on federal lands. State forestry agencies and other entities—including tribal, county, city, and rural fire departments—have primary responsibility for managing wildland fires on nonfederal lands and share responsibility for protecting homes and other private structures.

A series of damaging wildland fires in the 1990s led the Forest Service and the Interior agencies to reassess their approach to managing fire. It also prompted a sustained effort, known as the National Fire Plan,¹ on the part of the federal agencies and Congress to improve fire suppression capabilities, reduce potentially hazardous vegetation that can fuel wildland fires, restore fire-adapted ecosystems, and help communities better

¹The National Fire Plan is a joint interagency effort to respond to wildland fires. Its core comprises several strategic documents, including (1) a September 2000 report from the Secretaries of Agriculture and the Interior to the President in response to the wildland fires of 2000; (2) congressional direction accompanying substantial new appropriations for fire management for fiscal year 2001; and (3) several strategies and plans to implement all or parts of the plan. See GAO, *The National Fire Plan: Federal Agencies Are Not Organized to Effectively and Efficiently Implement the Plan*, [GAO-01-1022T](#) (Washington, D.C.: July 31, 2001).

withstand wildland fire. Growing recognition of the long-term fiscal challenges facing the nation has also led Congress, the agencies, and others to focus on ensuring that federal wildland fire activities are appropriate and carried out in a cost-effective manner. Over the last decade, this focus led federal agencies (including the Forest Service, Interior, the Department of Agriculture's Office of Inspector General, and us) and other organizations (including the National Association of State Foresters and the National Academy of Public Administration) to conduct numerous reviews of federal wildland fire programs. For example, we have reported or testified more than 50 times since 1999 on issues related to wildland fire management, recommending more than 50 actions the Forest Service and the Interior agencies could take to improve the programs. The agencies have taken—and continue to take—steps to address the shortcomings the reviews identified and to otherwise improve their fire management programs, but concerns persist over the agencies' response to the deteriorating fire situation.

In this context, and to provide the administration and the 111th Congress with an overview of the agencies' efforts to address the wildland fire problem, this report provides information on (1) the progress the Forest Service and the Interior agencies have made in managing wildland fire and (2) key actions we previously recommended and believe are still necessary to improve the agencies' management of wildland fire. We prepared this report under the Comptroller General's authority to conduct evaluations on his own initiative.

To address our first objective, we reviewed agency documents to identify the agencies' overall approach to managing wildland fire, the key steps the agencies have taken to address the growing wildland fire problem, and any improvement resulting from those steps. To further our understanding of these issues, we interviewed various agency officials, including officials in Washington, D.C., and at the National Interagency Fire Center in Boise, Idaho. To address our second objective, we reviewed our prior reports and testimonies to identify steps we previously recommended that the agencies take to improve their wildland fire programs and reviewed relevant agency documents and interviewed agency officials to determine the status of the agencies' implementation of those recommendations. Appendix I describes our scope and methodology in more detail. We conducted this performance audit from January 2009 to September 2009, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that

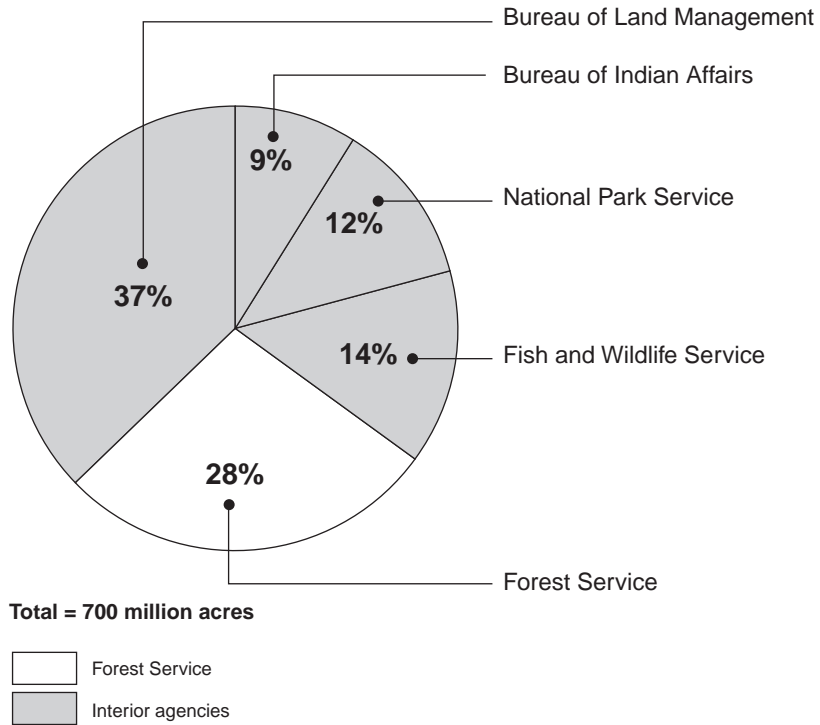
the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Wildland fires triggered by lightning are both natural and inevitable and play an important ecological role on the nation's landscapes. These fires shape the composition of forests and grasslands, periodically reduce vegetation densities, and stimulate seedling regeneration and growth in some species. Over the past century, however, various land use and management practices—including fire suppression, grazing, and timber harvesting—have reduced the normal frequency of fires in many forest and rangeland ecosystems and contributed to abnormally dense, continuous accumulations of vegetation. Such accumulations not only can fuel uncharacteristically large or severe wildland fires but also—with more homes and communities built in or near areas at risk from wildland fire—threaten human lives, health, property, and infrastructure. Moreover, the introduction and spread of invasive nonnative species (such as cheatgrass), along with the expanded range of certain flammable native species (such as western juniper) have also altered natural fire regimes, contributing to wildland fires' burning in some areas with uncharacteristic frequency or intensity.

The Forest Service, Bureau of Indian Affairs, Bureau of Land Management, Fish and Wildlife Service, and National Park Service are responsible for wildland fire management. These five agencies manage about 700 million acres of land in the United States, including national forests, national grasslands, Indian reservations, national parks, and national wildlife refuges. The Forest Service and the Bureau of Land Management manage the majority of these lands. The Forest Service manages about 190 million acres; the Bureau of Land Management manages about 260 million acres; and the Bureau of Indian Affairs, Fish and Wildlife Service, and National Park Service each manage less than 100 million acres. Figure 1 shows the distribution of land among the five agencies. Each agency has from 7 to 12 regional or state offices that oversee field units.

Figure 1: Distribution of Total Land Managed by the Five Agencies Responsible for Wildland Fire Management



Sources: GAO analysis of Forest Service and Interior data.

The federal wildland fire management program has three major components: preparedness, suppression, and fuel reduction.² To prepare for a wildland fire season, the agencies acquire firefighting assets—including firefighters, fire engines, aircraft, and other equipment—and station them either at individual federal land management units (such as national forests or national parks) or at centralized dispatch locations. The primary purpose of these assets is to respond to fires before they become large—a response referred to as initial attack—thus forestalling threats to communities and natural and cultural resources. The agencies fund the assets used for initial attack primarily from their wildland fire preparedness accounts.

²Other fire program components include prevention; science, research, and development; and assistance to nonfederal entities.

When a fire starts, current federal policy directs the agencies to consider land management objectives—identified in land and fire management plans developed by each land management unit—and the structures and resources at risk when determining whether or how to suppress the fire. A wide spectrum of strategies is available to choose from, and the land manager at the affected local unit is responsible for determining which strategy to use. In the relatively rare instances when fires escape initial attack and grow large, the agencies respond using an interagency system that mobilizes additional firefighting assets from federal, state, and local agencies, as well as private contractors, regardless of which agency or agencies have jurisdiction over the burning lands. Federal agencies typically fund the costs of these activities from their wildland fire suppression accounts.

In addition to preparing for and suppressing fires, the agencies attempt to reduce the potential for severe wildland fires, lessen the damage caused by fires, limit the spread of flammable invasive species, and restore and maintain healthy ecosystems by reducing potentially hazardous vegetation that can fuel fires. Approaches used for managing vegetation include setting fires under controlled conditions (prescribed burns), mechanical thinning, herbicides, certain grazing methods, or combinations of these and other approaches. The agencies fund these activities from their fuel reduction accounts.

Congress, the Office of Management and Budget, federal agency officials, and others have expressed concern about mounting federal wildland fire expenditures. Federal appropriations to the Forest Service and the Interior agencies to prepare for and respond to wildland fires, including appropriations for reducing fuels, have more than doubled, from an average of \$1.2 billion from fiscal years 1996 through 2000 to an average of \$2.9 billion from fiscal years 2001 through 2007. Adjusting for inflation, the average annual appropriations to the agencies for these periods increased from \$1.5 billion to \$3.1 billion (in 2007 dollars). The Forest Service received about 70 percent, and Interior about 30 percent, of the appropriated funds; table 1 shows the agencies' combined fire appropriations for fiscal years 1996 through 2007.

Table 1: Forest Service and Interior Wildland Fire Appropriations, Fiscal Years 1996 through 2007

Dollars in millions

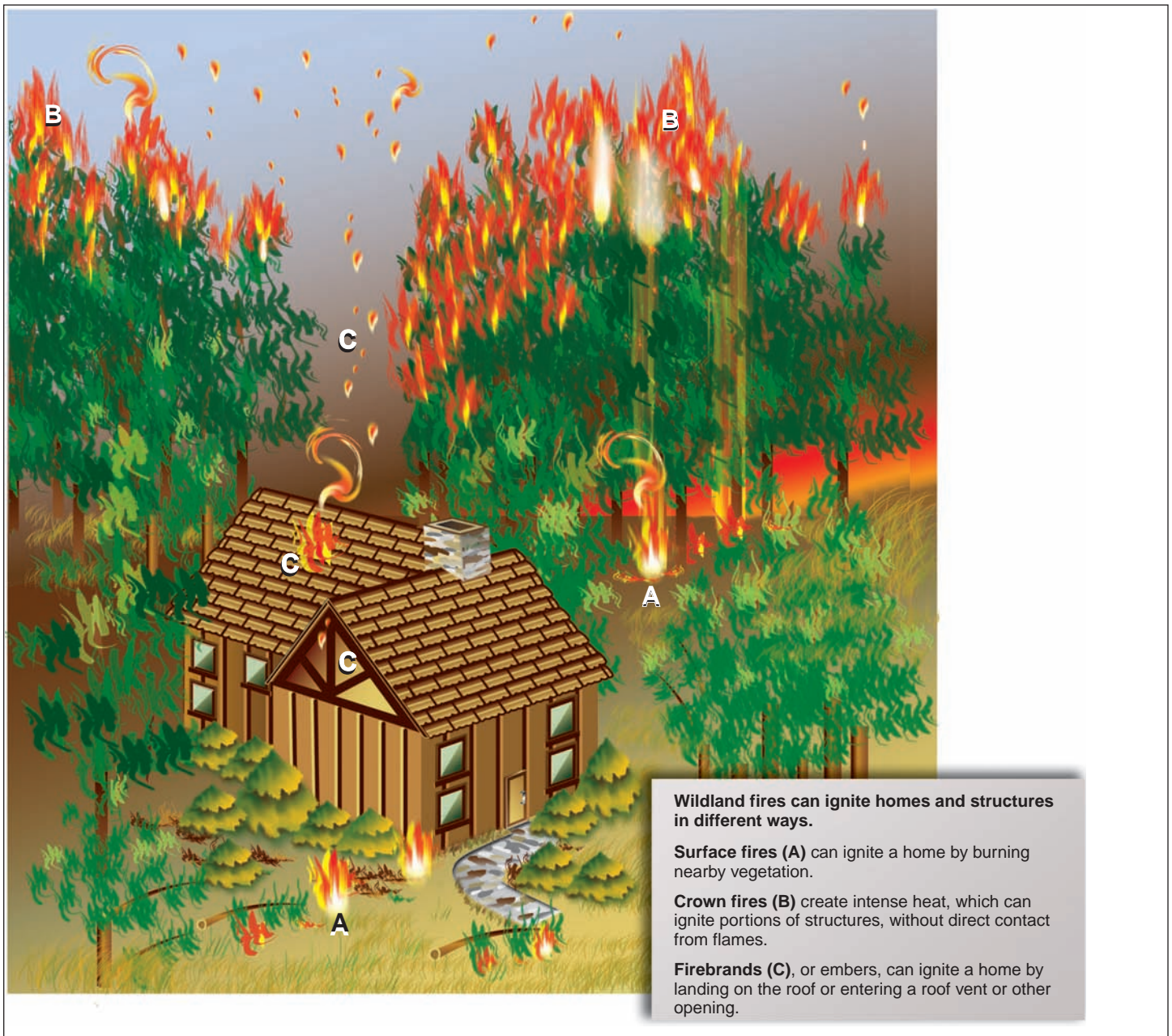
Fiscal year	Total appropriations	
	Nominal	Inflation-adjusted ^a
1996	\$772.4	\$984.2
1997	1,432.1	1,793.3
1998	1,116.7	1,381.7
1999	1,159.3	1,415.9
2000	1,598.9	1,914.2
2001	2,859.9	3,344.7
2002	2,238.8	2,569.0
2003	3,165.1	3,560.2
2004	3,230.6	3,541.6
2005	2,929.8	3,144.0
2006	2,701.4	2,775.4
2007	\$3,047.0	\$3,047.0

Source: GAO analysis of Congressional Research Service data.

^aWe adjusted the appropriations amounts for inflation, using the chain-weighted gross domestic product price index with fiscal year 2007 as the base year.

Analysis of structures damaged during past fires and experimental research have identified a number of relatively simple steps that can reduce the risk of damage to structures from wildland fire. Minimizing or preventing damage requires understanding the different types of wildland fire and how they can ignite structures. Surface fires—which burn vegetation or other fuels, such as shrubs, fallen leaves, small branches, and roots, near the surface of the ground—can ignite a home or other building by burning nearby vegetation and eventually igniting flammable portions of the building, including exterior walls or siding; attached structures, such as a fence or deck; or other nearby flammable materials, such as firewood or patio furniture. Crown fires—which burn the tops, or crowns, of trees—place homes at risk because they create intense heat, which can ignite portions of structures even without direct contact from flames. Embers, or “firebrands”—which can be carried on the wind a mile or more from a fire—can ignite a structure by landing on the roof or by entering a vent or other opening. Figure 2 illustrates how each type of fire can take advantage of a structure’s vulnerabilities and those of its immediate surroundings.

Figure 2: Ways Wildland Fire Can Threaten a Structure



Source: GAO.

Agencies' Efforts to Implement a New Approach to Managing Wildland Fire Have Better Positioned Them to Respond to Fire Effectively

As the Forest Service and the Interior agencies have improved their understanding of wildland fire's role on the landscape, their approach to managing fire has evolved. Under the new approach, the agencies seek to make the landscape less susceptible to damage by wildland fire and to respond to fires in ways that protect communities and important resources while also considering the cost and long-term effects of that response.

Agencies' Approach to Managing Wildland Fire Has Evolved

Historically, the Forest Service and the Interior agencies generally viewed fire as a damaging force that they attempted to suppress quickly—as exemplified by the “10 a.m. policy,” in which the goal was to contain every fire by 10:00 the morning after it was reported. For decades, the agencies were often successful in this approach. This emphasis on suppression led to a substantial decline in the average number of acres burned annually from the 1930s through the 1970s. A number of damaging fires in the 1990s, however, led the agencies to fundamentally reassess their understanding of wildland fire's role on the landscape. Their view of fire's ecological role began to expand, from seeing benefits in a few ecosystems, like certain grasslands and forest types, to realizing that in many locations—particularly the arid West—fire was inevitable. In addition, they recognized that by allowing brush, small trees, and other vegetation to accumulate, their past success in suppressing fires was in part responsible for making recent fires more severe.

The agencies' increased awareness of fire's benefits, as well as of the unintended negative consequences of suppression, led them in 1995 to develop the Federal Wildland Fire Management Policy, a policy they reaffirmed and updated in 2001.³ Under the policy, the agencies abandoned their attempt to put out every wildland fire, seeking instead to

³U.S. Department of Agriculture and U.S. Department of the Interior, *Federal Wildland Fire Management Policy and Program Review* (Washington, D.C.: December 1995); Department of the Interior, Department of Agriculture, Department of Energy, Department of Defense, Department of Commerce, Environmental Protection Agency, Federal Emergency Management Agency, and National Association of State Foresters, *Review and Update of the 1995 Federal Wildland Fire Management Policy* (Washington, D.C.: January 2001).

(1) make communities and resources less susceptible to being damaged by wildland fire and (2) respond to fires so as to protect communities and important resources at risk but also to consider both the cost and long-term effects of that response. As a result, the agencies have increasingly emphasized firefighting strategies that focus on land management objectives, which may lead them to use less aggressive firefighting strategies that can not only reduce costs in some cases but also be safer for firefighters by reducing their exposure to unnecessary risks, according to agency fire officials.

Agencies Have Laid Important Groundwork through Their Efforts to Reduce Damage to Communities and Resources and to Improve Their Responses to Wildland Fire

In recent years, the Forest Service and the Interior agencies have taken steps to help them better achieve the Federal Wildland Fire Management Policy's vision. In an effort to make the landscape less susceptible to damage from wildland fire, for example, they have reduced hazardous fuels and fostered fire-resistant communities. They have also improved their ability to respond efficiently and effectively to wildland fires that occur, including taking steps to (1) implement the federal wildland fire management policy, (2) improve decisions regarding fire management strategies, and (3) improve how they acquire and use firefighting assets.

Agencies Have Taken Steps Intended to Reduce Wildland Fire Damage to Communities and Resources

In an effort to reduce damage to communities and resources from wildland fire, the agencies have continued to reduce fuels and foster fire-resistant communities, but the extent to which these efforts have reduced risk is unknown.

Reducing hazardous fuels. Reducing hazardous fuels—to keep wildland fires from spreading into the wildland-urban interface and to help protect important resources by lessening a fire's intensity—is one of the primary objectives of the National Fire Plan. The agencies reported reducing fuels on more than 29 million acres from 2001 through 2008. The agencies have also improved the data they use to help identify lands where fuels need to be reduced and have taken steps to improve their processes for allocating fuel reduction funds and setting priorities for fuels projects. The agencies have nearly completed their geospatial data and modeling system, LANDFIRE, as we recommended in 2003.⁴ LANDFIRE is intended to produce consistent and comprehensive maps and data describing

⁴GAO, *Wildland Fire Management: Additional Actions Required to Better Identify and Prioritize Lands Needing Fuels Reduction*, GAO-03-805 (Washington, D.C.: Aug. 15, 2003).

vegetation, wildland fuels, and fire regimes across the United States.⁵ Such data are critical to helping the agencies (1) identify the extent, severity, and location of wildland fire threats to the nation's communities and resources; (2) predict fire intensity and rate of spread under particular weather conditions; and (3) evaluate the effect that reducing fuels may have on future fire behavior. LANDFIRE data are already complete for the contiguous United States, and the agencies have reported they expect to complete the data for Alaska and Hawaii in 2009. Because vegetative conditions change over time for a variety of reasons, including landscape-altering events such as hurricanes, disease, or wildland fires themselves, the agencies also plan several processes for updating the data, including selective updates every 2 years to reflect changes due to fires, fuel treatments, and other disturbances and a comprehensive update every 10 years.

In addition, the agencies have begun to improve their processes for allocating fuel reduction funds to different areas of the country and for selecting fuel reduction projects, as we recommended in 2007.⁶ The agencies have started moving away from "allocation by tradition" toward a more consistent, systematic allocation process. That is, rather than relying on historical funding patterns and professional judgment, the agencies are developing a process that also considers risk, effectiveness of fuel reduction treatments, and other factors. The Forest Service uses this process to allocate funds to its nine regions and has directed the regions to use it to allocate funds to their respective national forests. Interior uses a similar process to allocate funds to its four agencies, and the agencies in turn use it to allocate funds to their respective state or regional offices. The agencies have been increasing their use of this process, in fiscal year 2009 applying the results to help them determine how to allocate their fuel reduction dollars. Interior, however, kept its agencies and regions from gaining or losing more than 10 percent in funds relative to fiscal year 2008. Agency officials told us they expect to continue to improve their processes and to increasingly rely on them to allocate fuel reduction funds.

⁵A fire regime generally classifies the role that wildland fire plays in a particular ecosystem on the basis of certain characteristics, such as the average number of years between fires and the typical severity of fire under historic conditions.

⁶GAO, *Wildland Fire Management: Better Information and a Systematic Process Could Improve Agencies' Approach to Allocating Fuel Reduction Funds and Selecting Projects*, [GAO-07-1168](#) (Washington, D.C.: Sept. 28, 2007).

Despite these improvements, further action is needed to ensure that the agencies' efforts to reduce hazardous fuels are directed to areas at highest risk. The agencies, for example, still lack a measure of the effectiveness of fuel reduction treatments and therefore lack information needed to ensure that fuel reduction funds are directed to the areas where they can best minimize risk to communities and natural and cultural resources. Forest Service and Interior officials told us that they recognize this shortcoming and that efforts are under way to address it. The Joint Fire Science Program, for example, has funded almost 50 studies examining the effectiveness of fuel reduction treatments in different locations and has begun a comprehensive effort to evaluate the effectiveness of different types of fuel treatments, as well as the longevity of those treatments and their effects on ecosystems and natural resources.⁷ Efforts like these are likely to be long term, involving considerable research investment, and have the potential to improve the agencies' ability to assess and compare the cost-effectiveness of potential treatments in deciding how to optimally allocate scarce funds.

Fostering fire-resistant communities. Protecting the nation's communities is both one of the key goals of wildland fire management and one of the leading factors contributing to rising fire costs. Increasing the use of protective measures to mitigate the risk to structures from wildland fire is a key goal of the National Fire Plan—a goal which also may help contain the cost of managing fires in the long term. This plan, developed by federal wildland fire agencies and state governors, encourages, but does not mandate, state and local governments to adopt laws requiring homeowners and homebuilders to take measures to help protect structures from wildland fires. Because these measures rely on the actions of individual homeowners and homebuilders or on laws and land-use planning affecting private lands, achieving this goal is primarily a state and local government responsibility. Nonetheless, the Forest Service and the Interior agencies have helped sponsor the Firewise Communities program, which works with community leaders and homeowners to increase the use

⁷Other Joint Fire Science Program efforts may also help the agencies improve their fuel reduction efforts, including efforts to synthesize and disseminate the current scientific knowledge related to reducing fuels in different forests and grassland types and to develop a system that would allow field managers to better use a variety of sources of fuels data.

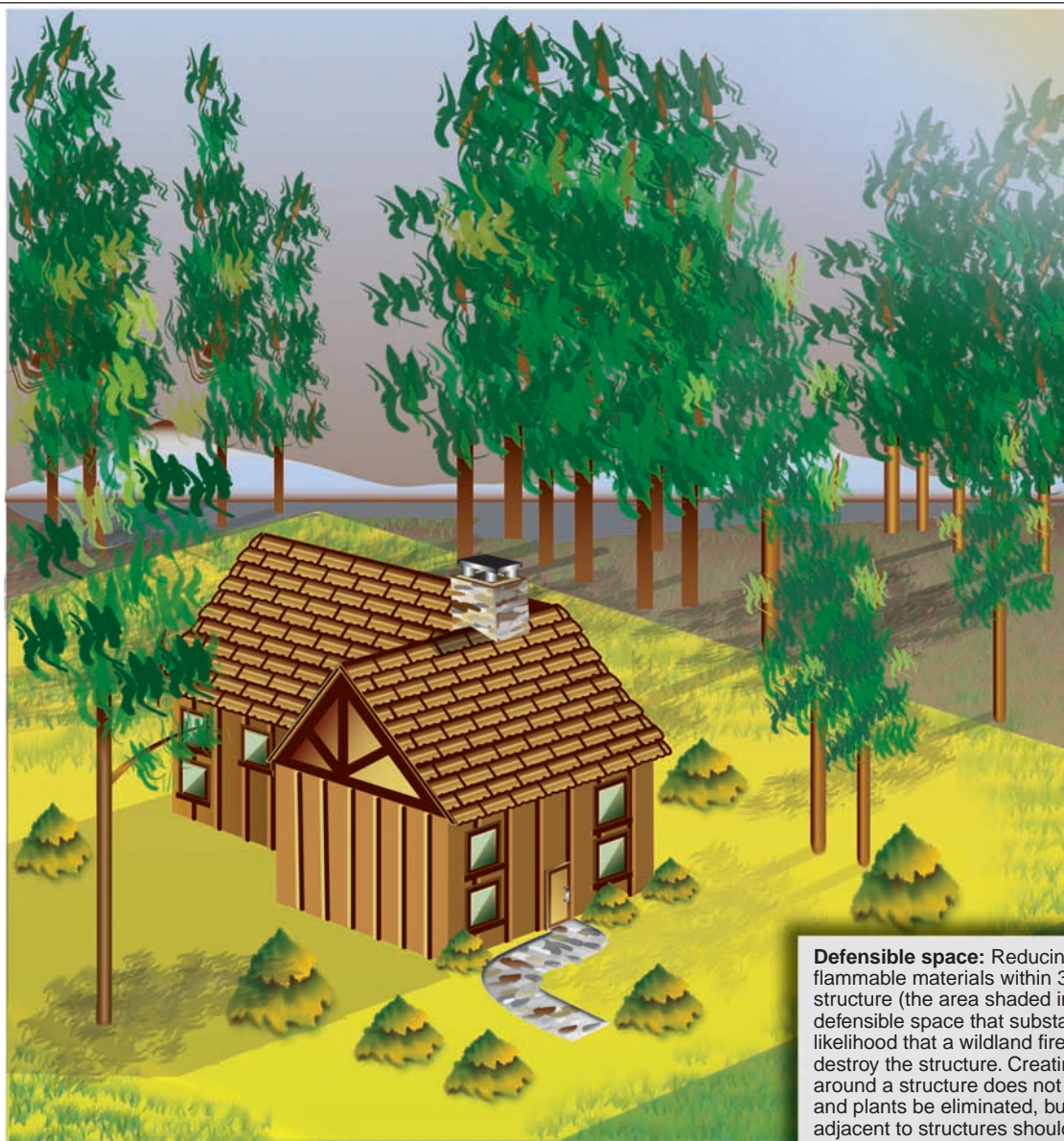
of fire-resistant landscaping and building materials in areas of high risk.⁸ Federal and state agencies also provide grants to help homeowners pay for creating defensible space around private homes.

A few relatively simple steps can reduce the risk of damage to structures from wildland fire. Experts from a symposium convened for us in 2004 by the National Academy of Sciences emphasized that the two most critical measures for protecting structures from wildland fires are (1) reducing vegetation and flammable objects within an area of 30 to 100 feet around a structure, often called creating defensible space (see fig. 3), and (2) using fire-resistant roofing materials and covering attic vents with mesh screens.⁹ Analysis of structures damaged during past fires and experimental research have shown these two steps to be key determinants of whether or not a structure is damaged by wildland fire.

⁸The Firewise Communities program is the primary national effort to educate homeowners about wildland fire risks. The program is jointly sponsored by the International Association of Fire Chiefs, National Emergency Management Association, National Association of State Fire Marshals, National Association of State Foresters, National Fire Protection Association, Federal Emergency Management Agency, U.S. Fire Administration, Forest Service, Bureau of Indian Affairs, Bureau of Land Management, Fish and Wildlife Service, and the National Park Service. Numerous state and local fire and forestry officials also participate in the program. See <http://www.firewise.org/> for more information.

⁹Other measures, including using fire-resistant windows and building materials, also help protect buildings from damage from wildland fire; see GAO, *Technology Assessment: Protecting Structures and Improving Communications during Wildland Fires*, GAO-05-380 (Washington, D.C: Apr. 26, 2005).

Figure 3: Home with Defensible Space



Defensible space: Reducing vegetation and other flammable materials within 30 to 100 feet of a structure (the area shaded in yellow) creates defensible space that substantially reduces the likelihood that a wildland fire will damage or destroy the structure. Creating defensible space around a structure does not require that all trees and plants be eliminated, but plants or trees adjacent to structures should be carefully spaced and be pruned to remove the lower branches that hang over the roof.

Source: GAO.

Nevertheless, use of protective measures is inconsistent. We reported in 2005 that many homeowners in the wildland-urban interface have not used such measures to mitigate fire risk because of the time or expense involved. State and local fire officials estimated that the price of creating defensible space, for example, can range from a negligible amount, if homeowners can do the work themselves, to \$2,000 or more. Competing concerns also influence the use of protective measures. For example, although modifying landscaping to create defensible space has proved to be key in protecting structures from wildland fire, officials and researchers have reported that homeowners are more concerned about the effect of landscaping on their property's appearance, privacy, or habitat for wildlife. Defensible space can, however, be created so as to alleviate many of these concerns. Leaving thicker vegetation away from a structure and pruning plants close by it, for instance, can help protect the structure and still be attractive, private, and wildlife-friendly. Misconceptions about fire behavior and the effectiveness of protective measures can also influence what people do to protect structures from wildland fires. For example, homeowners may not know that homes can be more flammable than the surrounding trees, shrubs, or other vegetation and therefore do not recognize the need to reduce the flammability of the structure itself (see fig. 4). Fire officials told us that few people realize that reducing tree density close to a structure can return a wildland fire to the ground, where it is much easier to keep away from structures, or that fire-resistant roofs and screened attic vents can reduce the risk of ignition from firebrands. Finally, homeowners may not use protective measures because they believe that firefighters are responsible for protecting their homes and do not recognize that they share this responsibility.

Figure 4: Burning Home Surrounded by Unburned Vegetation



Source: Forest Service.

Agencies' Improvements Have Laid Important Groundwork for Enhancing Their Response to Wildland Fire

Implementing the Federal Wildland Fire Management Policy. The Federal Wildland Fire Management Policy directs each agency to develop a fire management plan for all areas they manage with burnable vegetation. Without such plans, agency policy does not allow use of the whole spectrum of wildland fire response strategies, including less aggressive strategies—meaning that, for areas without such plans, the agencies must attempt to suppress fires regardless of any benefits that might come from allowing them to burn. We reported in 2006 that about 95 percent of the agencies' 1,460 individual land management units had completed the required plans. We also reported, however, that the agencies may not always find it easy to update these plans; a Forest Service official told us, for example, that, if the introduction of new data into a fire management plan results in the development of new fire management objectives, the agency might need to conduct a new environmental analysis of that plan, requiring additional time and resources.¹⁰ Moreover, in examining 17 fire management plans, a May 2007

¹⁰Under the National Environmental Policy Act of 1969, agencies evaluate the likely environmental effects of their activities using an environmental assessment or, if the activity likely would significantly affect the environment, a more detailed environmental impact statement.

independent review of large wildland fires managed by the Forest Service in 2006 identified several shortcomings in the plans, including that most of them examined did not contain current information on fuel conditions and that many did not provide sufficient guidance on selecting firefighting strategies.¹¹ If fire management plans are not updated to reflect the most current information on the extent and distribution of fire risks and the most promising methods for dealing with these risks, the plans will be of limited use to the agencies in managing wildland fire.

The Federal Wildland Fire Management Policy also states that the agencies' responses to wildland fires are to be based on the circumstances of each fire and the likely consequences to human safety and to natural and cultural resources. Interagency guidance on implementing the policy, adopted in 2009, clarifies that the full range of fire management strategies and tactics are to be considered when responding to every wildland fire and that a single fire may be simultaneously managed for different objectives. Previous guidance required each fire to be managed either for suppression objectives—that is, to put out the fire as quickly as possible—or to achieve resource benefits—that is, to allow the fire to burn to gain certain benefits such as reducing fuels or seed regeneration. Both the Department of Agriculture's Inspector General and we criticized the previous guidance, in part because it did not allow the agencies the flexibility to switch between these strategies as fire conditions changed or to manage parts of a single fire differently.¹² By allowing this flexibility, the new guidance should help the agencies achieve management objectives on more acres and help contain the long-term costs of fire management.

Improving decisions about fire management strategies. The agencies have recently undertaken several efforts to improve decisions about firefighting strategies. In 2007 we reported that previous studies had found that officials may not always consider the full range of available strategies and may not select the most appropriate strategy, which would account for the cost of suppression; the value of structures and other resources

¹¹Independent Large Wildfire Cost Panel, chartered by the U.S. Secretary of Agriculture, *Towards a Collaborative Cost Management Strategy: 2006 U.S. Forest Service Large Wildfire Cost Review Recommendations* (Washington, D.C.: May 15, 2007).

¹²GAO, *Wildland Fire Management: Lack of Clear Goals or a Strategy Hinders Federal Agencies' Efforts to Contain the Costs of Fighting Fires*, [GAO-07-655](#) (Washington, D.C.: June 1, 2007).

threatened by the fire; and, where appropriate, any potential benefits to natural resources.¹³

Managers of the agencies' individual land management units—typically known as line officers and including national forest supervisors, BLM district managers, and others—are responsible for making strategic decisions about how to manage a fire. A 2000 review by the National Association of State Foresters, however, concluded that many line officers have little wildland fire experience and may select fire management strategies that lead to unnecessarily high suppression costs. Fire officials told us such strategies may also have a low likelihood of success, unnecessarily exposing firefighters to risk of injury. The Forest Service initiated a program in 2007 designed to add to line officers' knowledge and experience through a series of certifications at three competency levels, certifying the officer to manage a fire of low, medium, or high complexity. If a fire exceeds the line officer's certification level, a more experienced officer is assigned to coach the less experienced officer; final decisions on strategies, however, remain the responsibility of the line officer of the unit where the fire is burning.

To help line officers and fire managers¹⁴ in making on-the-ground decisions about how to manage a particular fire, the agencies in 2009 began to use a new analytical tool, known as the wildland fire decision support system. This new tool helps line officers and fire managers analyze various factors—such as the fire's current location, adjacent fuel conditions, nearby structures and other highly valued resources, and weather forecasts—in determining the strategies and tactics to adopt. For example, the tool generates a map illustrating (1) the probability that a particular wildland fire, barring any suppression actions, will burn a certain area within a specified time and (2) the structures or other resources that may therefore be threatened. Having such information can help line officers and fire managers understand the resources at risk and identify the most appropriate response—for example, whether to devote substantial resources to attempt full and immediate suppression or instead to take a less intensive approach, which may reduce risks to firefighters and be less costly.

¹³[GAO-07-655](#).

¹⁴Fire managers known as incident commanders are responsible for implementing the suppression strategies selected by line officers.

The agencies have also established four teams, known as national incident management organization teams, staffed with some of the most experienced fire managers.¹⁵ These teams have several purposes, including managing some of the most complex and costly fires; identifying and disseminating best management practices throughout the agencies; and, during periods of low fire activity, working with staff at the national forests where large fires are particularly likely to occur, to better prepare staff to respond. Fire officials said that over time they expect these teams will improve decisions about firefighting strategies, both for fires the teams manage directly and those where they worked with staff ahead of time.

In addition, the agencies, following congressional committee direction,¹⁶ require an independent review of all fires whose costs exceed \$10 million, including an examination of the strategic decisions affecting suppression costs.¹⁷ Although these reviews may identify instances where the agencies could have used more cost-efficient firefighting strategies, and may provide long-term benefits by helping the agencies identify and disseminate best practices, the reviews are typically conducted after the fires have been suppressed and therefore are not intended to help fire managers change strategies while fires are still burning, before managers have taken ineffective or unnecessary suppression actions.

To influence strategic firefighting decisions while fires are still burning, the Forest Service (which, among the responsible federal agencies, most often manages the most expensive fires) has experimented in recent years with several approaches for identifying ongoing fires where suppression actions are unlikely to be effective and for influencing strategic decisions made during those fires that might help contain costs and reduce risk to firefighters. A senior Forest Service official told us that these efforts have helped raise awareness of the importance of basing strategic decisions on (1) the resources at risk of damage and (2) the likelihood that suppression actions will be effective, but that the agency was still working to improve its ability to quickly identify strategic firefighting decisions likely to be ineffective. This official told us that the concept of reviewing strategic

¹⁵Based in the Forest Service, the teams are available to work with all wildland fire agencies.

¹⁶See H.R. Rep. No. 111-180 at 82 (2009).

¹⁷In addition to these independent reviews, the Forest Service requires an internal review of fires whose costs exceed \$5 million.

decisions while a fire is still burning is new, as is the concept of considering the probability of success, and not just the resources at risk, in making those decisions; he added that he believed the agency was making strides in implementing this approach but that it would be a long process dependent on managers in the field gaining a better understanding of the benefits of the new approach.

According to this official, the agency's approach in 2009 is to identify ongoing fires for which the cost of suppression—estimated using information from the wildland fire decision support system—is expected to be higher than the cost predicted by a measure known as the stratified cost index, based on the costs of previous fires with similar characteristics.¹⁸ On those fires for which suppression costs are expected to be substantially higher than costs for similar fires in the past, Forest Service officials will consult with local line officers and fire management officials to ensure that the most appropriate firefighting strategies are being implemented. The basis for this comparison—the stratified cost index of previous fires—is not entirely reliable, however; our 2007 report identified several shortcomings with it, including the lack of data from many fires where less costly firefighting strategies were used (because the agencies have only recently emphasized the importance of using less aggressive suppression strategies).¹⁹ As a result, using the index as the basis for comparison may not allow the Forest Service to accurately identify fires where more, or more-expensive, resources than needed are being used.

Although these efforts are new and we have not fully evaluated them, we believe they have the potential to help the agencies strengthen how firefighting strategies are selected. The efforts, however, do not address certain critical shortcomings. We reported in 2007, for example, that officials in the field have few incentives to consider cost containment in making critical decisions affecting suppression costs, and that previous studies had found that the lack of a clear measure to evaluate the benefits and costs of alternative firefighting strategies fundamentally hindered the

¹⁸Characteristics affecting suppression costs include fire size; fuel types; fire intensity; physical terrain; proximity to the nearest community; total value of structures close to the fire; and special management considerations, such as whether the fire was burning in a wilderness or other designated area.

¹⁹The utility of the index should improve over time as data from recent fires, including those where less aggressive firefighting strategies were used, are incorporated; see [GAO-07-655](#).

agencies' abilities to provide effective oversight.²⁰ Although the agencies have made progress in other areas, they still lack such a measure.

Acquiring and using firefighting assets effectively. In 2007 we reported that (1) federal agencies lacked a shared or integrated system for effectively determining the appropriate type and quantity of firefighting assets needed for a fire season; (2) the agencies' processes and systems for acquiring firefighting assets lacked controls to ensure that the agencies were procuring assets cost-effectively; and (3) the agencies sometimes used firefighting assets ineffectively or inefficiently, often in response to political or social pressures.²¹ Despite continued improvement, further action to address these shortcomings is needed.

First, to address congressional committee direction²² that they improve their system for determining needed firefighting assets, the agencies in 2009 began deploying an interagency budget-planning system known as fire program analysis (FPA). FPA was intended to help the agencies develop their wildland fire budget requests and allocate funds by, among other objectives, (1) providing a common budget framework to analyze firefighting assets without regard for agency jurisdictions; (2) examining the full scope of fire management activities, including preparing for fires by acquiring and positioning firefighting assets for the fire season, mobilizing assets to suppress fires, and reducing potentially hazardous fuels; (3) modeling the effects over time of differing strategies for responding to wildland fires and treating lands to reduce hazardous fuels; and (4) using this information to identify the most cost-effective mix and location of federal wildland fire management assets. In 2008, we reported that FPA showed promise in achieving some of the key objectives originally established for it but that the approach the agencies have taken hampers FPA from meeting other key objectives, including the ability to project the effects of different levels of fuel reduction and firefighting strategies over time.²³ We therefore concluded that agency officials lack information that would help them analyze the extent to which increasing or decreasing funding for fuel reduction and responding more or less

²⁰GAO-07-655.

²¹GAO-07-655.

²²See H.R. Conf. Rep. No. 107-234 at 68 (2001).

²³GAO, *Wildland Fire Management: Interagency Budget Tool Needs Further Development to Fully Meet Key Objectives*, GAO-09-68 (Washington, D.C.: Nov. 24, 2008).

aggressively to fires in the short term could affect the expected cost of responding to wildland fires over the long term. Senior agency officials told us in 2008 that they were considering making changes to FPA that may improve its ability to examine the effects over time of different funding strategies. The exact nature of these changes, or how to fund them, has yet to be determined. Officials also told us the agencies are currently working to evaluate the model's performance, identify and implement needed corrections, and improve data quality and consistency. The agencies intend to consider the early results of FPA in developing their budget requests for fiscal year 2011, although officials told us they will not rely substantially on FPA's results until needed improvements are made. As we noted in 2008, the approach the agencies took in developing FPA provides considerable discretion to agency decision makers and, although providing the flexibility to consider various options is important, doing so makes it essential that the agencies ensure their processes are fully transparent.

Second, we also reported in 2007 that the agencies were planning improvements to their acquisition processes to ensure they were procuring assets cost-effectively. The agencies rely on private contractors to provide many firefighting assets and have begun implementing a new system for determining which contractors to use. This system considers the capabilities of the equipment or personnel, as well as the cost, and is intended to help the agencies identify the "best value" and not just the lowest cost or closest asset. A Forest Service official said that the agencies are also evaluating how the equipment and personnel from each contractor perform in the field and, once they have gathered enough data, plan to apply that information in selecting contractors. The agencies are already using this system to select contractors for many kinds of frequently used equipment, including firefighting crews, fire engines, aircraft, and water trucks, and plan to expand the system to include other equipment in future years.

Third, the agencies have taken several steps to improve their efficiency in using firefighting assets. As we reported in 2007, for example, the agencies implemented a computer-based dispatching system called the resource ordering and status system.²⁴ The agencies had been using a manual, paper-based system for requesting and assigning firefighting assets, and the new system was meant to allow them to more effectively and

²⁴[GAO-07-655](#).

efficiently monitor firefighting assets during a fire or other incident. We reported that although the system's benefits had not been quantified, it had likely reduced suppression costs by making it easier to use local firefighting assets—which could hasten response and thus perhaps reduce fire size—and by reducing the personnel needed to dispatch resources. The agencies can also use the system to identify individuals qualified and available to serve in various firefighting positions, which may help increase the agencies' use of local incident commanders and reduce the need to mobilize more-costly incident management teams.

We also reported in 2007 that the agencies required that an "incident business advisor" be assigned to fires expected to cost more than \$5 million and recommended that an advisor be assigned to fires expected to cost more than \$1 million. An incident business advisor represents the line officer's interest in containing costs by observing firefighting operations and working with the incident management team to identify ways those operations could be more cost-effective. For example, an incident business advisor may observe the types and quantity of firefighting personnel and equipment assigned to a fire and how they are used; observe how equipment and supplies are procured; and, as a fire comes under control, ensure that the most expensive personnel and equipment are released first.

In 2008, the agencies also changed how they determined where to send certain firefighting assets to ensure that assets perform the highest-priority work. Agency officials told us they instituted a new practice to increase the likelihood that firefighting assets perform the highest-priority actions. Under this practice, certain assets that are often in high demand (including some of the most experienced firefighting crews) are assigned to perform only the highest-priority actions on a particular fire or set of adjacent fires and are then reassigned to perform high-priority actions on other fires,²⁵ rather than being assigned for several weeks to a single fire, as has been typical. This practice should help the agencies address a shortcoming previous studies have identified—that firefighting assets may sit idle at a fire rather than be released for use elsewhere because managers are concerned that they will be unable to recall an asset if they need it later, a practice that unnecessarily increases a fire's cost and prevents those assets from helping to protect communities and resources from fires

²⁵As we reported in 2007, the agencies already used a similar practice to determine where many aircraft, including air tankers and helicopters, were assigned; see [GAO-07-655](#).

burning elsewhere. In addition, the officials said it can be important to ensure that assets are sufficiently flexible to respond to new fires, even if many fires are already burning. Responding quickly can substantially increase the likelihood that firefighters will be able to contain fires before they become large, which is particularly important when fires start in weather and fuel conditions that can cause them to burn intensely and spread rapidly. Agency officials also said they have improved their ability to predict when an unusually high number of fires might start and have emphasized the need to keep some firefighting assets in reserve to respond to new fires quickly.

Previous studies also found that agencies sometimes use more, or more-costly, firefighting assets than necessary, often in response to political or social pressures to demonstrate they are taking all possible action to protect communities and resources. Consistent with these findings, fire officials told us they were pressured in 2008 to assign more firefighting assets than could be effectively used to fight fires in California. More generally, previous studies have found that air tankers may drop flame retardants when on-the-ground conditions may not warrant such drops. Aviation activities are expensive, accounting for about one-third of all firefighting costs on a large fire. Providing clarity about when different types of firefighting assets can be used effectively could help the agencies resist political and social pressure to call up more assets than they need.

Agencies Have Yet to Take Certain Key Actions That Would Substantially Improve Their Management of Wildland Fire

Despite the important steps the agencies have taken, much work remains. We have previously recommended several key actions—including development of an overarching investment strategy for addressing the wildland fire problem—that, if completed, would improve the agencies’ management of wildland fire. In addition to completing the overarching strategy (which we have termed a cohesive strategy), we have recommended that the agencies clarify the importance of containing costs relative to other, often-competing objectives and clarify financial responsibilities for fires that cross federal, state, and local jurisdictions. Finally, we have identified several steps the agencies should take, and Congress could consider, that could mitigate the effects on the agencies’ other programs of rising fire management costs.

Develop a Cohesive Strategy

If the agencies and Congress are to make informed decisions about an effective and affordable long-term approach for addressing wildland fire problems that have been decades in the making, the agencies need a cohesive strategy that identifies the options and associated funding for

reducing excess vegetation and responding to fires. By laying out various potential approaches for addressing the growing wildland fire threat, the estimated costs associated with each approach, and the trade-offs involved, a cohesive strategy would help Congress and the agencies make informed decisions about how to invest scarce funds.

We first recommended a cohesive strategy for addressing excess vegetation in 1999.²⁶ Subsequently, after evaluating a number of related wildland fire management issues, we reiterated the need for a cohesive strategy in 2005 and 2006 and broadened our recommendation to better address the interrelated nature of fuel reduction efforts and wildland fire response.²⁷ The agencies have concurred with our recommendations to develop a cohesive strategy but have yet to develop a strategy that clearly formulates different approaches and associated costs.²⁸ In July 2009, agency officials told us they had begun planning how to develop a cohesive strategy but were not far enough along to provide further information. We were therefore unable to determine the extent to which it might provide the information the agencies and Congress need to make fundamental decisions about the best way for the nation to respond to the growing wildland fire problem. Because of the critical importance of this step in improving the agencies' overall management of wildland fire, we continue to believe that the agencies should complete a strategy, and begin implementing it, as quickly as possible. The Federal Land Assistance, Management, and Enhancement Act, introduced in 2009, would require the agencies to produce, within 1 year of its enactment, a cohesive strategy consistent with our previous recommendations.²⁹

A document that included the critical elements of a cohesive strategy was created in 2002: an analysis by a team of Forest Service and Interior

²⁶GAO, *Western National Forests: A Cohesive Strategy Is Needed to Address Catastrophic Wildfire Threats*, [GAO/RCED-99-65](#) (Washington, D.C.: Apr. 2, 1999).

²⁷GAO, *Wildland Fire Management: Important Progress Has Been Made, but Challenges Remain to Completing a Cohesive Strategy*, [GAO-05-147](#) (Washington, D.C.: Jan. 14, 2005); *Wildland Fire Management: Update on Federal Agency Efforts to Develop a Cohesive Strategy to Address Wildland Fire Threats*, [GAO-06-671R](#) (Washington, D.C.: May 1, 2006).

²⁸Although the agencies issued a document titled *Protecting People and Natural Resources: A Cohesive Fuels Treatment Strategy* in 2006, this document did not identify long-term options or associated funding for reducing fuels and responding to wildland fires, elements we believe are critical to a cohesive strategy.

²⁹S. 561 (2009); H.R. 1404 (2009).

experts estimated the funds needed to implement each of eight different fuel reduction options for protecting communities and ecosystems across the nation over the next century.³⁰ The team determined that reducing the risks to communities and ecosystems across the nation could require an approximate tripling of funding for fuel reduction, to about \$1.4 billion annually, for an initial period of several years. These initially higher costs for fuel reduction would decline after fuels had been sufficiently reduced to make it possible to use less expensive prescribed burning methods in many areas. More important, the team estimated that the reduction in fuels would allow the agencies to suppress more fires at lower cost and would reduce total wildland fire management costs and risk after 15 years. Alternatively, the team concluded, maintaining the then-current level of investment in fuel reduction would increase costs, as well as risks to communities and ecosystems in the long term.

The Office of Management and Budget raised concerns about the accuracy of the long-term funding estimates used by the strategy document, however, and Office of Management and Budget officials told us in 2006 that the agencies needed to have sufficiently reliable data before they could publish a strategy with long-term funding estimates. Since that time, the agencies have continued to improve their data by nearly completing their LANDFIRE and FPA projects, laying important groundwork for future progress. Our 2008 review of FPA,³¹ however, recognized that although FPA represented a significant step forward and showed promise in meeting several of its objectives, it had limited ability to examine the long-term effects of differing funding allocation strategies—a shortcoming that could limit FPA’s ability to contribute to the agencies’ development of a cohesive strategy.³² In addition, the agencies’ abilities to develop effective long-term options for reducing fuels will improve if they succeed in their current efforts to measure the effectiveness and durability of different fuel reduction treatments.

³⁰Wendell Hann, et al., “A Cohesive Strategy for Protecting People and Sustaining Natural Resources: Predicting Outcomes for Program Options” (a paper presented at the Fire, Fuel Treatments, and Ecological Restoration Conference, a meeting on national wildland fire experts convened by the Forest Service’s Rocky Mountain Research Station, Fort Collins, Colo., April 2002).

³¹[GAO-09-68](#).

³²As previously discussed, senior agency officials told us in 2008 that they are considering making changes to FPA that may improve its ability to examine the effects over time of different funding strategies, although they have yet to determine the exact nature of the changes or how to fund them.

Establish a Cost-Containment Strategy

We reported in 2007 that although the Forest Service and the Interior agencies had taken several steps intended to help contain wildland fire costs, they had not clearly defined their cost-containment goals or developed a strategy for achieving those goals—steps that are fundamental to sound program management.³³ Since our 2007 review, the agencies have continued to implement individual cost-containment steps, including the wildland fire decision support system and updated guidance for implementing the federal wildland fire management policy, but they have yet to develop clear cost-containment goals or a strategy for achieving them, as we recommended in our 2007 report. Without such goals and a strategy, we believe the agencies will have difficulty determining whether they are taking the most important steps first, as well as the extent to which the steps they are taking will help contain costs.

The Forest Service and Interior generally disagreed with the characterization of many of our 2007 findings. In particular, they identified several agency documents—including the 2001 *Review and Update of the 1995 Federal Wildland Fire Management Policy* and their 10-year strategy to implement the National Fire Plan—that they argued clearly define goals and objectives and that make up their strategy to contain costs. Although the documents cited by the agencies provide overarching goals and objectives, they lack the clarity and specificity needed by land management and firefighting officials in the field to help manage and contain wildland fire costs. Interagency policy, for example, established an overarching goal of suppressing wildland fires at minimum cost, considering firefighter and public safety and the importance of resources being protected, but the agencies have established neither clear criteria by which to weigh the relative importance of the often-competing elements of this broad goal, nor measurable objectives by which to determine if the agencies are meeting the goal. As a result, despite improvements the agencies continue to make to policy, decision-support tools, and oversight, we believe that managers in the field lack a clear understanding of the relative importance that the agencies' leadership places on containing costs and—as we concluded in our 2007 report—are therefore likely to continue to select firefighting strategies without due consideration of the costs of suppression. Forest Service officials told us in July 2009 that although they are concerned about fire management costs, they are emphasizing the need to select firefighting strategies on the basis of land management objectives and reducing unnecessary risks to firefighters, an

³³ [GAO-07-655](#).

emphasis that, in the long run, may also help contain costs. Nonetheless, we continue to believe that our recommendations, if effectively implemented, would help the agencies better manage their cost-containment efforts and improve their ability to contain wildland fire costs.

Clearly Define Financial Responsibilities for Fires That Cross Jurisdictions

In 2006, we reported that federal and nonfederal officials had concerns about how costs for suppressing fires that burn across federal, state, and local jurisdictions were shared among federal and nonfederal entities and that these concerns may reflect a more fundamental issue—that those entities had not clearly defined their financial responsibilities for wildland fire suppression, particularly those for the often costly efforts to protect the wildland-urban interface.³⁴ Nonfederal entities—including state forestry entities and tribal, county, city, and rural fire departments—play an important role in protecting communities and resources and responding to fires. We reported in 2006, however, that federal officials were concerned that the existing framework for sharing suppression costs among federal and nonfederal entities, coupled with the availability of federal emergency assistance,³⁵ insulated state and local governments from the cost of providing wildland fire protection in the wildland-urban interface.³⁶ As a result, state and local governments had less incentive to adopt laws (such as building codes requiring fire-resistant building materials in areas at high risk of wildland fire) that, in the long run, could help reduce the cost of suppressing wildland fires. We therefore recommended that the federal agencies work with relevant state entities to develop more-specific guidance as to when particular cost-sharing methods should be used and to clarify their respective financial responsibility for fires that burn, or threaten to burn, across multiple jurisdictions. The agencies have updated their guidance on when particular cost-sharing methods should be used, although we have not

³⁴GAO, *Wildland Fire Suppression: Lack of Clear Guidance Raises Concerns about Cost Sharing between Federal and Nonfederal Entities*, [GAO-06-570](#) (Washington, D.C.: May 30, 2006).

³⁵The Federal Emergency Management Agency can reimburse nonfederal entities for up to 75 percent of allowable fire suppression costs for eligible fires. In 2007 and 2008, two bills were introduced that would have allowed the reimbursement rate to increase to 90 percent, provided the area at risk had adopted building codes and other measures designed to protect communities from wildland fire. S. 2390 (2007); H.R. 5218 (2008).

³⁶[GAO-06-570](#).

evaluated the effect of this guidance. Still, the agencies have yet to clarify the financial responsibility for fires that threaten multiple jurisdictions.

Our 2006 report identified two primary ambiguities regarding financial responsibilities for fire suppression.

- Federal wildland fire management policy states that protecting structures is the responsibility of state, tribal, and local entities but it also states that, under a formal fire protection agreement specifying the financial responsibilities of each entity, federal agencies can assist nonfederal entities to protect the exterior of structures threatened by wildland fire.³⁷ Forest Service guidance defines actions to protect the exterior of structures to include removing fuels in the vicinity of structures and spraying water or retardant on structures or surrounding vegetation. Federal and nonfederal officials agreed that federal agencies can assist with such actions, but they did not agree on which entities are responsible for bearing the costs. Federal officials told us that the purpose of this policy is to allow federal agencies to use their personnel and equipment to help protect homes but not to bear the financial responsibility of providing that protection. Nonfederal officials, however, said that these actions are intended to keep a wildland fire from reaching structures, and financial responsibility should therefore be shared between both federal and nonfederal entities. The Forest Service developed new “structure protection principles” in 2009, but these principles do not clarify the financial responsibilities for suppression actions intended to protect structures.
- The presence of structures adjacent to federal lands can substantially alter fire suppression strategies and raise costs. A previous report and agency officials have questioned which entities are financially responsible for suppression actions taken on federal lands but intended primarily or exclusively to protect adjacent wildland-urban interface areas. Fire managers typically use existing roads and geographic features, such as rivers and ridgelines, as firebreaks to help contain wildland fires. If, however, homes and other structures are located between a fire and such natural firebreaks, firefighters may have to construct other firebreaks and rely more than they would otherwise on aircraft to drop fire retardant to

³⁷Department of the Interior, Department of Agriculture, Department of Energy, Department of Defense, Department of Commerce, Environmental Protection Agency, Federal Emergency Management Agency, and the National Association of State Foresters, *Review and Update of the 1995 Federal Wildland Fire Management Policy* (Washington, D.C.: January 2001).

protect the structures, thereby increasing suppression costs. Nonfederal officials in several states questioned the appropriateness of assigning to nonfederal entities the costs for suppression actions taken on federal lands. They said that an accumulation of fuels on federal lands is resulting in more-severe wildland fires and contributing to the increased cost of fire suppression. They also said that federal agencies are responsible for keeping wildland fires from burning off federal land and should therefore bear the costs of doing so. Federal officials recognized this responsibility, but some also said that with the growing awareness that wildland fires are inevitable in many parts of the country, policy should recognize that wildland fires will occur and are likely to burn across jurisdictional boundaries. In their view, those who own property in areas at risk of wildland fires share a portion of the financial responsibility for protecting it. Previous federal agency reports have also recognized this issue and called for clarifying financial responsibility for such actions.³⁸

Agency officials, in conjunction with officials from nonfederal entities, including the National Association of State Foresters, have initiated an effort intended to help clarify federal and nonfederal financial responsibilities, although it is too early to determine if the effort will succeed. Yet the continuing expansion of the wildland-urban interface and the rising costs for protecting these areas make resolving these issues ever more urgent. Unless the financial responsibilities for multijurisdictional fires are clarified, the concerns that the existing framework insulates nonfederal entities from the cost of protecting the wildland-urban interface from fire—and that the federal government therefore continues to bear more than its share of that cost—are unlikely to be addressed.

Mitigate Effects of Rising Fire Costs on Other Agency Programs

Rising wildland fire costs have led the Forest Service and the Interior agencies to transfer funds from other programs to help pay for fire suppression. The year-to-year variability in the number, location, and severity of fires makes it difficult to estimate needed suppression funds accurately, and when appropriated funds are insufficient to cover actual suppression expenditures, the agencies are authorized to use funds from their other programs to pay for emergency firefighting activities. We reported in 2004 that from 1999 through 2003, the agencies transferred

³⁸See Department of Agriculture, *Secretary of Agriculture Independent Cost-Control Review Panel, FY 2004 Large Cost Wildfires Report* (Washington, D.C.: March 2005), and Department of Agriculture and Department of the Interior, *Consolidation of the 2003 National and Regional Large Incident Strategic Assessment and Oversight Review Key Findings* (Washington, D.C.: September 2003).

more than \$2.7 billion from these other programs.³⁹ The Forest Service transferred funds from numerous programs, including construction and maintenance; the national forest system; and state and private forestry programs that provide grants to states, tribes, communities, and private landowners for fire and insect management, among other purposes. Interior transferred funds primarily from its construction and land acquisition programs. We have not examined this issue in detail since our 2004 report, but in 2009 we testified that funding transfers continued, with the agencies transferring funds in fiscal years 2006, 2007, and 2008.⁴⁰

Although the agencies received additional appropriations to cover, on average, about 80 percent of the funds transferred, we found that the transfers caused the agencies to cancel or delay some projects and fail to fulfill certain commitments to their nonfederal partners. We reported, for example, that funding transfers delayed planned construction and land acquisition projects, which in some cases led to higher project costs due to revised budget and construction plans or higher supply and land acquisition costs. In one instance, the Forest Service delayed purchasing a 65-acre property in Arizona that it had planned to acquire for approximately \$3.2 million in 2002; it was able to purchase the property about a year later, but the cost of the property had increased by \$195,000. Also, although funds were transferred to help the agencies suppress wildland fires, among the delayed projects were ones to reduce fuels to lower the fire risk to communities, construct new firefighting facilities, and provide firefighting training courses.

To help the agencies address the impacts of funding transfers on other agency programs, we recommended in 2004 that they take a number of steps, including improving their methods for estimating annual suppression costs. Typically, the agencies base their estimates of needed suppression funding on the 10-year rolling average of fire costs⁴¹—a

³⁹GAO, *Wildfire Suppression: Funding Transfers Cause Project Cancellations and Delays, Strained Relationships, and Management Disruptions*, [GAO-04-612](#) (Washington, D.C.: June 2, 2004).

⁴⁰GAO, *Wildland Fire Management: Actions by Federal Agencies and Congress Could Mitigate Rising Fire Costs and Their Effects on Other Agency Programs*, [GAO-09-444T](#) (Washington, D.C.: Apr. 1, 2009).

⁴¹The agencies calculate a simple rolling or moving average by computing average annual expenditures over a 10-year period and updating the average each year, using expenditures from the most recent 10 years. Each year's value receives equal weight in the average. The moving average is generally considered to be a lagging indicator of current costs.

method with known problems. Although we noted in our 2004 report that better estimates of the costs of suppressing fires in a given year would reduce the likelihood that the agencies would need to transfer funds from other accounts, the agencies continue to use the 10-year rolling average as the foundation of their budget requests. Interior stated at the time that it believed that the 10-year average was a “reasonable and durable basis for suppression budgeting.” The Forest Service, however, concurred with our recommendation. Nevertheless, a Forest Service official told us in 2008 that the agency had analyzed alternative methods for estimating needed suppression funds but determined that no better method was available. While we recognize that the accuracy of the 10-year average is likely to improve as recent years with higher suppression costs are included in that average, the need to transfer funds in each of the last 3 years suggests that the agencies should continue to seek a more accurate method for estimating needed suppression costs.

In addition to the actions we believe the agencies need to take, we have also suggested that Congress consider legislating alternative approaches to funding wildland fire suppression that could help reduce the need for the agencies to transfer funds. As we reported in 2004, for example, Congress could consider alternative funding approaches for wildland fire suppression, including establishing a reserve account that the agencies could access when their suppression accounts are depleted.⁴² Such an account could provide either a specified amount (a definite appropriation) or as much funding as the agencies need to fund emergency suppression (an indefinite appropriation).

Each approach has advantages and disadvantages. Establishing a reserve account with a definite appropriation would provide the agencies with incentives to contain suppression costs within the amount in the reserve account, but depending on the size of the appropriation and the severity of a fire season, suppression costs could still exceed the funds reserved, and the agencies might still need to transfer funds from other programs. An account with an indefinite appropriation, in contrast, would eliminate the need for transferring funds from other programs but would offer no inherent incentives for the agencies to contain suppression costs. Furthermore, both definite and indefinite appropriations could raise the overall federal budget deficit, depending on whether funding levels for other agency or government programs are reduced. The Federal Land

⁴² [GAO-04-612](#).

Assistance, Management, and Enhancement bill would establish a wildland fire reserve account; the administration's budget for fiscal year 2010 also proposes a \$282 million reserve account for the Forest Service and a \$75 million reserve account for Interior to provide funding for firefighting when the appropriated 10-year average is exhausted.⁴³

Concluding Observations

The agencies responsible for managing wildland fires on federal lands have unquestionably improved their understanding of the nation's wildland fire problem and have positioned themselves to respond to fire more effectively. Noteworthy advances include more flexible firefighting strategies, better information and decision-making tools, and a more coordinated approach. Yet it is not clear how much ground the agencies have gained through these improvements, because at the same time the agencies have been working to improve, the conditions contributing to the nation's fire problem have worsened—with increasing development in the wildland-urban interface, a continued excess of accumulated fuels, and growing evidence of the effects of climate change. The agencies have recognized that additional, strategic action is needed if they are to get ahead of the fire problem rather than simply react to it, but they have yet to take the bold steps we believe are necessary to implement such a strategic approach. Such steps—including implementation of a cohesive strategy and efforts to better predict, contain, and share firefighting costs—could, over time, allow the agencies to better prepare for, and respond to, the severe wildland fire seasons to come. Without such steps, the agencies risk failing to capitalize on the important, but incomplete, improvements they have made—and risk losing ground in their fight to manage the wildland fire problem.

We are making no new recommendations at this time. As noted, however, we believe that our previous recommendations—which the agencies have generally agreed with—could, if implemented, substantially assist the agencies in capitalizing on the important progress they have made to date.

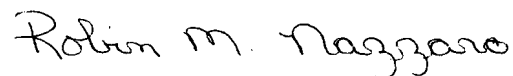
⁴³The FLAME bill would establish in the Treasury a fund known as the Federal Land Assistance, Management, and Enhancement Fund. The fund would include amounts appropriated to it in annual appropriations acts as well as amounts transferred from any fire suppression remaining unobligated at the end of the fiscal year. Money in the fund would be available on a permanent indefinite basis to pay the costs of certain catastrophic emergency wildland fire suppression activities.

Agency Comments

We provided a draft of this report to the Departments of Agriculture and the Interior for comment. Both the Forest Service and the Department of the Interior agreed with the findings in the report. The Forest Service's and Interior's written comments are reproduced in appendixes II and III, respectively.

We are sending copies of this report to interested congressional committees; the Secretaries of Agriculture and the Interior; the Chief of the Forest Service; the Directors of the Bureau of Indian Affairs, Bureau of Land Management, Fish and Wildlife Service, and National Park Service; and other interested parties. The report also is available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staffs have questions about this report, please contact me at (202) 512-3841 or nazzaror@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix IV.



Robin M. Nazzaro
Director, Natural Resources and Environment

List of Congressional Addressees

The Honorable Tom Harkin
Chairman
The Honorable Saxby Chambliss
Ranking Member
Committee on Agriculture, Nutrition, and Forestry
United States Senate

The Honorable Jeff Bingaman
Chairman
The Honorable Lisa Murkowski
Ranking Member
Committee on Energy and Natural Resources
United States Senate

The Honorable Collin C. Peterson
Chairman
The Honorable Frank D. Lucas
Ranking Member
Committee on Agriculture
House of Representatives

The Honorable Nick J. Rahall II
Chairman
Committee on Natural Resources
House of Representatives

The Honorable Dianne Feinstein
Chairman
The Honorable Lamar Alexander
Ranking Member
Subcommittee on Interior, Environment,
and Related Agencies
Committee on Appropriations
United States Senate

The Honorable Joe Baca
Chairman
The Honorable Jeff Fortenberry
Ranking Member
Subcommittee on Department Operations,
Oversight, Nutrition, and Forestry
Committee on Agriculture
House of Representatives

The Honorable Norman D. Dicks
Chairman
The Honorable Michael K. Simpson
Ranking Member
Subcommittee on Interior, Environment,
and Related Agencies
Committee on Appropriations
House of Representatives

The Honorable Raul M. Grijalva
Chairman
The Honorable Rob Bishop
Ranking Member
Subcommittee on National Parks, Forests,
and Public Lands
Committee on Natural Resources
House of Representatives

Appendix I: Scope and Methodology

To determine progress the Forest Service and Department of the Interior agencies have made in managing wildland fire, we reviewed pertinent agency documents and our previous reports and testimonies. To identify the agencies' overall approach to managing wildland fires and any changes they have made to that approach, we reviewed key agency documents, including the 1995 and 2001 federal wildland fire management policies and the key documents making up the National Fire Plan. To identify key steps the agencies have taken to address the growing wildland fire problem and any improvement resulting from these steps, we reviewed agency documents and previous GAO reports and testimonies related to wildland fire. To further our understanding of the changes in the agencies' approach to managing wildland fire and the steps they have taken to address the problem—and to identify any additional agency efforts to improve their wildland fire programs—we interviewed various agency officials, including officials in Washington, D.C., and at the National Interagency Fire Center in Boise, Idaho.

To determine the key actions we previously recommended and believe are still needed to improve the agencies' management of wildland fire, we reviewed our previous reports and testimonies and identified steps we had previously recommended the agencies take to improve their wildland fire programs. In many cases, our earlier recommendations were based on our review of agency documents and of independent analysis of the agencies' programs (including reviews by the National Academy of Public Administration and the National Association of State Foresters). To determine the status of the agencies' implementation of our recommendations, we reviewed relevant agency documents and interviewed agency officials.

We conducted this performance audit from January 2009 to September 2009, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: Comments from the Department of Agriculture, Forest Service



Forest Service
Washington Office

1400 Independence Avenue, SW
Washington, DC 20250

File Code: 1430

Date:

SEP 2 2009

Robin M. Nazarro
Director, Natural Resources and Environment
Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Ms. Nazarro:

Thank you for the opportunity to comment on the Government Accountability Office (GAO) draft report, GAO-09-877, "Wildland Fire Management: Federal Agencies Have Taken Important Steps Forward, but Additional Strategic Action is Needed to Capitalize on Those Steps." The Forest Service generally agrees with GAO's findings and confirms the validity of this draft report, which contained no recommendations for further actions. The Forest Service appreciates that GAO has recognized the substantial efforts that the Forest Service and its partners in the wildland fire community have undertaken to improve wildland fire management in recent years. Many of the key actions GAO points to as remaining to be completed are multi-jurisdictional in nature. They require collaboration among Federal and State wildland fire partners, and we will continue to work with these partners to make wildland fire management more effective.

Fundamentally, we believe engaging in a robust use of risk management protocols in wildland fire management, which includes assessing risk to life and property, will link to governance that results in informed, strategic choices on each incident.

Any issues or concerns we had were raised during our briefing meeting and have been adequately addressed. We acknowledge the substantial effort on the part of GAO in conducting this report and look forward to working with GAO in the future.

If you have further questions, please contact Sandy T. Coleman, Forest Service Assistant Director for GAO/OIG Audit Liaison Staff, at 703-605-4699.

Sincerely,

THOMAS L. TIDWELL
Chief

cc: Jaelith H Rivera, Erica Kim



Caring for the Land and Serving People



Appendix III: Comments from the Department of the Interior



United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, DC 20240



AUG 28 2009

Ms. Robin M. Nazzaro
Director, Natural Resources and Environment
United States Government Accountability Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Ms. Nazzaro:

Thank you for the opportunity to review and comment on the Government Accountability Office draft report entitled "*Wildland Fire Management: Federal Agencies Have Taken Important Steps Forward, but Additional Strategic Action is Needed to Capitalize on Those Steps*," (GAO-09-877). The Department of the Interior generally agrees with the findings in this draft report and believes GAO accurately portrayed the substantial progress the Department has made in recent years - together with our partners - to better manage wildland fire. The draft report contains no new recommendations for further action. We appreciate GAO's summary of previous reviews and recommendations contained in this draft report. The Department is committed to continuing this progress.

Any issues or concerns we had with your review were raised during our meeting and have been adequately addressed. We acknowledge the substantial effort on the part of GAO in conducting this draft report, and look forward to working with them again in the future.

Please contact Mr. Kirk Rowdabaugh, Director, Office of Wildland Fire Coordination, at 202-606-3447 with any questions.

Sincerely,

For
Rhea Suh
Assistant Secretary
Policy, Management and Budget

Appendix IV: GAO Contact and Staff Acknowledgments

GAO Contact

Robin M. Nazzaro, (202) 512-3841, or nazzaror@gao.gov

Staff Acknowledgments

In addition to the individual named above, Steve Gaty, Assistant Director; David P. Bixler; Ellen W. Chu; Jonathan Dent; Richard P. Johnson; and Kim Raheb made key contributions to this report.

Related GAO Products

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