

June 2007

# WILDLAND FIRE MANAGEMENT

## Lack of Clear Goals or a Strategy Hinders Federal Agencies' Efforts to Contain the Costs of Fighting Fires





Highlights of [GAO-07-655](#), a report to congressional requesters

## Why GAO Did This Study

Annual appropriations to prepare for and respond to wildland fires have increased substantially over the past decade, in recent years totaling about \$3 billion. The Forest Service within the Department of Agriculture and four agencies within the Department of the Interior (Interior) are responsible for responding to wildland fires on federal lands. GAO determined what steps federal agencies have taken, in response to findings from previous studies, to (1) address key operational areas that could help contain the costs of preparing for and responding to wildland fires and (2) improve their management of their cost-containment efforts. To address these objectives, GAO reviewed previous cost-containment studies and other agency documents and interviewed agency officials.

## What GAO Recommends

GAO recommends that the Secretaries of Agriculture and the Interior take several steps to improve their management of cost-containment efforts, including establishing clearly defined goals and measurable objectives and a strategy to achieve them, and provide this information to Congress in preparation for the 2008 fire season. The Forest Service and Interior generally disagreed with GAO's findings, stating that GAO did not accurately portray some of the agencies' actions to contain costs. They neither agreed nor disagreed with GAO's recommendations.

[www.gao.gov/cgi-bin/getrpt?GAO-07-655](http://www.gao.gov/cgi-bin/getrpt?GAO-07-655).

To view the full product, including the scope and methodology, click on the link above. For more information, contact Robin M. Nazzaro at (202) 512-3841 or [nazzaror@gao.gov](mailto:nazzaror@gao.gov).

# WILDLAND FIRE MANAGEMENT

## Lack of Clear Goals or a Strategy Hinders Federal Agencies' Efforts to Contain the Costs of Fighting Fires

### What GAO Found

The Forest Service and Interior agencies have initiated a number of steps to address key operational areas previously identified as needing improvement to help federal agencies contain wildland fire costs, but the effects on containing costs are unknown, in part because many of these steps are not yet complete. First, federal firefighting agencies are developing a system to help them better identify and set priorities for lands needing treatment to reduce fuels, but they have yet to decide how they will keep data in the system current. Second, federal agencies have taken some steps to improve how they acquire and use personnel, equipment, and other firefighting assets—such as implementing a computerized system to more efficiently dispatch and track available firefighting assets—but have not yet completed the more fundamental step of determining the appropriate type and quantity of firefighting assets needed for the fire season. Third, the agencies have clarified certain policies and are improving analytical tools that assist officials in identifying and implementing an appropriate response to a given fire, but several other policies limit the agencies' use of less aggressive firefighting strategies, which typically cost less. Fourth, federal agencies, working with nonfederal entities, have recently taken steps to clarify guidance to better ensure that firefighting costs are shared consistently for fires that threaten both federal and nonfederal lands and resources, but it is unclear how the agencies will ensure that this guidance is followed.

The agencies have also taken steps to address previously identified weaknesses in their management of cost-containment efforts, but they have neither clearly defined their cost-containment goals and objectives nor developed a strategy for achieving them—steps that are fundamental to sound program management. Although the agencies have established a broad goal of suppressing wildland fires at minimum cost—considering firefighter and public safety and resources and structures to be protected—they have no defined criteria by which to weigh the relative importance of these often-competing priorities. As a result, according to agency officials and reports, officials in the field lack a clear understanding of the relative importance the agencies' leadership places on containing costs and therefore are likely to select firefighting strategies without due consideration of the costs of suppression. The agencies also have yet to develop a vision of how the various cost-containment steps they are taking relate to one another or to determine the extent to which these steps will be effective. The agencies are working to develop a better cost-containment performance measure, but the measure may take a number of years to fully refine. Finally, the agencies have taken, or are beginning to take, steps to improve their oversight and increase accountability—such as requiring agency officials to evaluate firefighting teams according to how well they contained costs—although the extent to which these steps will assist the agencies in containing costs is unknown.

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United States Government Accountability Office  
Washington, DC 20548

June 1, 2007

The Honorable Jeff Bingaman  
Chairman  
Committee on Energy and Natural Resources  
United States Senate

The Honorable Larry E. Craig  
United States Senate

The federal government's cost of preparing for and responding to wildland fires, which burn millions of acres each year, has increased substantially over the past decade. Five federal land management agencies—the Forest Service within the Department of Agriculture (Agriculture) and the Bureau of Land Management, Bureau of Indian Affairs, National Park Service, and Fish and Wildlife Service within the Department of the Interior (Interior)—are responsible for managing wildland fires on federal lands. A firefighting agency's response to a wildland fire can range from monitoring the fire while letting it burn to aggressively suppressing it. In choosing a response, agency officials must assess a number of factors that can affect the size and severity of the fire as well as the value of threatened resources, such as communities, watersheds, or natural resources. In recent years, accumulations of fuels, due in part to past suppression policies, and severe drought and weather in some areas of the country have contributed to more-severe fires and longer fire seasons. At the same time, wildland fires have increasingly threatened not only federal lands and public resources, such as forests and watersheds, but also nonfederal lands and resources, including homes and other structures, as development has continued to expand into areas in or near wildlands—commonly known as the wildland-urban interface. Consequently, preparing for and responding to wildland fires has become more costly. Over the past decade, annual wildland fire appropriations to prepare for and suppress wildland fires, including appropriations for reducing fuels, have increased from an average of \$1.1 billion from fiscal years 1996 through 2000 to more than \$2.9 billion from fiscal years 2001 through 2005;

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adjusted for inflation, the appropriations increased from \$1.3 billion to \$3.1 billion.<sup>1</sup>

Congress, the Office of Management and Budget, federal agency officials, and others have expressed concerns about the mounting federal wildland fire expenditures. Over the last decade, these concerns have led federal agencies (including the Forest Service, Interior, the Agriculture Office of Inspector General, and GAO) and other organizations (including the National Association of State Foresters and the National Academy of Public Administration<sup>2</sup>) to conduct numerous reviews of the federal wildland fire program. These reviews generally sought to identify the reasons for worsening wildland fire severity and increasing expenditures and to recommend possible steps that federal agencies could take to contain costs. Despite the dozens of studies conducted, problems identified, and hundreds of recommendations for agency action, concerns remain about the increasing costs of preparing for and responding to wildland fires and the effectiveness of the agencies' efforts to contain those costs.

In this context, we examined the responsible federal agencies' efforts to contain wildland fire costs. This report discusses steps the Forest Service and Interior agencies have taken, in response to findings from previous studies, to (1) address key operational areas that could help contain the costs of preparing for and responding to wildland fires and (2) improve their management of their cost-containment efforts.

To address these issues, we reviewed selected studies—most conducted since 2000 by federal, state, and nongovernmental entities—that evaluated issues related to wildland fire cost containment, including studies of several large fires. We reviewed the issues these studies identified as needing improvement to help contain costs and categorized them into

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<sup>1</sup>Federal expenditures are a more direct measure of the federal government's investment in wildland fire activities, but the Forest Service and Interior agencies were unable to provide us with consistent data on these expenditures for the years we reviewed. As a result, we are instead reporting appropriations data. We adjusted the appropriations dollars for inflation, using the chain-weighted gross domestic product price index with fiscal year 2005 as the base year.

<sup>2</sup>The National Association of State Foresters is a nonprofit organization representing the directors of the forestry agencies of the 50 states, the District of Columbia, and 8 United States territories. The National Academy of Public Administration is an independent, nonpartisan organization chartered by Congress to help federal, state, and local governments improve the management and administration of government agencies.

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broad areas corresponding to key operational areas of preparing for and responding to wildland fires. To corroborate our understanding and categorization of the issues and the steps that federal agencies have taken to address the issues, we interviewed officials from the Forest Service, Bureau of Land Management, and Office of Wildland Fire Coordination within Interior at the national offices in Washington, D.C., and at the National Interagency Fire Center in Boise, Idaho.<sup>3</sup> We also reviewed program documents from the Forest Service and Interior agencies. These documents, along with Congressional Research Service reports, provided information on the costs of preparing for and responding to wildland fires. Appendix I describes our scope and methodology in more detail, and appendix II lists many of the studies we reviewed. We performed our work in accordance with generally accepted government auditing standards, which included an assessment of data reliability, from May 2006 through May 2007.

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## Results in Brief

The Forest Service and Interior agencies have initiated a number of steps to address issues that previous studies identified as needing improvement to help federal agencies contain wildland fire costs, but the effects of these steps on containing costs are unknown, in part because many of the steps are not yet complete. These issues are generally related to the key operational areas of reducing accumulated fuels, acquiring and using firefighting personnel and equipment, and selecting firefighting strategies. Concerns have also been raised about the framework used to share firefighting costs between federal and nonfederal entities.

- *Reducing accumulated fuels.* Federal firefighting agencies have made progress in developing a system to help them better identify and set priorities for lands needing treatment to reduce accumulated fuels. Many studies have identified fuel reduction as important for containing wildland fire costs because accumulated fuels can contribute to more-severe and more costly fires. The agencies' new system, LANDFIRE, is scheduled for completion in 2009, but the agencies have yet to decide how they will keep data in the system current. Forest Service and Interior officials told us they recognize the importance of ensuring that data are periodically

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<sup>3</sup>The National Interagency Fire Center is the nation's support center for wildland firefighting. Representatives from each of the five wildland firefighting agencies, as well as from the National Association of State Foresters, National Weather Service, and Office of Aircraft Services, are located there and work together to coordinate and support wildland fire and disaster operations.

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updated, and they are developing a plan to operate and maintain the system, including determining how often data will be updated.

- *Acquiring and using firefighting assets.* Federal firefighting agencies have also taken some steps to improve how they acquire and use firefighting personnel, aviation resources, equipment, and supplies—assets that constitute a major cost of responding to wildland fires—but much remains to be done. Agencies have computerized their systems for dispatching and monitoring firefighting assets and for gathering and analyzing cost data, although project officials could not quantify the savings resulting from such efforts. Agencies have not yet improved their systems for determining the appropriate type and quantity of firefighting assets needed for the fire season or for effectively and efficiently procuring them.
- *Selecting firefighting strategies.* The agencies have clarified certain policies and are improving analytical tools that assist agency officials in identifying and implementing an appropriate response to a given fire, but shortcomings remain. Officials have a wide spectrum of strategies available to them when responding to wildland fires, some of which can be significantly more costly than others. For individual fires, studies have found that officials may not always consider the full range of available strategies and may not select the most appropriate one, which would consider the cost of suppression; value of structures and other resources threatened by the fire; and, where appropriate, any potential benefits to natural resources. The agencies use the term “appropriate management response” for a strategy that considers these factors. The agencies updated their policies in 2004 to require officials to consider the full spectrum of available strategies when selecting a firefighting strategy, but studies have identified several policies that limit the agencies’ use of less aggressive strategies, which typically cost less. The agencies are also continuing to refine existing tools, and to develop new ones, for analyzing both fuel and predicted weather conditions to model expected fire behavior, information that officials can use to identify appropriate suppression strategies. These tools are still being designed and tested, however, and it is not yet clear to what extent these tools will affect officials’ selection of firefighting strategies.
- *Sharing wildland fire costs.* We and others have also reported that the existing framework for sharing firefighting costs between federal and nonfederal entities insulates state and local governments from the cost of protecting homes and communities in or near wildlands, which may reduce those governments’ incentive to adopt building codes and land use requirements that could help reduce the cost of suppressing wildland fires.

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Federal agencies, working with some nonfederal entities, have recently taken steps to clarify guidance and better ensure that firefighting costs are shared consistently for fires that threaten both federal and nonfederal lands and resources. It is unclear, however, how the agencies will ensure that this guidance is followed in the field.

The agencies have also taken steps to address previously identified weaknesses in their management of cost-containment efforts, but they have neither clearly defined their cost-containment goals and objectives nor developed a strategy for achieving them—steps that are fundamental to sound program management. To manage their cost-containment efforts effectively, the Forest Service and Interior agencies should, at minimum, have (1) clearly defined goals and measurable objectives, (2) a strategy to achieve the goals and objectives, (3) performance measures to track progress, and (4) a framework for holding the appropriate agency officials accountable for achieving the goals.<sup>4</sup> First, although the agencies have established a broad goal of suppressing wildland fires at minimum cost considering firefighter and public safety and the resources and structures to be protected, they have established neither clear criteria by which to weigh the relative importance of these often-competing priorities, nor measurable objectives by which to determine if they are meeting their goals. Without such criteria and objectives, according to agency officials we interviewed and reports we reviewed, officials in the field lack a clear understanding of the relative importance that the agencies' leadership places on containing costs and, therefore, are likely to select firefighting strategies without due consideration of the costs of suppression. Second, the agencies have not developed a vision of how the various cost-containment steps they are taking relate to one another or determined the extent to which these steps will be effective. Third, the agencies are working to develop a better performance measure for containing costs, but the measure may take a number of years to fully refine, and, moreover, the agencies have yet to identify the cost-containment goals they are trying to achieve. Finally, the agencies have also taken, or are beginning to take, steps to improve their oversight and accountability framework—such as requiring officials to evaluate firefighting teams according to how well they contained costs—although the extent to which these steps will assist the agencies in containing costs is unknown.

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<sup>4</sup>Principles of sound program management for federal agencies are established in, among other sources, the Government Performance and Results Act of 1993 and GAO, *Standards for Internal Control in the Federal Government*, [GAO/AIMD-00-21.3.1](#) (Washington, D.C.: Nov. 1999).

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Without clear goals and a strategy for containing wildland fire costs, the agencies are unable to effectively and efficiently manage their myriad ongoing efforts to contain wildland fire costs. To help them do so, and to assist Congress in its oversight role, we are recommending that the Secretaries of Agriculture and the Interior work together to direct their respective agencies to (1) establish clearly defined goals and measurable objectives for containing wildland fire costs, (2) develop a strategy to achieve these goals and objectives, (3) establish performance measures that are aligned with these goals and objectives, and (4) establish a framework to ensure that officials are held accountable for achieving the goals and objectives. Because of the importance of these actions and continuing concerns about the agencies' response to the increasing cost of wildland fires—and so that the agencies can use the results of these actions to prepare for the 2008 fire season—the agencies should provide Congress with this information no later than November 2007.

In commenting on a draft of this report, the Forest Service and Interior generally disagreed with the characterization of many of our findings; they neither agreed nor disagreed with our recommendations. In particular, the Forest Service and Interior stated that they did not believe we had accurately portrayed some of the significant actions they had taken to contain wildland fire costs, and they identified several agency documents that they believe provide clearly defined goals and objectives that make up their strategy to contain costs. We added further clarifying language, where appropriate, to more accurately characterize some of the agencies' actions. Although documents cited by the agencies provide overarching goals and objectives, we believe that they lack the clarity and specificity needed by their land management and firefighting officials in the field to help manage and contain wildland fire costs. We 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. The Forest Service and Interior's joint comments, and our evaluation of them, are included in appendix III.

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## Background

Wildland fires triggered by lightning are both natural and inevitable and play an important ecological role in 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 harvest—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 can threaten human lives, health, property, and infrastructure as more homes and communities are built in or near areas at risk from wildland fires. Over the past decade, the number of acres burned annually by wildland fires in the United States has substantially increased.

Federal appropriations to the Forest Service and Interior agencies to prepare for and respond to wildland fires, including appropriations for fuel treatments have almost tripled, from an average of \$1.1 billion from fiscal years 1996 through 2000 to more than \$2.9 billion from fiscal years 2001 through 2005 (see table 1). Adjusting for inflation, the average annual appropriations for these periods increased from \$1.3 billion to \$3.1 billion. The Forest Service received about 70 percent and Interior about 30 percent of the funds appropriated.

**Table 1: Forest Service and Interior Wildland Fire Appropriations and Distribution, by Wildland Fire Activity, Fiscal Years 1996 through 2005**

Dollars in millions

Fiscal year	Total appropriations		Distribution of appropriations, by wildland fire activity (percentage)		
	Nominal	Inflation-adjusted <sup>a</sup>	Preparedness <sup>b</sup>	Suppression <sup>c</sup>	Other <sup>d</sup>
1996	\$772.3	\$924.8	55.2%	44.8%	N/A
1997	1,081.9	1,273.3	42.8	57.2	N/A
1998	1,119.3	1,301.6	42.5	57.5	N/A
1999	1,159.2	1,330.6	45.9	54.1	N/A
2000	1,588.9	1,787.6	36.8	63.2	N/A
2001	2,863.6	3,147.4	32.4	67.6	N/A
2002	2,269.1	2,447.2	39.8	31.0	29.2%
2003	3,195.6	3,378.1	27.8	53.9	18.4
2004	3,293.8	3,394.1	28.1	52.7	19.2
2005	2,998.6	2,998.6	31.2	46.4	22.4

Source: GAO analysis of Congressional Research Service data.

Note: N/A, not applicable.

<sup>a</sup>We adjusted the appropriations dollars for inflation, using the chain-weighted gross domestic product price index with fiscal year 2005 as the base year.

<sup>b</sup>Includes appropriations for hiring, training, and paying fire organization personnel; for acquiring needed equipment; and for prevention activities, including public education efforts.

<sup>c</sup>Includes emergency supplemental and contingent appropriations that Congress provided to fund suppression activities in years when agencies' suppression expenditures exceeded the funds initially appropriated.

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<sup>4</sup>Includes appropriations for fuel reduction activities for fiscal years 2002 through 2005; fuel reduction activities were limited before fiscal year 2002 and are included in the suppression column.

Increases in the size and severity of wildland fires, and in the cost of preparing for and responding to them, have led federal agencies to fundamentally reexamine their approach to wildland fire management. For decades, federal agencies aggressively suppressed wildland fires and were generally successful in decreasing the number of acres burned. In some parts of the country, however, rather than eliminating severe wildland fires, decades of suppression contributed to the disruption of ecological cycles and began to change the structure and composition of forests and rangelands, thereby making lands more susceptible to fire. Increasingly, the agencies have recognized the role that fire plays in many ecosystems and the role that it could play in the agencies' management of forests and watersheds. The agencies worked together to develop a federal wildland fire management policy in 1995, which for the first time formally recognized the essential role of fire in sustaining natural systems. This policy was subsequently reaffirmed and updated in 2001. The agencies, in conjunction with Congress, also began developing the National Fire Plan in 2000.<sup>5</sup> To align their policies and to ensure a consistent and coordinated effort to implement the federal wildland fire policy and National Fire Plan, Agriculture and Interior also established the Wildland Fire Leadership Council in 2002.<sup>6</sup> In addition to noting the negative effects of past successes in suppressing wildland fires, the policy and plan also recognized that continued development in the wildland-urban interface has placed more structures at risk from wildland fire at the same time that it has increased the complexity and cost of wildland fire suppression. Forest Service and university researchers estimated in 2005 that about 44 million homes in the lower 48 states are located in the wildland-urban interface.

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<sup>5</sup>The 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 in fiscal year 2001, and (3) several approved and draft strategies to implement all or parts of the plan.

<sup>6</sup>The Wildland Fire Leadership Council is composed of senior Agriculture and Interior officials, including the Agriculture Undersecretary for Natural Resources and Environment; the Interior Assistant Secretary for Policy, Management, and Budget; the Interior Deputy Assistant Secretary for Business Management and Wildland Fire; and the heads of the five federal firefighting agencies. Other members include representatives of the Intertribal Timber Council, the National Association of State Foresters, and the Western Governors' Association.

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To help address these trends, current federal policy directs agencies to consider land management objectives—identified in land and fire management plans developed by each local unit, such as a national forest or a Bureau of Land Management district—and the structures and resources at risk when determining whether or how to suppress a wildland fire. When a fire starts, the land manager at the affected local unit is responsible for determining the strategy that will be used to respond to the fire. A wide spectrum of strategies is available to choose from, some of which can be significantly more costly than others. For example, the agencies may fight fires ignited close to communities or other high-value areas more aggressively than fires on remote lands or at sites where fire may provide ecological or fuel-reduction benefits. In some cases, the agencies may simply monitor a fire, or take only limited suppression actions, to ensure that the fire continues to pose little threat to important resources, a practice known as “wildland fire use.”

An incident commander is responsible for implementing the suppression strategy selected by the land manager, including determining the tactics to use and ordering the firefighting assets needed to carry out the strategy. For large and complex fires, an incident management team comprising not only an incident commander but also a cadre of personnel to handle command, planning, logistics, operations, and finance functions manages suppression operations. The incident management team orders firefighting assets—including personnel, aircraft, equipment, and supplies—through a three-tiered system of local, regional, and national dispatch centers.

Because one firefighting agency alone cannot handle all wildland fires that may burn in its jurisdiction and because a single fire may burn across federal, state, and local jurisdictions, the five federal land management agencies work together with tribal, state, and local firefighting entities to respond to a fire. These entities develop agreements, often called master agreements, that guide cooperative fire protection efforts and include provisions for sharing the costs of these efforts. When a fire is first detected, firefighting entities normally follow a principle of “closest available resource,” whereby, regardless of jurisdiction, the closest available firefighting personnel and equipment respond to the fire. As the fire continues to burn, these entities use an interagency incident management system with an organizational structure that expands to meet a fire’s complexity and demands; this system enables entities to share firefighting assets and facilitates an effective response.

Since the mid-1990s, when annual federal expenditures for wildland fire suppression approached \$1 billion for the first time, numerous studies

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have been conducted examining steps that federal agencies could take to contain wildland fire suppression costs (see app. II). Some of these studies were produced in response to direction from Congress, some were initiated by the agencies themselves, and the National Academy of Public Administration conducted a series of five studies beginning in 2000. In addition, Agriculture's Inspector General, the National Association of State Foresters, and GAO have all examined the agencies' efficiency and effectiveness in wildland firefighting. In 2005, the Forest Service hired a consultant to review 22 recent reports and to evaluate the cost-effectiveness of the reports' more than 300 recommendations.

Because previous reports have, year after year, identified many of the same issues as needing improvement and recommended similar steps to address those issues, some recent studies have concluded that the agencies lack the leadership commitment to make the changes needed to contain wildland fire costs. The National Association of State Foresters, for example, reported that strong national leadership and a mechanism to hold officials throughout the agencies accountable for their decisions are needed to effectively contain wildland fire costs. The report concluded, however, that the Forest Service and Interior agencies had made little progress in developing a broad and effective response and appeared to lack the leadership commitment to make needed changes. An independent panel convened by the Wildland Fire Leadership Council reached a similar conclusion. Further, the Agriculture Inspector General reported that shortcomings identified in Forest Service management, although not specific to the wildland fire program, have proven resistant to change. In particular, the Inspector General noted that the Forest Service delegates broad authority to field units but does not have adequate internal controls, including appropriate performance measures, to ensure that agency policies are followed.

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## To Help Contain Costs, Federal Agencies Are Taking Some Steps to Target Operational Areas Identified as Needing Improvement, but Results Are Unknown

Dozens of studies by federal agencies and other organizations examining federal agencies' management of wildland fire have repeatedly identified a number of similar issues related to wildland fire operations as needing improvement to help contain wildland fire costs. These issues generally fall into one of three operational areas—reducing accumulated fuels, acquiring and using firefighting assets, and selecting firefighting strategies. Recent studies have also raised concerns about the framework used to share the cost of fighting fires between federal and nonfederal entities. Federal agencies have a number of efforts under way to address needs for improvement, but in part because many of the efforts are incomplete, the results of these efforts are unknown.

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## System to Help Identify and Set Priorities for Lands Needing Fuel Treatment Is under Development but Not Yet Completed

Numerous studies have reported that reducing accumulated vegetation and other fuels, although not directly part of wildland firefighting, is a key area needing attention if the agencies are to effectively contain wildland fire preparedness and suppression costs. These fuels can contribute to larger and more-severe wildland fires and, consequently, to increasing preparedness and suppression costs. The studies also identified several factors that hindered the agencies' ability to effectively reduce fuels. For example, we issued a number of reports, beginning in 1999, that found that the agencies lacked (1) basic data needed to identify and prioritize lands needing fuel reduction treatment; (2) a sound framework to ensure that funds appropriated to reduce fuels were spent in an effective, efficient, and timely manner; and (3) a cohesive strategy for addressing accumulated fuels and wildland fire problems.<sup>7</sup> Other organizations, including the Agriculture Inspector General and the National Association of State Foresters, reported similar findings. A 2001 update of the federal wildland fire management policy also reported that no centralized database was available to agency officials and scientists for compiling consistent information and using that information for long-term monitoring, research, or planning.

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<sup>7</sup>GAO, *Western National Forests: A Cohesive Strategy Is Needed to Address Catastrophic Wildfire Threats*, [GAO/RCED-99-65](#) (Washington, D.C.: Apr. 2, 1999); *Severe Wildland Fires: Leadership and Accountability Needed to Reduce Risks to Communities and Resources*, [GAO-02-259](#) (Washington, D.C.: Jan. 31, 2002); *Wildland Fire Management: Additional Actions Required to Better Identify and Prioritize Lands Needing Fuels Reduction*, [GAO-03-805](#) (Washington, D.C.: Aug. 15, 2003); *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); and *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).

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To help address these shortcomings, the agencies are developing a geospatial data and modeling system, called LANDFIRE, but the agencies have yet to decide how they will keep data in the system current. LANDFIRE—about a \$39 million undertaking shared by the Forest Service and Interior—is intended to produce consistent and comprehensive maps and data describing vegetation, wildland fuels, and fire regimes across the United States.<sup>8</sup> The agencies will be able to use this information to help identify fuel accumulations and fire hazards across the nation, help set nationwide priorities for fuel reduction projects, and assist in identifying the appropriate response when wildland fires do occur. According to Forest Service and Interior officials, the agencies completed mapping the western United States in April 2007; mapping of the eastern states is scheduled to be completed by 2008 and of Alaska and Hawaii by 2009. The agencies are developing, but have not yet finalized, a plan for routinely updating data to reflect changes to fuels, including from landscape-altering events, such as hurricanes, disease, or wildland fires themselves. Such a step is critical for keeping the system both current and relevant over the long term and for ensuring that the funds invested in LANDFIRE will be of more than short-term value. Forest Service and Interior officials told us that they recognize the importance of ensuring that data are periodically updated, and they are developing a plan to operate and maintain the system, including determining how often data will be updated. The officials expect to submit this plan in June 2007 to the Wildland Fire Leadership Council for approval.

The agencies have yet to develop a cohesive strategy, including long-term options and associated funding, to address accumulated fuels and wildland fire problems, although they agreed with our recommendation that they do so. In February 2006, the agencies completed a document titled *Protecting People and Natural Resources: A Cohesive Fuels Treatment Strategy*. Our review of this document, however, showed that it did not include long-term options and associated funding, which are key elements of an effective cohesive strategy. Officials from the Office of Management and Budget told us they would not allow the firefighting agencies to publish long-term funding estimates until the agencies had sufficiently reliable data on which to base those estimates. As a result, we recommended that the agencies develop a joint tactical plan outlining the

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<sup>8</sup>A 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.

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critical steps, together with related time frames, that they would take to complete a cohesive strategy. Such a strategy and tactical plan would help Congress and the agencies in making informed decisions about effective and affordable long-term approaches to addressing the nation's wildland fire problems, but as of April 2007, the agencies had developed neither a cohesive strategy nor a tactical plan. Because containing costs is one of several goals of the wildland fire program, developing a cohesive strategy that addresses all aspects of the agencies' preparation for and response to wildland fires is fundamental if the agencies are to contain costs.

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### Agencies Have Addressed Few of the Problems Identified in Their Acquisition and Use of Firefighting Assets

Federal firefighting agencies have taken some steps to improve how they acquire and use firefighting personnel, aviation resources, equipment, and supplies—an area that studies have identified as needing improvement to better contain costs, especially because firefighting assets constitute a major cost of responding to wildland fires—but much remains to be done. Issues identified as needing improvement included 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.

### Determining the Appropriate Type and Quantity of Wildland Firefighting Assets for a Fire Season

Studies have reported that the agencies do not use a shared or integrated system for determining the appropriate type and quantity of firefighting assets—personnel, aviation resources, equipment, and supplies—that they need during a fire season to respond effectively and efficiently to wildland fires. This problem is part of a larger issue: the agencies have no standardized budgeting and resource allocation process. In 2001, a team of Forest Service, Interior, and state officials evaluated the processes used by the Forest Service and Interior agencies to determine wildland fire budget needs and to allocate resources among fire management activities. The team found a number of problems.<sup>9</sup> First, agencies' budgeting and resource allocation systems differed from one to the other, and as a result, it was difficult to evaluate and compare information across agencies. Yet given

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<sup>9</sup>U.S. Department of Agriculture, Forest Service, and U.S. Department of the Interior, *Developing an Interagency, Landscape-Scale Fire Planning Analysis and Budget Tool* (Washington, D.C.: November 2001).

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the cooperative firefighting system used in the United States, a common federal budgeting and allocation system would help ensure that each agency's resources and firefighting assets are considered when determining type, quantity, and location of firefighting assets needed for a fire season. Second, the systems to budget and allocate resources for different fire management activities within an agency, such as fuel reduction and wildland fire response, were not integrated, even though these programs can complement one another in achieving overall land management goals and objectives. For example, funds spent to reduce accumulated fuels may help reduce the number of severe wildland fires and, accordingly, wildland firefighting costs. Third, the team found that some of the systems used by individual agencies did not provide managers with the tools to determine the most cost-effective type and quantity of firefighting assets or where they should be located to most effectively respond to wildland fires. Determining the appropriate types, quantity, and location of firefighting assets is key to carrying out a rapid, effective, and efficient response. The review team recommended that Agriculture and Interior develop and implement a common interagency process that would identify resource needs for the full scope of fire management activities and develop the most cost-effective allocation of fire program resources across and within these activities. In 2002, the National Academy of Public Administration similarly reported that the agencies needed a national budgeting methodology to analyze the cost, benefit, number, composition, location, mobility, productivity, and seasonality of each type of firefighting asset.<sup>10</sup>

Although the agencies are working on two efforts that could potentially improve their ability to determine the appropriate type and quantity of firefighting assets needed for a fire season, it is unclear whether these efforts will actually do so. The first effort is development of a Fire Program Analysis (FPA) system, which was proposed and funded to help the agencies

- determine national budget needs by analyzing budget alternatives at the local level—using a common, interagency process for fire management planning and budgeting—and aggregating the results;

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<sup>10</sup>National Academy of Public Administration, *Wildfire Suppression: Strategies for Containing Costs* (Washington, D.C.: September 2002).

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- determine the relative costs and benefits for the full scope of fire management activities, including potential trade-offs among investments in fuel reduction, fire preparedness, and fire suppression activities; and
  - identify, for a given budget level, the most cost-effective mix of personnel and equipment to carry out these activities.

Recent design modifications to the system, however, raise questions about the agencies' ability to fully achieve these key goals. A midcourse review of the developing system resulted in the Wildland Fire Leadership Council's approving in December 2006 modifications to the system's design. FPA and senior Forest Service and Interior officials told us they believed the modifications will allow the agencies to meet the key goals. The officials said they expected to have a prototype developed for the council's review in June 2007 and to substantially complete the system by June 2008. We have yet to systematically review the modifications, but after reviewing agency reports on the modifications and interviewing knowledgeable officials, we have concerns that the modifications may not allow the agencies to meet FPA's key goals. For example, under the redesigned system, local land managers will use a different method to analyze and select various budget alternatives, and it is unclear whether this method will identify the most cost-effective allocation of resources. In addition, it is unclear how the budget alternatives for local units will be meaningfully aggregated on a nationwide basis, a key FPA goal.

The agencies are also working together to develop national strategies for the organization, procurement, and management of aviation resources and firefighting crews. Although national Forest Service and Interior officials originally indicated that these strategies would be completed by the end of 2006, as of March 2007, the strategies were unfinished. Agency officials said that it could be another year before the strategies are completed.

#### Acquiring Firefighting Assets Cost-Effectively

Studies also reported that federal firefighting agencies lacked effective systems for acquiring needed firefighting assets cost-effectively, that is, ensuring that vendors provided equipment of sufficient quality at competitive prices. Once the agencies have determined the type and quantity of firefighting assets needed, they must decide where and how to acquire these assets. They have a variety of procurement options to choose from:

- *National contracts* are used for assets that can be deployed anywhere in the nation, including some firefighting crews; aviation resources, such as large helicopters and air tankers; and camp resources, such as catering

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and shower facilities.

- *Regional contracts* are similar to national contracts, but they are executed at the regional or state level.
- *Emergency equipment rental agreements* are often developed before the fire season, but they are executed only when needed; they are used for assets such as firefighting crews, engines, bulldozers, water tenders, and other equipment.
- *Fire caches* store firefighting equipment and other items that can be delivered to a fire; 11 national caches are strategically located around the country.
- *Buying teams* support an incident management team at a fire by procuring services and supplies and renting land and equipment locally.

Several studies reported, however, that despite the agencies' growing reliance on contracted personnel and equipment to carry out firefighting activities, the agencies' acquisition systems had several shortcomings. The National Academy of Public Administration reported that the agencies' acquisition process was unable to help federal firefighting agencies determine the best source for needed firefighting assets—for example, in-house or contracted. The academy, the Forest Service, and other organizations also reported problems with the Forest Service's process for developing contracts and rental agreements for emergency equipment, observing, for example, that requirements varied from contract to contract and did not ensure that the agencies obtained the most cost-effective assets. Further, inadequate administration and oversight of the agreements by the agencies resulted in poor contractor performance and high rental rates. A 2003 interagency report recommended that the Forest Service and Interior agencies establish national standards for agreements and strengthen national control and oversight to better ensure standard operating procedures and policies. Nevertheless, when the Agriculture Inspector General evaluated the same issue in 2005, it found that the problems remained.<sup>11</sup> The Inspector General reported that the Forest Service's administration of the agreements provided the agency with neither the best value nor the best vendor for its dollar. Further, although

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<sup>11</sup>U.S. Department of Agriculture, Office of Inspector General, *Audit Report: Forest Service Emergency Equipment Rental Agreement*, Report No. 08601-40-SF (Washington, D.C.: July 2005).

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the Forest Service identified potential vendors and equipment before a fire season, the agency did not use a competitive bidding process to improve either the price or equipment quality.

Despite planned improvements in the acquisition process, the agencies have made limited progress in implementing needed changes. The effort to improve acquisition practices—led by the Forest Service—is initially focused on developing a nationwide Web-based system for managing the rental agreements for emergency equipment. Such a system would make it easier to locate reliable, cost-effective firefighting assets. The agencies could use the system to help choose suppliers at the time of a fire—using information provided by contractors on equipment specifications, price, and other information—and to evaluate and record contractor performance afterward. A Forest Service official said that when fully implemented, the system will let the agencies better evaluate “best value,” rather than just lowest price for firefighting assets, although the official said that it may be difficult to measure the system’s effect on containing costs. This effort faces some challenges, however. First, while testing a prototype, the Forest Service found problems that are likely to delay completion of the system by more than a year, until fiscal year 2009. Moreover, although using this system will be mandatory for the Forest Service, it will not be required for either Interior or state agencies, according to Forest Service officials, and Interior agencies have expressed concerns about the security of a Web-based system. The Forest Service and Bureau of Land Management have also begun an effort to evaluate the national cache system to ensure that the appropriate types and quantities of items are maintained in the caches. A strategic plan has been developed but, according to the Forest Service national manager in charge of the effort, no changes to the cache system have been made. Finally, a senior Forest Service acquisition official said that the agencies also planned to improve national and regional contracts, but they have not begun these efforts.

## Using Firefighting Assets Effectively and Efficiently

The agencies have taken steps to develop and implement systems to help improve the effective and efficient use of firefighting assets—another area that studies have identified as needing improvement. Studies have reported that agencies sometimes used more, or more-costly, firefighting assets than necessary, often in response to political or social pressures. For example, 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, or air tankers may drop flame retardants when on-the-ground conditions may not warrant such drops. Agency and other studies reported that to more effectively use their

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firefighting assets, the agencies needed to improve their systems for (1) requesting, deploying, tracking, and releasing firefighting assets for a fire and (2) recording and analyzing data about the cost and use of these assets at the time of the fire. The studies also recommended that agencies should make greater use of local incident commanders to reduce the need to mobilize more-costly incident management teams.

The agencies have implemented two systems to help improve the use of their firefighting assets. They completed implementation of a computer-based dispatching system called the Resource Ordering and Status System, or ROSS, in December 2006. For many years, agencies used a manual, paper-based system for requesting and assigning firefighting assets; ROSS was designed to allow the agencies to more effectively and efficiently monitor firefighting assets during a fire or other incident.<sup>12</sup> A project official told us that he could not quantify the actual cost savings resulting from ROSS, but he provided us with a cost-benefit analysis for the project. This analysis indicated potential cost savings from increasing the use of local firefighting assets, which could hasten response and thus perhaps reduce fire size, and from reducing the personnel needed to dispatch resources. In addition, the agencies can also use ROSS 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.

The agencies have also implemented a system, known as I-Suite, to improve the accuracy and completeness of cost and other data needed to effectively monitor and manage firefighting assets. The National Wildfire Coordinating Group<sup>13</sup> chartered a task group in April 2001 to evaluate and recommend a data management application to address what was identified as a perennial problem for incident management teams: lack of data management tools to use at a fire. I-Suite, completed by the Forest Service

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<sup>12</sup>This effort came not in response to reports issued since 2000 but rather from investigations and interagency management reviews of disasters in 1994 involving the loss of life and property. Findings from the investigations and reviews at that time cited shortcomings in the dispatch systems for fire and other incidents, insufficient documentation on the status of firefighting personnel and equipment, and the inability to mobilize appropriate resources in a timely manner. The Secretaries of Agriculture and the Interior, in a December 1995 policy memorandum, directed the agencies to correct the deficiencies in the dispatch process.

<sup>13</sup>The purpose of the National Wildfire Coordinating Group is to coordinate programs of the participating federal and state wildfire management agencies.

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in October 2006, is a set of computer applications designed to automate and improve business practices at a fire through a common system to track and analyze information about firefighting assets, such as personnel hours worked, contractor costs, and fire costs. According to a Forest Service official, I-Suite has helped contain costs by reducing the number of timekeepers needed to process records for personnel and equipment and has improved the accuracy of payment documents, although officials could not quantify the cost savings. Only the Forest Service, however, requires that I-Suite be used on all fires; Interior has recommended but not mandated its use, and I-Suite is optional for state-managed fires.

In addition to implementing these systems, the agencies have taken other steps to improve the agencies' use of aviation resources, which can account for about one-third of all firefighting costs on a large fire. In 2004, the agencies assigned a helicopter coordinator to the national dispatch center in Boise, Idaho, to monitor helicopter use and help identify situations where less expensive helicopters could be deployed. An estimated \$1.8 million in savings were identified in 2005 as a direct result of the helicopter coordinator's efforts. In 2006, the agencies began testing a computer program to assist the helicopter coordinator in identifying the best-value helicopter, given a particular fire's elevation and the temperature. Also beginning in 2006, the national dispatch center assumed control of national aviation resources, including helicopters and air tankers, rather than leaving them under the control of regions or incident management teams. National control of these assets will allow the agencies to evaluate where best to deploy them from a national perspective, rather than from a regional or local perspective. National aviation officials said that this step is important because little incentive exists at the local level to contain costs. Interagency guidance states that the assignment of national assets will be reviewed daily, and national dispatch center officials will make the final decision.

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### Agencies May Miss Opportunities to Increase Their Use of Lower-Cost Firefighting Strategies

The Forest Service and Interior agencies have taken steps, and are considering taking additional steps, to improve their policies on how firefighting strategies are chosen and the analytical tools managers in the field use to compare alternative strategies, issues that previous studies have identified as needing improvement to help contain costs. Although the agencies have made some progress, considerable work remains if they are to seize additional opportunities to increase their use of less aggressive strategies, which typically cost less.

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Land managers and incident management teams have a wide spectrum of strategies available to them when responding to wildland fires, some of which can be significantly more costly than others. These strategies range from having a few personnel monitor a fire while allowing it to burn to achieve ecological benefits, a practice known as wildland fire use, to mobilizing all available personnel and equipment to try to control the entire perimeter of the fire or otherwise suppress it as quickly as possible. In selecting a strategy for a particular fire, land managers are required to consider the cost of suppression; value of structures and other resources threatened by the fire; and, where appropriate, potential ecological benefits. The agencies use the term “appropriate management response” for a strategy that considers these factors.

Previous studies have raised concerns that federal policies and shortcomings in the agencies’ analytical tools are limiting the ability of land managers and incident management teams to use the full spectrum of available strategies, including less costly ones. Interagency policy, for example, directs land managers to select firefighting strategies in accordance with local federal units’ land and fire management plans. If a plan has not been developed and approved, the policy directs land managers to suppress the fire. A 2006 Agriculture Inspector General report also found that for the Forest Service, several existing policies unduly restrict land and fire managers from using lower-cost firefighting strategies. In particular, Forest Service policy prohibits (1) managing a fire for both suppression and wildland fire use concurrently, (2) deciding to let a fire burn after initially deciding to suppress it, and (3) considering potential ecological or fuel-reduction benefits of letting a fire burn certain areas if the decision has already been made to suppress it. Interior agencies face similar constraints. Previous studies also reported that key elements of the analytical tools agency managers use to compare alternative firefighting strategies are based on subjective or incomplete information; these tools may therefore not provide accurate information that would enable managers to select the appropriate firefighting strategy, that is, one that neither unnecessarily increases suppression costs nor unnecessarily places resources at risk.

### Steps to Improve Policies Regarding Firefighting Strategies

The agencies have taken steps to clarify their policies on, and to emphasize the importance of, selecting appropriate firefighting strategies. For example, in 2004, the agencies updated their *Interagency Standards for Fire and Fire Aviation Operations* to require that land managers consider the full range of strategies available in developing their response to a wildland fire. They also have emphasized the importance of considering appropriate firefighting strategies in the action plans they

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develop annually to provide guidance for the pending fire season. In addition, agency officials told us that since 2000 they have substantially increased wildland fire use, a strategy at one end of the response spectrum. For example, Forest Service officials estimated that the agency managed approximately 250,000 acres for wildland fire use in fiscal year 2005—compared with less than 70,000 acres annually in fiscal years 2000 through 2002—but we were unable to verify the reliability of these data. According to one Forest Service official, this trend represented an improvement, but opportunities remained to further increase wildland fire use.

Considerable work remains if the agencies are to fulfill the potential of using less costly strategies. First, the Forest Service and Interior agencies are working together to revise their policies—revisions that could allow different areas of the same fire to be managed for suppression and wildland fire use concurrently and could allow a fire that was previously being suppressed to be managed instead for wildland fire use. It is still too early, however, to determine how the policies may change or the extent to which any changes will help contain costs. Second, Agriculture’s Inspector General recently reported that the agencies lack qualified staff to manage wildland fire use fires.<sup>14</sup> A wildland fire use official for the Forest Service estimated that for trained staff to be located in the field where decisions are made about whether to suppress a fire or manage it for wildland fire use, the agency needed about 300 wildland fire use managers. As of fall 2006, the Forest Service had fewer than 100 qualified managers, although about another 100 were being trained. Senior Forest Service officials said that once these managers were trained, they believed that the agency would have sufficient staff trained in wildland fire use. An Interior official said that Interior also needed more personnel qualified in wildland fire use, but this official did not have any estimate of additional staff needed. Third, we recently reported that although 95 percent of the agencies’ land management units had completed fire management plans that could allow them to select lower-cost firefighting strategies, the agencies did not require that these plans be updated to reflect new data, such as data from LANDFIRE.<sup>15</sup> If the plans do not contain accurate information on current fuel conditions, land managers and incident management teams may be more likely to select more-aggressive firefighting strategies. Fourth,

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<sup>14</sup>U.S. Department of Agriculture, Office of Inspector General, *Audit Report: Forest Service Large Fire Suppression Costs*, Report No. 08601-44-SF (Washington, D.C.: Nov. 20, 2006).

<sup>15</sup>[GAO-07-427T](#).

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Steps to Improve Tools That  
Managers Use to Select  
Firefighting Strategies

although agency policy directs land managers to consider the full range of available strategies, our discussions with agency officials and review of a recent Agriculture Inspector General report show that the agencies lack a method for ensuring that land managers follow this direction.

Federal firefighting agencies, led by the Forest Service, are also taking steps to improve decision-support tools that help land managers select appropriate firefighting strategies, but shortcomings with these tools remain. If firefighters are unable to contain a fire during initial attack, land managers are directed to analyze alternative strategies for suppressing it. The agencies have taken steps in recent years to improve the current tool for conducting such an analysis, which is known as wildland fire situation analysis. Forest Service researchers, for example, have made wildland fire situation analysis a Web-based system, and they have created different versions of the tool, which provide additional elements for land managers to use for larger or more-severe fires. The Web-based version, first released in 2005, has several advantages, according to a Forest Service researcher. First, the Web-based version is updated centrally, thus ensuring that land managers in the field are using the most up-to-date version. Second, it provides an easier means for managers near a fire to share information with experts elsewhere about a fire's expected behavior and the likely values at risk, and can provide a way for senior officials to review the basis for strategic decisions while there is still time to change them. Third, the Web-based version also includes some geospatial mapping capabilities, which helps land managers and incident management teams quickly identify key geographic features, roads, structures, and other resources that may be threatened by the fire.

Many critical inputs to wildland fire situation analysis are estimates, whose accuracy depends to a great extent on the knowledge and experience of land managers in the field, and this knowledge and experience can vary. The firefighting strategy ultimately used—which greatly influences a fire's final cost—is chosen largely on the basis of these estimates. First, the range of firefighting strategies considered in the analysis depends on the knowledge and experience of the land managers in the field who identify possible alternatives. Second, estimating the probability of success for each alternative is critical to making an informed decision in selecting a firefighting strategy; yet this estimate is based on the manager's subjective assessment of fuel conditions, topography, weather predictions, and the availability of firefighting resources. Third, the expected suppression cost for each alternative is also an estimate, often based on the cost per acre of suppressing previous fires in the area—which may or may not be an accurate predictor of future

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costs—and on the final size of the fire, which is also an estimate. Finally, land managers identify structures and other resources that may be threatened by the fire, but, agency officials told us, there is no consistent method for estimating the value of the identified structures and resources. Senior Forest Service and Interior officials told us that professional judgment is an inherent element of managing wildland fires, and local managers' estimates and predictions are important in selecting appropriate firefighting strategies, but that they also recognized the importance of establishing robust processes and tools to assist managers in making informed decisions.

Forest Service researchers are developing a new tool, called the wildland fire decision support system, which may alleviate some of these shortcomings. The exact capabilities of the new tool are still being determined, but it is expected to greatly increase the analytical power available to land managers. For example, the new tool will likely allow managers in the field to predict the probability that a wildland fire will reach certain areas—considering the fire's current location, adjacent fuel conditions, and forecast weather conditions—and to identify nearby structures and other highly valued resources. The results of this analysis can be combined to provide land managers and incident management teams with a map illustrating the probability that a particular wildland fire, barring any suppression actions, will burn a certain area within a specified time and which structures or other resources may therefore be threatened. In addition, the tool is expected to improve the precision of the cost estimates for different suppression strategies. Having such information would better help land managers and incident management teams understand the resources threatened by a wildland fire, the costs associated with different firefighting strategies, and the probability of successfully suppressing the fire, and it could result in less intensive, and therefore less costly, responses. Although the new tool will not be available to managers in the field before 2009, Forest Service researchers have begun to use several of its components to provide analysis to land managers. The researcher leading this effort said that information on predicted fire spread and the locations of structures and other highly valued resources at risk has been provided for more than 70 fires since 2005 and that the information contributed to strategic decisions that likely reduced costs, although he was unable to estimate the impact. For example, for a 2006 fire in Idaho, he said that managers in the field used the information to identify where best to position firefighting assets and to determine that fewer assets were needed than initially projected, thus reducing costs.

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Several challenges have been identified, however, to the full development and deployment of the wildland fire decision support system. First, the fire spread probability model relies on data from LANDFIRE about fuel conditions, and, as we previously discussed, the agencies have yet to decide how they will keep data on fuel conditions updated over time. If LANDFIRE data do not reflect current fuel conditions, land managers and incident management teams are unlikely to trust the fire spread probability maps, which we believe could result in the selection of more-aggressive and more-costly firefighting strategies than necessary. Second, according to the lead researcher, successful deployment of the system requires (1) training staff in the field to use it, (2) acquiring new computer hardware capable of quickly running data-intensive calculations, and (3) ensuring adequate bandwidth in field locations to allow remote access to complex Web-based applications. Third, although the tool would help managers estimate the probability that particular locations will burn, an element of risk is inherent in decisions about firefighting strategies. According to the lead agency researcher, whether the wildland fire decision support system results in less aggressive and less costly strategy decisions will depend greatly on the framework the agencies establish to define acceptable levels of risk and to ensure that managers in the field select appropriate strategies.

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**Agencies Have Updated Guidance for Sharing Suppression Costs with Nonfederal Entities but Have No Clear Plan for Ensuring That Appropriate Cost-Sharing Methods Are Used**

Finally, we and others have reported that federal and nonfederal entities need to work together to better share wildland fire suppression costs.<sup>16</sup> For example, we reported that agencies lacked clear guidance on how federal and nonfederal entities should share the cost of fighting fires that burned or threatened both federal and nonfederal lands, an issue of increasing importance because of the rising number of homes in the wildland-urban interface and the increasing costs of protecting these homes from fires. We further reported that the existing framework for sharing costs insulates state and local governments from the cost of protecting the wildland-urban interface, which may reduce those governments' incentive to adopt building codes and land use requirements that could help reduce the cost of suppressing wildland fires.

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<sup>16</sup>GAO, *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).

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Federal agencies, working with nonfederal entities, have recently taken steps to clarify guidance and better ensure that firefighting costs are shared consistently for fires that threaten both federal and nonfederal lands and resources. In early 2007, the Forest Service and Interior agencies approved an updated template that land managers can use when developing master agreements—which establish the framework for sharing costs between federal and nonfederal entities—as well as agreements on how to share costs for a specific fire. It may take several years to fully incorporate this new guidance into master agreements because they are normally updated every 5 years. Although the guidance states that managers must document their rationale for selecting a particular cost-sharing method, according to officials, the agencies have no clear plan for how they will provide oversight to ensure that appropriate cost-sharing methods are used.

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## Lack of Clear Goals or a Strategy Hinders Federal Agencies' Management of Wildland Fire Cost-Containment Efforts

To effectively manage their cost-containment efforts, the Forest Service and Interior agencies should, at a minimum, have (1) clearly defined goals and measurable objectives, (2) a strategy to achieve these goals and objectives, (3) performance measures to track their progress, and (4) a framework for holding the appropriate agency officials accountable for achieving the goals.<sup>17</sup> The agencies, however, have yet to clearly define their goals or establish measurable objectives for containing costs or to develop a strategy for achieving those goals. In addition, while the agencies have adopted a new cost-containment performance measure and have taken, or are planning to take, steps to improve accountability within the agencies for containing costs, the extent to which these steps will help contain costs is unknown.

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## Agencies Lack Clear Cost-Containment Goals and Objectives

Federal firefighting agencies have yet to establish clear goals and measurable objectives for their wildland fire cost-containment efforts. Since 2000, the agencies have issued many documents—including updates to the federal wildland fire policy, agency strategic plans, and annual interagency fire and aviation operations plans—that recognize the importance of cost containment. These documents may have raised awareness in the agencies about containing costs, but none of them clearly states the agencies' cost-containment goals and objectives. For example,

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<sup>17</sup>Principles of sound program management for federal agencies are established in, among other sources, the Government Performance and Results Act of 1993 and [GAO/AIMD-00-21.3.1](#).

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several key documents—including the 2001 *Review and Update of the 1995 Federal Wildland Fire Management Policy*, the *Interagency Standards for Fire and Fire Aviation Operations*, and the Forest Service’s and Interior’s policy manuals—state that wildland fires are to be suppressed at minimum cost, considering firefighter and public safety and resources to be protected. The agencies, however, 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 they are meeting the goal. Without such criteria and objectives, the importance of containing costs, relative to the other elements, is not clear. As a result, according to agency officials we interviewed and reports we reviewed, 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 due consideration of the costs of suppression.

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### Agencies Lack a Clear Strategy to Contain Wildland Fire Costs

The Forest Service and Interior agencies have also yet to establish an overall cost-containment strategy. Without a strategy designed to achieve clear cost-containment goals, the agencies (1) have no assurance that the variety of steps they are taking to help contain wildland fire costs are prioritized so that the most important steps are undertaken first and (2) are unable to determine to what extent these steps will help contain costs and if a different approach may therefore be needed. The agencies have issued several documents addressing the increased costs and severity of wildland fires, but none of the documents we reviewed provided an overall strategy for how the agencies would contain costs. For example, the 2005 *Quadrennial Fire and Fuel Review Report* identifies several factors contributing to more-severe fires and higher costs but does not indicate the steps the agencies would take to respond effectively to those factors. In contrast, a March 2003 document, *Large Fire Cost Reduction Action Plan*, lists many steps the agencies planned to take to help contain costs but does not indicate to what extent the steps would in fact do so. Although senior fire officials in both the Forest Service and Interior said the agencies did not have a written strategy for containing costs, some of these officials said they believed the steps they were taking were useful and reflected a sound approach to containing costs.

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## Performance Measures for Containing Costs Have Improved, but Concerns Remain

Recent reports, as well as Office of Management and Budget reviews, have raised concerns that the Forest Service's and Interior agencies' performance measures do not allow the agencies to measure their progress effectively or report their accomplishments in containing wildland fire costs. The Forest Service, in its strategic plan for fiscal years 2004 through 2008, established as its primary cost-containment performance measure the percentage of large fires in which the value of protected resources exceeded the cost of suppression. This measure, however, evaluates neither the effectiveness nor the efficiency of the agencies' suppression activities. For example, the Forest Service might carry out suppression activities that cost less than the value of the resources protected, but those actions might not contribute to containing the fire and might therefore be unnecessary. In other cases, the agency might have been able to protect the same resources by taking different, less costly actions. The Forest Service has recognized the shortcomings of this performance measure and has not reported any results for the measure in its annual performance and accountability reports for fiscal years 2004 through 2006. Unlike the Forest Service, Interior has not adopted any performance measures related to containing wildland fire costs in its strategic plan. In conjunction with the Forest Service and nonfederal partners, however, Interior adopted a performance measure in the May 2002 *10-Year Comprehensive Strategy* as part of the National Fire Plan to track the average suppression cost per acre for wildland fires (1) in different size classes and fire regimes, (2) near and away from the wildland-urban interface, and (3) in areas with and without approved fire management plans. Such information, collected and tracked over time, could assist the agencies in gauging their progress in containing costs. However, the agencies have not reported the results of this measure, in part because of difficulties in obtaining accurate data, according to Forest Service officials.

To address these concerns, federal firefighting agencies have adopted a new performance measure that may improve their ability to evaluate their progress in containing costs.<sup>18</sup> Since 2005, the agencies, led by the Forest Service, have been developing a measure known as the stratified cost

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<sup>18</sup>The Forest Service used this measure in its July 2006 submission to the Office of Management and Budget and has indicated that it will also adopt the measure in its revised strategic plan, which is currently being developed. The Forest Service and Interior agencies, along with their nonfederal partners, also adopted this measure in a December 2006 update to the *10-Year Comprehensive Strategy*, although data for Interior are not yet available.

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index. This index is based on models that estimate suppression costs for a particular fire on the basis of the costs of previous fires with similar characteristics.<sup>19</sup> The new performance measure identifies the percentage of fires whose suppression costs exceeded the cost estimated by the stratified cost index. The Forest Service has reported that 31 of 117 fires (26 percent) in fiscal year 2005 cost significantly more than predicted by the stratified cost index, and that 24 fires (21 percent) cost significantly less than predicted by the index. In part because of the development of the index, the Office of Management and Budget recently recognized that the Forest Service has improved the wildland fire program's performance measures, although it also stated that further improvement is needed.

Several concerns have been raised about the stratified cost index. First, although the agencies have improved their data on suppression costs and fire characteristics in recent years, additional improvement is needed. In particular, cost data for "fire complexes"—that is, two or more fires burning in proximity that are managed as a single incident—are particularly difficult to identify. Thus, the costs of many of the largest fires are not included in the models, limiting their effectiveness. Second, the wide variation in the costs of past fires with similar characteristics means that the models' ability to estimate suppression costs is limited. For example, although the models estimated an average cost of \$317 per acre for fires in fiscal year 2005, the range of estimated costs was \$88 to \$1,132.<sup>20</sup> This range is expected to narrow over time as data from more fires are incorporated into the models. Third, to date, the models are based solely on fires managed by the Forest Service. Forest Service researchers are developing, at Interior's request, similar models for fires managed by the Interior agencies. However, it will be several years, at the earliest, before enough data have been collected for the model to be useful. In addition, we are concerned that because the stratified cost index is based on costs from previous fires—and because the agencies have only recently emphasized the importance of using less aggressive suppression strategies—the index does not include data from many fires where less

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<sup>19</sup>Forest Service researchers have developed two regression models to date, one for the western United States (Forest Service regions 1 through 6) and one for the eastern United States (Forest Service regions 8 and 9). Characteristics 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.

<sup>20</sup>The range of \$88 to \$1,132 per acre reflects one standard deviation from the mean; several fires' cost per acre were outside of this range.

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costly firefighting strategies were used. As a result, the index may not accurately identify fires where more, or more-expensive, resources were used than needed. According to Forest Service officials, data from recent fires will be added to the models annually; therefore, over time, the models should include more fires where less aggressive firefighting strategies were used.

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### Agencies Have Yet to Establish an Effective Oversight and Accountability Framework

Federal firefighting agencies lack effective oversight mechanisms to increase accountability for containing costs, according to previous studies. Even though land managers and incident management teams make critical decisions affecting suppression costs, previous studies have found that managers and teams have few incentives to consider cost containment in making those decisions. Some of these and other studies have also reported that despite longtime recognition of the lack of incentives, the agencies have not yet established effective oversight mechanisms to increase managers' and teams' accountability. The agencies, for example, do not consistently review decisions made in the field that affect suppression costs. The studies reported that the lack of a clear and valid measure evaluating both the benefits and costs of alternative suppression strategies was a key impediment to the agencies' establishing more effective oversight mechanisms. In addition, an independent panel convened by the Wildland Fire Leadership Council concluded that the current budget framework was perceived as providing a "blank check" for firefighting and provided few incentives for the agencies to contain costs. To increase such incentives, the panel recommended that the agencies allocate suppression funds on a regional basis and penalize regions that exceed their allocation by reducing the funds from the region's other accounts, such as those for land management activities.

Federal firefighting agencies have taken a number of steps to establish or improve oversight mechanisms, but the extent to which these steps will assist the agencies in containing costs is unknown. These steps include:

- *Reviewing the costs of large fires.* The Forest Service has reviewed the costs of many large fires, a practice that could help identify instances where officials could have taken less costly actions. Since 2003, the Forest Service has directed its regional offices to review all fires in each region that cost more than \$2 million to suppress, and directed the Washington, D.C., office to review fires costing more than \$5 million. Agriculture's Inspector General, however, recently reported that the Forest Service

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reviewed only 11 of the 91 fires (12 percent) requiring regional review and 7 of the 50 fires (14 percent) requiring national review.<sup>21</sup> Forest Service officials told us they did not review more of these fires because it would have taken too much staff time to complete all of the reviews. They therefore decided to conduct fewer but more-detailed reviews. These officials also said that they are in the process of changing their policy to require regional reviews of fires costing more than \$5 million and national reviews of fires costing more than \$10 million. In addition, Congress directed the Forest Service to establish an outside independent review panel to examine, beginning in fiscal year 2004, Forest Service fires with suppression costs that exceeded \$10 million. Together, these reviews identified many steps that local land managers and incident management teams could have taken to help contain costs. However, some studies have questioned the effectiveness of these reviews because, for example, managers were not required to respond to the issues the reviews raised or to implement the recommended steps. Forest Service officials told us that, beginning with fires that occurred in fiscal year 2006, land managers are required to respond to recommendations made in the reviews, either by agreeing to implement a recommendation or by explaining why not.

- *Clarifying land managers' responsibility for containing costs.* The agencies have issued guidance clarifying that land managers, not incident management teams, have primary responsibility for containing wildland fire costs, but they have not yet determined how the land managers are to be held accountable for doing so. Rather, the agencies have taken several incremental steps intended to assist land managers in carrying out this responsibility. First, a Forest Service official told us that because many land managers lack both wildland fire experience and the time to closely monitor incident management teams, the agencies require that an "incident business advisor" be assigned to fires expected to cost more than \$5 million and recommend that an advisor be assigned to fires expected to cost more than \$1 million. An incident business advisor represents the land manager'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 ensure that the most expensive personnel and equipment are released first as a fire comes under control. The overall impact of incident business advisors has

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<sup>21</sup>U.S. Department of Agriculture, Office of Inspector General, *Audit Report: Forest Service Large Fire Suppression Costs*.

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most likely been moderate, Forest Service officials told us, in large part because the advisors do not examine the firefighting strategies being used. Second, the agencies require land managers to include cost containment as a consideration when they delegate authority to an incident management team to fight a particular fire and to evaluate the team for how well it achieves the land managers' goals. These requirements are intended to provide a mechanism for land managers to hold a team accountable for achieving cost-containment goals. The Forest Service officials told us, however, that there is no clear method of evaluating the cost-effectiveness of the firefighting actions taken by the incident management team. Moreover, land managers may be reluctant to identify instances where firefighting actions were not cost-effective, since poor performance by the incident management team also reflects poorly on the land managers. Third, the agencies have adopted policies requiring land managers to consider expected fire suppression costs when developing land and fire management plans. Decisions made in these plans can affect future suppression costs, and this requirement is intended to ensure that managers consider this impact. It is too early to determine the effectiveness of this requirement.

- *Establishing a comptroller to monitor costs.* In August 2006, the Chief of the Forest Service established a comptroller position to oversee Forest Service wildland fire suppression expenditures. The current comptroller, the Associate Deputy Chief for State and Private Forestry, told us that the duties of the position are not defined, although in 2006 he reviewed several high-cost fires, including fires in California and Washington. During these reviews, to identify opportunities for achieving firefighting goals at a lower cost, the comptroller discussed with managers in the field, and with the appropriate regional foresters, the firefighting strategies selected and the quantity of firefighting assets used. The comptroller told us he believed these efforts were helpful, in part because managers in the field were aware that their decisions could be reviewed, but he could not provide an example where his involvement led directly to a change in strategy or tactics that could have reduced costs. The role of the comptroller for 2007 and later is still being determined. The Forest Service has also indicated that, beginning with fires in 2007, it will designate a small team to monitor fires having the potential to be costly or otherwise complex and to work with field managers and regional officials to represent the Chief's interest in containing costs.

Although the agencies have taken some steps to improve their oversight of wildland fire costs, they have made little progress in two key areas identified by previous studies. First, the agencies have yet to establish a clear measure to evaluate the benefits and costs of alternative firefighting

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strategies, even though some studies have concluded that absence of such a measure fundamentally hinders the agencies' ability to provide effective oversight. Second, the agencies considered the recommendation to provide budgetary incentives to regions to contain wildland fire costs but decided against pursuing it, in part because of concerns that transferring funds from other appropriations accounts would violate appropriations law. The co-chair of the Wildland Fire Leadership Council panel recently testified before the Senate Committee on Energy and Natural Resources that the panel continues to believe that this recommendation provides the greatest opportunity for the agencies to contain wildland fire costs.

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## Conclusions

Continuing concerns over the last decade about the mounting federal cost of preparing for and responding to wildland fires have spurred numerous studies and actions by federal wildland fire agencies to address areas needing improvement, but little in the way of a coordinated and focused effort to rein in these costs. Although the agencies have taken—and continue to take—steps intended to contain wildland fire costs, the effect of these steps on containing costs is unknown, in part because the agencies lack a clear vision for what they want to achieve. Without clearly defined cost-containment goals and objectives, federal land and fire managers in the field are more likely to select strategies and tactics that favor suppressing fires quickly over those that seek to balance the benefits of protecting the resources at risk and the costs of protecting them. Further, without clear goals, the agencies will be unable to develop consistent standards by which to measure their performance. Perhaps most important, without a clear vision of what they are trying to achieve and a systematic approach for achieving it, the agencies—and Congress and the American people—have little assurance that cost-containment efforts will lead to substantial improvement. Because cost-containment goals should be considered in relation to other wildland fire program goals—such as protecting life, resources, and property—it is important that the agencies integrate cost-containment goals within the overall cohesive strategy for responding to wildland fires that we previously recommended. The conditions that have contributed to increasing wildland fire severity and expenditures are complex, have been decades in the making, and will take decades to resolve. Developing an effective and affordable strategy for addressing these conditions is therefore critical, particularly in light of the large federal deficit and the long-term fiscal challenges facing the nation.

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## Recommendations for Executive Action

Without clear goals and a strategy for containing wildland fire costs, the agencies are unable to effectively and efficiently manage their myriad ongoing efforts to contain wildland fire costs. Thus, to help manage these efforts and to assist Congress in its oversight role, we recommend that the Secretaries of Agriculture and the Interior work together to direct their respective agencies to take the following four actions:

- Establish clearly defined goals and measurable objectives for containing wildland fire costs.
- Develop a strategy to achieve these goals and objectives.
- Establish performance measures that are aligned with these goals and objectives.
- Establish a framework to ensure that officials are held accountable for achieving these goals and objectives.

Because of the importance of these actions and continuing concerns about the agencies' response to the increasing cost of wildland fires—and so that the agencies can use the results of these actions to prepare for the 2008 fire season—the agencies should provide this information to Congress no later than November 2007.

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## Agency Comments and Our Evaluation

In commenting on a draft of this report, the Forest Service and Interior generally disagreed with the characterization of many of our findings; they neither agreed nor disagreed with our recommendations. In particular, the Forest Service and Interior stated that they did not believe we had accurately portrayed some of the significant actions they had taken to contain wildland fire costs, and they identified several agency documents that they believe provide clearly defined goals and objectives that make up their strategy to contain costs. We acknowledge that the agencies have established a broad goal of suppressing fires at minimum cost, considering firefighter and public safety and resources to be protected, but we also found that the agencies have established neither clear criteria by which to weigh the relative importance of these often-competing priorities nor measurable objectives by which to determine if they are meeting this goal. Our review suggests that without measurable objectives, the importance of containing costs relative to the other program priorities is not clear and that managers in the field are therefore likely to select firefighting strategies without due consideration of suppression costs. Therefore, 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. The Forest Service and

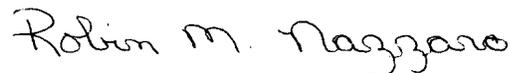
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Interior's joint comments, and our evaluation of them, are included in appendix III.

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As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution of this report until 30 days from the report date. At that time, we will send copies of this report to interested congressional committees, the Secretaries of Agriculture and the Interior, the Chief of the Forest Service, the Director of the Bureau of Land Management, and other interested parties. We will also make copies available to others upon request. In addition, this report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staff have questions about this report, please contact me at (202) 512-3841 or [nazzaror@gao.gov](mailto: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 V.



Robin M. Nazzaro  
Director, Natural Resources  
and Environment

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# Appendix I: Scope and Methodology

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To determine the steps that federal agencies have taken to address the areas identified by previous studies, we first reviewed selected studies—most conducted since 2000 by federal, state, and nongovernmental entities—that examined issues related to wildland fire cost containment. Studies reviewed included independent reviews by GAO, the Department of Agriculture (Agriculture) Office of Inspector General, the National Academy of Public Administration, the National Association of State Foresters, and the Wildland Fire Leadership Council, as well as studies by the Forest Service and Department of the Interior (Interior) agencies, including several reviews of individual wildland fires. Forest Service and Interior officials at the national offices in Washington, D.C., reviewed our list of studies and agreed that we had included those key to addressing issues related to cost containment. We reviewed the issues these studies identified as needing improvement to help contain costs and categorized them into broad operational areas corresponding to key aspects of preparing for and responding to wildland fires. To determine the steps that federal agencies have taken to address these issues—and to corroborate our understanding and categorization of the issues—we interviewed officials from the Forest Service, Bureau of Land Management, and Office of Wildland Fire Coordination within Interior at the national offices and at the National Interagency Fire Center in Boise, Idaho. To determine the current status and results or intended results of the steps that the agencies identified, we reviewed relevant agency documents, including agency policies, manuals, other guidance, implementation strategies, and project plans. We also interviewed pertinent agency officials and nonagency officials, including those from the National Academy of Public Administration and state representatives on the Wildland Fire Leadership Council’s independent panel.

To determine steps that the agencies have taken to improve their management of their cost-containment efforts, we reviewed wildland fire program reviews by the Office of Management and Budget, agency documents—including strategic plans and performance and accountability reports, federal wildland fire policy documents, and National Fire Plan documents—and interviewed agency officials. We also interviewed officials from the Office of Management and Budget. To determine management steps that agencies are required to take and best management practices, we reviewed relevant statutes and guidance, including the Government Performance and Results Act of 1993 and GAO’s

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*Standards for Internal Control in the Federal Government*,<sup>1</sup> as well as other GAO reports on improving federal agency management.

We performed our work in accordance with generally accepted government auditing standards, which included an assessment of data reliability, from May 2006 through May 2007.

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<sup>1</sup>GAO, *Standards for Internal Control in the Federal Government*, [GAO/AIMD-00-21.3.1](#) (Washington, D.C.: November 1999).

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# Appendix II: Selected GAO Products and Other Reports Reviewed

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To identify areas potentially in need of improvement for federal firefighting agencies to contain the costs of fighting wildland fires, we reviewed dozens of reports, most issued since 2000. In addition to our own reports on wildland fire issues, we also reviewed reports prepared or commissioned by Agriculture, Interior, the Agriculture Office of Inspector General, the National Association of State Foresters, and the National Academy of Public Administration. The following list does not include all of the reports we reviewed but is intended to illustrate the range of related topics that we examined.

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## GAO Products

*Wildland Fire Management: Lack of a Cohesive Strategy Hinders Agencies' Cost-Containment Efforts.* [GAO-07-427T](#). Washington, D.C.: January 30, 2007.

*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.

*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.

*Wildland Fire Management: Important Progress Has Been Made, but Challenges Remain to Completing a Cohesive Strategy.* [GAO-05-147](#). Washington, D.C.: January 14, 2005.

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

*Forest Service: Little Progress on Performance Accountability Likely Unless Management Addresses Key Challenges.* [GAO-03-503](#). Washington, D.C.: May 1, 2003.

*Wildland Fire Management: Improved Planning Will Help Agencies Better Identify Fire-Fighting Preparedness Needs.* [GAO-02-158](#). Washington, D.C.: March 29, 2002.

*Severe Wildland Fires: Leadership and Accountability Needed to Reduce Risks to Communities and Resources.* [GAO-02-259](#). Washington, D.C.: January 31, 2002.

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

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## Federal or State Firefighting Entity Reports

Secretary of Agriculture Independent Cost-Control Review Panel. *FY 2005 Large Cost Wildfires Report*. Washington, D.C.: April 2006.

System Planning Corporation. *Prioritizing Wildland Fire Cost Containment Strategies*. A report prepared for the U.S. Department of Agriculture, Forest Service. Arlington, VA: March 2006.

U.S. Department of Agriculture, Forest Service; U.S. Department of the Interior; and the National Association of State Foresters. *Quadrennial Fire and Fuel Review Report*. Washington, D.C.: June 2005.

Secretary of Agriculture Independent Cost-Control Review Panel. *FY 2004 Large Cost Wildfires Report*. Washington, D.C.: March 2005.

Wildland Fire Leadership Council. *Large Fire Suppression Costs: Strategies for Cost Management*. Washington, D.C.: August 2004.

U.S. Department of Agriculture, Forest Service, and U.S. Department of the Interior. *Developing an Interagency, Landscape-Scale Fire Planning Analysis and Budget Tool*. Washington, D.C.: November 2001.

National Association of State Foresters. *Cost Containment on Large Fires: Efficient Utilization of Wildland Fire Suppression Resources*. Washington, D.C.: July 2000.

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## Department of Agriculture's Office of Inspector General Reports

*Audit Report: Forest Service Large Fire Suppression Costs*. Report No. 08601-44-SF. Washington, D.C.: November 2006.

*Audit Report: Implementation of the Healthy Forests Initiative*. Report No. 08601-6-AT. Washington, D.C.: September 2006.

*Management Challenges*. Washington, D.C.: August 2006.

*Audit Report: Forest Service Emergency Equipment Rental Agreements*. Report No. 08601-40-SF. Washington, D.C.: July 2005.

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**National Academy of  
Public Administration  
Reports**

*Containing Wildland Fire Costs: Enhancing Hazard Mitigation Capacity.* Washington, D.C.: January 2004.

*Containing Wildland Fire Costs: Utilizing Local Firefighting Forces.* Washington, D.C.: December 2003.

*Containing Wildland Fire Costs: Improving Equipment and Services Acquisition.* Washington, D.C.: September 2003.

*Wildfire Suppression: Strategies for Containing Costs.* Washington, D.C.: September 2002.

*Managing Wildland Fire: Enhancing Capacity to Implement the Federal Interagency Policy.* Washington, D.C.: December 2001.

# Appendix III: Comments from the Forest Service and the Department of the Interior

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



THE DEPARTMENT OF AGRICULTURE

WASHINGTON



THE DEPARTMENT OF THE INTERIOR

May 24, 2007

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:

We appreciate the opportunity to review and comment on the draft Government Accountability Office (GAO) report, GAO-07-655, "Wildland Fire Management: Lack of Clear Goals and Strategy Hinders Federal Agencies' Efforts to Contain the Costs of Fighting Fires." As we discussed with you recently, the fire community has found GAO reports and recommendations to be constructive in addressing issues related to the fire program. However, the agencies generally disagree with the characterization of many of the findings in this report and believe that GAO has not accurately portrayed some of the significant actions the agencies have taken to address large fire suppression costs and management efficiencies.

Our goal continues to be the protection of life, property and resources. While accomplishing our goal of protection, we continue to strive aggressively to contain the costs of fire suppression.

GAO concludes the steps the Forest Service and Interior agencies have taken to contain costs are unknown because these steps are not complete, and recommends we establish clearly defined goals and objectives, a strategy to achieve them, and corresponding performance measures. We do have objectives and clearly defined goals that make up our strategy for better managing large fire suppression costs. The Federal Wildland Fire Policy, the Healthy Forests Initiative, Healthy Forests Restoration Act, and the 10-Year Strategy Implementation Plan provide overarching interagency goals and objectives.

When we discussed our concerns with GAO regarding this report, we provided numerous, important clarifying comments on the draft. We did not see significant

See comment 1

See comment 2.

acknowledgment of these clarifications in the subsequent draft, and are concerned that important miscommunications remain. GAO presents an incomplete view on four key areas we discuss below that we believe will help us better manage and contain costs: Appropriate Management Response (AMR), Fire Program Analysis (FPA), LANDFIRE and the stratified cost index (SCI).

See comment 3.

GAO failed to recognize, and include in their report, a major component of our cost containment management strategy which we believe to be a significant improvement over past suppression strategies. AMR moves the agencies from aggressively attacking wildfires of all sizes to a more risk-informed, performance-based strategy that will reduce costs by increasing flexibility in wildland firefighting decisions. The transition to AMR has been underway for some time, and improvements have been made in using Wildland Fire Use as a tool for achieving desirable environmental outcomes with reasonable cost expenditures. Further use of AMR is expected in 2007 and 2008 as the agencies aggressively apply AMR more widely.

See comment 4.

GAO takes exception to recent FPA design modifications that they say may compromise the agencies' ability to fully achieve key goals. GAO goes on to say it is unclear whether this method will identify the most cost-effective allocation of resources, and that it is also unclear how budgets for local units will be meaningfully aggregated on a national basis. We strongly disagree. Additional information was supplied by the FPA project manager, although it was not incorporated or acknowledged. To restate:

*In December 2006, the Wildland Fire Leadership Council called for development of a revised analytical system for FPA. The revised system will be used to systematically evaluate alternative investment strategies and identify options that best reduce wildland fire losses, improve ecological conditions, and minimize cost. The system is designed to explicitly address uncertainty and risk in predicting future wildland fires. A combination of simulation models, GIS analyses, and sophisticated decision analysis tools array alternatives using quantitative performance measures that readily display inherent risks and trade-offs at both FPU and national levels. This approach provides a more robust basis for modeling real-world complexities than the linear optimization approach used in Phase 1, while maintaining the ability to compare the performance and effectiveness of alternative funding decisions.*

See comment 5.

GAO views LANDFIRE as an unproven work in progress and they question our ability to complete and maintain LANDFIRE but offer no explanation. We strongly disagree with this characterization. LANDFIRE is an important tool to prioritize our fuels work through geospatial data and modeling that will help identify fuel accumulations and fire hazards across the nation, set nationwide priorities for fuel reduction projects, and assist in identifying the appropriate response when wildland fires do occur. Two of the four milestones are complete, the third milestone is 1/3 complete and work has begun on the fourth milestone. In addition, it was utilized during FY 2006 on more than 60 wildland fire incidents to assist in maximizing firefighting safety, pre-position resources and evaluate wildland fire behavior under a variety of fire weather conditions. GAO also questions our ability to maintain the system but then acknowledges that the agencies are

submitting a maintenance plan to the Wildland Fire Leadership Council in June 2007. Development of this plan has been underway for some time now and clearly indicates that we have planned for the necessity of routinely updating the data to reflect changing landscape conditions.

See comment 6.

Regarding the stratified cost index performance measure, GAO expresses concerns about cost data for fire complexes, the ability to precisely estimate suppression costs and that, to date, the data are based solely on Forest Service managed fires. The report also says that the agencies have not identified the goals we are trying to achieve with this measure. The agencies have openly, freely and frequently acknowledged that the SCI will continue to be refined and improved in the coming years as data is added to the model. However, in its current form, the SCI still provides very useful information that was not previously available and assists field managers in better managing their large fire suppression costs. Furthermore, the SCI is not meant, nor was it ever intended to, "precisely" estimate suppression expenditures. Instead, it was developed to provide managers with an acceptable expenditure range based on historic data. With the multitude of unknowns that occur daily on every large fire suppression incident, it is naïve to believe that anything has the ability to "precisely" estimate expenditures.

We disagree with GAO's conclusion that the agencies have not identified goals for this measure. SCI was adopted under Goal 1 of the 10-Year Strategy Implementation Plan which is to improve fire prevention and suppression. In addition, specific targets have already been set for the Forest Service. We first stated our goals for future years for this measure in the OMB PART reassessment in July 2006. We established the baseline in 2005 and subsequently established future year targets. These targets are also in the revised Forest Service Strategic Plan. GAO also says Interior has not adopted any performance measures related to containing wildland fire costs in its strategic plan and that it will be several years at the earliest before enough data have been collected for DOI for the SCI model to be useful. This is inaccurate. DOI adopted the stratified cost index measure in its new Strategic Plan (2008-2012) and expects to have the research results this summer. We expect 2006 data to be reported as baseline data and plan to report on the SCI in FY 2007.

See comment 7.

GAO also states in the report that agencies have updated guidance for sharing suppression costs with nonfederal entities, but have no clear plan for ensuring that appropriate cost-sharing methods are used. Clarifying the guidance was recommended in an earlier GAO report. We clarified the guidance as GAO recommended. As our formal responses to the earlier report stated, the guidance will serve as a place to begin negotiations with our partners, but the final cost-sharing method will be based on a multitude of factors that will be determined at the incident. The agencies work in partnership with our cooperators, so we cannot guarantee or ensure that our preferred cost-sharing method will be the one selected on an incident.

See comment 8.

Finally, GAO says that the agencies need to establish a framework to ensure that officials are held accountable for achieving cost containment goals and objectives. We have established a framework to hold officials accountable for achieving cost containment

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**Appendix III: Comments from the Forest  
Service and the Department of the Interior**

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goals. The Forest Service has already adopted significant elements this year, and Interior is also addressing these on an interagency basis as appropriate. These include a line officer certification process, a competency in their annual performance appraisals, and oversight on significant incidents by a "Chief's Principle Representative". Both agencies continue interagency large fire cost reviews that require regions to respond to and implement recommendations made by the review teams.

If you have any additional questions or concerns, please contact Sandy T. Coleman, Forest Service Assistant Director for GAO/OIG Audit Liaison staff, at 703-605-4699, or Deborah Williams, DOI/GAO Liaison at 202 208-3963.



Abigail R. Kimbell  
Chief  
U.S. Forest Service  
U.S. Department of Agriculture



James E. Cason  
Associate Deputy Secretary  
U.S. Department of the Interior

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## GAO's Comments

1. Our draft report stated that the *effects* of the steps the agencies are taking to contain costs, not the steps themselves, are unknown. We recognized that the agencies established—in several documents, including the federal wildland fire management policy—a broad goal of suppressing fires at minimum cost, considering firefighter and public safety and resources to be protected. However, because the different components of this broad goal often compete, our review suggests that it is also important for the agencies to establish clear criteria by which to weigh the relative importance of the components, as well as to establish clear objectives to measure their progress. We therefore recommended that the agencies take these steps. We believe that the importance of establishing clear goals and objectives will increase as the agencies continue their transition to using less aggressive firefighting strategies under their “appropriate management response” policy.
2. We fully considered the agencies’ comments and clarified our draft report as appropriate to address the four key areas raised (see comments 3 through 6).
3. Our draft report discussed the agencies’ transition to using less aggressive firefighting strategies in appropriate circumstances, although it did not use the phrase “appropriate management response.” We have added this phrase to the report. Our review, however, found that several agency policies limit the agencies’ use of such strategies, a finding also recently reported by the Department of Agriculture Office of Inspector General.
4. We continue to believe that the modifications may not allow the agencies to meet key FPA goals. As we noted in our draft report, the agencies believe that the modifications will achieve key FPA goals, but because they provided no analysis, we also stated that it is possible that the modifications may not do so. The paragraph that the agencies cite in their comments clearly acknowledges a difference between the two designs. However, this paragraph consists of summary, general assertions about the benefits of the modifications, and the agencies provided no detailed, comparative supporting analysis. Thus, it remains unclear how or how much the designs differ in identifying the most cost-effective alternatives, either locally or nationally. We remain concerned because, as officials told us, the agencies have not yet done a formal comparison of the differences between the modified and the original design.
5. We removed from the report the statement questioning the agencies’ ability to complete the LANDFIRE system. Our draft report stated that

the agencies recognized the importance of updating LANDFIRE data and expected to submit a plan for doing so in June 2007 to the Wildland Fire Leadership Council for approval. The plan, however, is not yet final, and it is therefore not clear how data will be updated.

6. We acknowledge that the stratified cost index is an improvement over the agencies' previous performance measures, but our report also raises several concerns about the index. The Forest Service and Interior seem to have misinterpreted our concern about the agencies' lack of goals. Our concern does not pertain to the stratified cost index performance measure itself. Rather, we believe that in general, for performance measures to be useful, they must accurately measure progress toward established goals and objectives, and we found that the agencies had not established clear cost-containment goals and objectives. We agree with the Forest Service and Interior that the index was not intended to precisely estimate suppression costs and have removed the word *precisely* from the report. The Forest Service and Interior also disagree with our statements that Interior had not adopted a performance measure related to containing costs in its strategic plan and that it would be several years before Interior would have sufficient data for the stratified cost index to be useful. Our review of Interior's strategic plans for 2003 through 2008 and for 2007 through 2012, the most recent plan available, did not identify any performance measure related to cost containment, including the stratified cost index. We do acknowledge that Interior is developing a stratified cost index, but our discussions with a key official developing this index indicates that to date it is based on data from few fires and that it will be several years for sufficient data to be available to refine the index's underlying models.
7. We acknowledge that the agencies have clarified their guidance, as we previously recommended. The guidance is an important first step in ensuring that suppression costs are shared equitably between federal and nonfederal entities. We agree that the agencies need to work with their nonfederal partners and that there may be disagreement about which cost-sharing method is appropriate in a given situation. Nonetheless, we believe that it is important that the federal agencies provide sufficient oversight of, and support to, their officials in the field as this guidance is implemented. Without such oversight and support, we believe that the guidance they have adopted may not address a concern our May 2006 review identified—that inconsistent application of cost-sharing methods was leading to inequities in how the federal government was treating nonfederal entities in different states.

8. Our draft report acknowledged several of the actions the agencies cite to enhance their oversight of wildland fire costs but also found that the agencies had not established a clear measure to evaluate the benefits and costs of alternative firefighting strategies, a key shortcoming identified by previous studies. As the agencies continue the transition to appropriate management response, such a measure is critical if—as the agencies state in their comments—appropriate management response is to be a performance-based approach. We continue to believe that such a measure is needed to help the agencies evaluate decisions about firefighting strategies and to hold officials accountable for those decisions.

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# Appendix IV: GAO Contact and Staff Acknowledgments

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## GAO Contact

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

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## Staff Acknowledgments

In addition to the contact person named above, David P. Bixler, Assistant Director; Ellen W. Chu; Brian Chung; Elizabeth Curda; Jonathan Dent; Janet Frisch; Timothy Guinane; Carol Henn; Kevin Jackson; Richard Johnson; Chester Joy; and John Warner made key contributions to this report.

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