

GAO

Report to the Chairman, Subcommittee  
on Forests and Forest Health,  
Committee on Resources, House of  
Representatives

June 2006

# WILDLAND FIRE REHABILITATION AND RESTORATION

## Forest Service and BLM Could Benefit from Improved Information on Status of Needed Work



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# Highlights

Highlights of [GAO-06-670](#), a report to the Chairman, Subcommittee on Forests and Forest Health, Committee on Resources, House of Representatives

## Why GAO Did This Study

Since 2001, Congress and federal agencies, including the Forest Service and Department of the Interior's Bureau of Land Management (BLM), have recognized the importance of rehabilitating and restoring lands unlikely to recover on their own after wildland fires. However, while funding has increased for fire prevention, suppression, and first-year emergency stabilization, it has decreased for rehabilitation (work up to 3 years after fires) and restoration (work beyond the first 3 years). GAO was asked (1) how the Forest Service and BLM plan postfire rehabilitation and restoration projects, (2) how much needed rehabilitation and restoration work they have completed for recent wildland fires, and (3) what challenges the agencies face in addressing their needs.

## What GAO Recommends

GAO is recommending that the Forest Service and BLM improve their information on whether postfire rehabilitation and restoration needs are met, and that the Forest Service augment research to help guide decisions. In commenting on a draft of this report, the Forest Service and Interior generally agreed with GAO's findings and recommendations.

[www.gao.gov/cgi-bin/getrpt?GAO-06-670](http://www.gao.gov/cgi-bin/getrpt?GAO-06-670).

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 REHABILITATION AND RESTORATION

## Forest Service and BLM Could Benefit from Improved Information on Status of Needed Work

### What GAO Found

The Forest Service and BLM use similar procedures to identify rehabilitation and restoration needs, but differ in how they plan and fund related projects. Given the variety of ecosystems they manage, Forest Service field staff have the discretion to locally prioritize projects, and the agency addresses them through various programs with appropriations from multiple accounts. In contrast, BLM has a standard process for planning needed rehabilitation projects and, through a single account, funds projects for up to 3 years after fires. For restoration projects—that is, work needed beyond 3 years after a fire—BLM requires them to be addressed through other programs such as rangeland management.

With available information, it is not possible to reliably determine how much needed rehabilitation and restoration work has been completed for recent Forest Service and BLM fires. The Forest Service does not know how much work has been completed because it does not collect nationwide data. BLM reported that, according to its data, it has completed most of its rehabilitation work, but the agency does not collect data on postfire restoration work, which is done through other programs. GAO surveyed Forest Service and BLM officials to determine how much needed work has been completed, but the information provided in the survey was not sufficiently reliable to report.

Forest Service and BLM officials face different challenges to addressing their rehabilitation and restoration needs. Forest Service officials cited factors such as competing priorities within constrained budgets and controversy over certain activities. Agency officials said that controversy over harvesting burned timber can be exacerbated by the limited scientific research available to guide such decisions. BLM officials cited challenges to achieving long-term success when seeding burned areas. The agency is taking several steps to improve success rates.

Forest Service Building Partly Buried by Postfire Flood Debris (left) and Restored Later



Source: Forest Service.

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## **Abbreviations**

BLM            Bureau of Land Management

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United States Government Accountability Office  
Washington, DC 20548

June 30, 2006

The Honorable Greg Walden  
Chairman  
Subcommittee on Forests and Forest Health  
Committee on Resources  
House of Representatives

Dear Mr. Chairman:

In the past 5 years, wildland fires have burned millions of acres of federal land, breaking records in size, costing billions of dollars to suppress, and drawing greater attention to the risks associated with wildland fires. Many fires occur naturally, and some ecosystems are adapted to fires, relying on them to maintain their health. However, wildland fires can sometimes leave behind a burned landscape that threatens human safety, property, and ecosystems. In areas of steep terrain, postfire rainstorms can cause mudslides that bury homes, destroy roads, and clog streams. Wildland fires also can create postfire environments that are ideal for the growth of noxious or invasive weeds. If these weeds replace native plant species, threatened or endangered wildlife species can lose their habitat. When fires result in such adverse effects, land managers may conduct emergency stabilization, rehabilitation, and restoration activities to mitigate the effects and to prevent further damage. The U.S. Department of Agriculture's Forest Service and the Department of the Interior's land management agencies are responsible for such activities on federal land.<sup>1</sup> Combined, the Forest Service and Interior manage about 630 million acres, or 94 percent, of the nation's federal land, including forests, rangelands, and other lands.

In 2001, in response to one of the worst fire seasons in over 50 years, the Departments of Agriculture and the Interior, in collaboration with state governors, adopted a 10-year strategy to address federal, state, local, and tribal management of wildland fires.<sup>2</sup> One of the four goals adopted in the strategy was to restore fire-adapted ecosystems through rehabilitation and

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<sup>1</sup>The Department of the Interior's federal land management agencies include the Bureau of Land Management, National Park Service, and Fish and Wildlife Service.

<sup>2</sup>Years cited in this report refer to calendar years except where otherwise specified.

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restoration efforts, combined with scientific research and monitoring. In support of this goal, Congress began providing funds in fiscal year 2001 to the Forest Service and Interior specifically for postfire rehabilitation and restoration.

In 2003, as a step toward coordinating their approaches to postfire management, the Forest Service and Interior adopted the following common definitions for emergency stabilization, rehabilitation, and restoration:

- **Emergency stabilization** activities are conducted within 1 year of a fire to address threats to life, property, or resources. Such activities may include seeding and mulching to prevent soil erosion.
- **Rehabilitation** activities, conducted within 3 years of a fire, address damage to minor facilities such as picnic facilities, or to lands unlikely to recover to a desired condition on their own. Such activities may include repairing roads or trails, planting trees, and restoring wildlife habitat.
- **Restoration** activities are a continuation of rehabilitation activities beyond the initial 3 years, or the repair or replacement of major facilities, such as a visitor center.

Although the Forest Service and the Bureau of Land Management (BLM)—the agency that manages the most land within Interior—are both responsible for managing postfire work on federal lands, the task is different for the two agencies. The Forest Service conducts emergency stabilization, rehabilitation, and restoration activities under multiple programs such as its watershed improvement and reforestation programs, while BLM conducts emergency stabilization and rehabilitation activities under distinct postfire programs that do not address restoration needs. Forest Service land encompasses a wide variety of ecosystems—ecological communities such as old-growth forests, alpine meadows, and marsh wetlands—and watersheds that provide drinking water and timber, while most of BLM’s land consists of rangeland (although BLM also manages about 55 million acres of forests and woodlands). These land characteristics influence the agencies’ work. For example, the Forest Service’s rehabilitation and restoration activities commonly include reforestation, road work, trail work, and weed control, but also can include activities ranging from surveying boundaries to securing archaeological sites. On the other hand, BLM’s rehabilitation activities include primarily weed control, grass and shrub seeding, and fence repair or replacement.

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Since 2001, Congress and the agencies have taken actions that recognize the importance of rehabilitation and restoration activities, including directing funds toward these activities and developing strategy documents. However, while resources for fire prevention, suppression, and emergency stabilization have increased, fewer resources have been focused on the long-term rehabilitation and restoration of lands burned by fires. Between fiscal year 2001 and 2005, annual appropriations to the Forest Service and Interior for fire prevention, suppression, and emergency stabilization increased by about 26 percent (15 percent adjusted for inflation), but rehabilitation and restoration appropriations (directed in law or committee reports) declined steeply, from \$246 million in fiscal year 2001 to \$37 million in fiscal year 2005—a decrease of about 85 percent (86 percent adjusted for inflation).<sup>3</sup> In this context, you asked us to determine (1) how the Forest Service and BLM identify and plan postfire rehabilitation and restoration activities; (2) how much needed rehabilitation and restoration work the agencies have completed for wildland fires that occurred between 2000 and 2004; and (3) what challenges the agencies face in addressing their postfire needs, and any actions they are taking in response.

In conducting our work, we met with Forest Service and BLM officials; reviewed agency documents about postfire rehabilitation and restoration programs, projects, and funding procedures; and discussed challenges the agencies face in addressing needed rehabilitation and restoration work. We visited seven forests and three BLM units in western states, where rehabilitation and restoration efforts are concentrated, to interview agency officials and observe postfire conditions and rehabilitation and restoration projects. We also administered a Web-based survey to agency officials for 276 randomly sampled fires that occurred between 2000 and 2004 and burned over 500 acres each. For each of the fires in our sample, we surveyed agency officials in the field about any needed rehabilitation and restoration projects they identified, whether the projects were completed, factors preventing their completion, and any effects of not completing needed projects. However, when we collected source documents to validate responses for 10 percent of the completed surveys, we found that the data provided were not sufficiently reliable to report. A more detailed description of our scope and methodology is presented in appendix I. We

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<sup>3</sup>Dollar amounts are presented in nominal terms—unadjusted for inflation—unless otherwise noted.

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performed our work from May 2005 through May 2006 in accordance with generally accepted government auditing standards.

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## Results in Brief

In the aftermath of wildland fires, the Forest Service and BLM use similar procedures to identify rehabilitation and restoration needs, but differ in how they plan, prioritize, and fund needed work. To determine what rehabilitation or restoration projects, if any, are necessary after a wildland fire, both the Forest Service and BLM first assess the condition of the burned area and compare it with prefire and desired conditions. In many cases, the condition of the land is satisfactory—for example, because the fire did not burn severely—and no rehabilitation or restoration is needed. For fires that need rehabilitation or restoration, the Forest Service and BLM differ in how they plan, prioritize, and fund projects. The Forest Service has no national requirements for its rehabilitation and restoration activities; instead, it gives its regions and forests the discretion to develop procedures independently, so they can tailor them to their particular ecosystems and priorities. For example, some regions place a higher priority on infrastructure projects, such as repairing roads, trails, and recreation facilities, while others prioritize projects to help ecosystems recover, such as replanting burned areas. The Forest Service pays for its rehabilitation and restoration projects using funds from several different appropriations, including appropriations specifically designated for such activities under the wildland fire management account; appropriations from the national forest system account, which are available for recreation and vegetation management, for example; and appropriations from the capital improvement and maintenance account, which are available for road and facility construction or repair, among other things. According to Forest Service officials, relying on these other program funds allows regions and forests greater flexibility to determine their priorities across many program areas and to accommodate needs that arise after other unpredictable events, such as hurricanes. BLM, on the other hand, uses a standardized process to plan, prioritize, and fund its rehabilitation work. BLM field staff develop 3-year rehabilitation plans, its state and headquarters officials review and approve the plans, and headquarters officials allocate the available funding. Unlike the Forest Service, BLM pays for nearly all of its rehabilitation work with appropriations from a single source—its wildland fire management account—and requires the work to be complete within 3 years after a fire. BLM requires any subsequent restoration work to be addressed through other programs, such as range improvement and noxious weeds.



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Using available information, neither the agencies nor we could reliably determine how much needed rehabilitation and restoration work has been completed for Forest Service and BLM fires that occurred between 2000 and 2004. The Forest Service does not maintain comprehensive data on rehabilitation and restoration work, and thus could not determine how much rehabilitation and restoration work has been completed nationwide. In our visits to several national forests, agency officials reported completing all needed rehabilitation and restoration work for some fires, and little or no needed work for other fires, but without nationwide data, it is unclear how widespread either of these situations is. Also, while BLM maintains data on its rehabilitation work, the agency does not maintain data on its postfire restoration work, which is completed through other programs. BLM officials told us that, according to their data, most rehabilitation work needed through fiscal year 2005 has been completed. However, we could not independently validate all of BLM's rehabilitation data because these data are commingled with the agency's emergency stabilization data for fires before 2004. We administered a survey to officials from both agencies to obtain this information, but determined that the data provided in the survey was not reliable. Specifically, we requested source documents from a sample of respondents to validate the survey data, but a significant portion of the documents we received did not substantiate the survey responses. Without comprehensive data on needed and completed rehabilitation and restoration work, Forest Service and BLM officials make management decisions, including requesting and allocating funding, without knowing to what extent they are addressing the needs on their lands.

Forest Service and BLM officials said they face different challenges in their efforts to address postfire rehabilitation and restoration needs, in part reflecting their different management approaches, ecosystems, and postfire activities. Forest Service field officials reported that a lack of dedicated funds, insufficient workforce, and other factors prevented many needed projects from being completed. In addition, officials told us the method the agency used to allocate annual rehabilitation and restoration funding to regions meant that available funds fluctuated dramatically from year to year, making it difficult to manage the program. Forest Service officials said they have tried to stabilize the erratic funding levels by changing how they allocate these funds to regions in fiscal year 2006, but have not asked for additional rehabilitation and restoration funding because of other competing program priorities and budget constraints. Forest Service field officials also noted that controversy about postfire activities, such as using chemical herbicides and harvesting burned timber, presented challenges. Disagreements about whether such actions would

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result in beneficial or harmful effects compared with doing nothing sometimes delayed projects, they said. Several Forest Service officials expressed concern that in some cases there is insufficient scientific evidence to support one action over another, and further noted that little research has been done to address this shortage. Consequently, officials rely on a limited number of studies when making decisions in these cases, which may at times exacerbate the existing controversy. For BLM, headquarters and field officials told us that while they believe they have completed most of their projects, they face challenges in achieving long-term success with some of their completed projects. According to agency officials, many of BLM's seeding and planting projects fail or are only partially successful because there is not enough rain for seeds to grow, or because officials, relying on limited information, use planting techniques that prevent seeds from germinating. To address this issue, BLM officials said they are now monitoring rehabilitation projects more consistently to learn why projects are effective or not, and have begun developing standard monitoring protocols and a Web-based information-sharing network that will allow staff to share lessons learned.

To ensure that agency and congressional decision makers know if high-priority needs are being met, and to help them make informed funding and other decisions, we are recommending that (1) the Secretary of Agriculture direct the Forest Service to track and report to Congress the extent to which it is addressing its high-priority rehabilitation and restoration work, and (2) the Secretary of the Interior direct BLM to establish a procedure to address any postfire restoration work needed after 3 years, and to track and report to Congress the status of such work. We also are recommending that the Secretary of Agriculture direct the Forest Service to conduct additional research on the effects of postfire projects to provide agency officials with more scientific evidence to better support their decisions, especially about controversial actions. In commenting on a draft of this report, the Forest Service and Interior generally agreed with our findings and recommendations.

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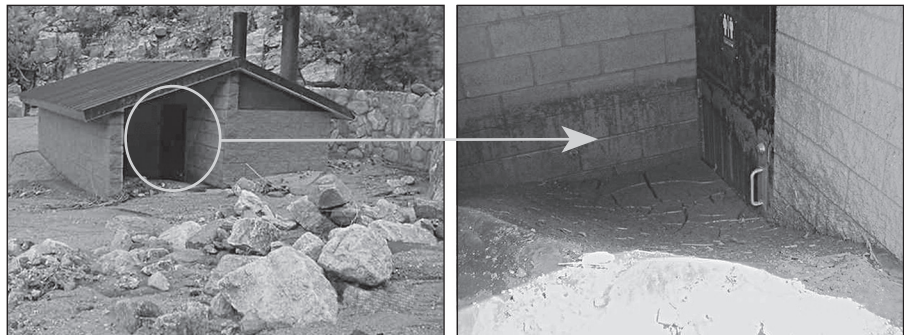
## Background

Although wildland fires are inevitable natural disturbances that have helped shape ecosystems over time, they can be unpredictable and destructive as well. Fires can kill trees and other vegetation, alter wildlife habitat and soils, and destroy roads, buildings, campgrounds and other infrastructure. Fires can also leave lands denuded of vegetation and vulnerable to severe erosion and mudslides, which can contaminate municipal water supplies and compromise water quality in streams and lakes. In addition, the open landscapes left by fires can create

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opportunities for invasive plants to become established or expand, crowding out native plants and the animals that depend on them. When wildland fires have adverse effects on natural resources, and federal land managers believe the lands are unlikely to recover to a desired condition on their own, they may conduct rehabilitation or restoration work to aid or accelerate recovery. Similarly, when wildland fires damage developed features such as roads, trails, buildings, fences, or campgrounds, land managers may identify needed work to repair or replace them, as shown in figures 1 and 2. Rehabilitation and restoration projects include, for example, repairing or maintaining roads and trails, controlling noxious and invasive weeds, replanting forests or grasslands, repairing or replacing fences, restoring fish or wildlife habitat, rebuilding burned facilities, replacing boundary markers, and stabilizing archaeological sites.

**Figure 1: Postfire Flood Damage at Sabino Canyon Recreation Site, Coronado National Forest, Arizona**



Source: Forest Service.

A restroom and turnaround (left) in a popular recreation area near Tucson, Arizona, were inundated with 4 feet of debris that washed down the canyon in August 2003, 1 month after the Aspen fire was controlled. Mud blocked the restroom door (right) and completely covered trash cans. The rock wall behind the restroom was damaged, and the road leading to the site was impassable. Concerns about public safety and accessibility necessitated public-use closures for about a year as additional floods continued to damage the site.

**Figure 2: Completed Rehabilitation of Sabino Canyon Recreation Site, Coronado National Forest, Arizona**



Source: Forest Service.

Forest Service officials repaired the damaged restroom in 2005 using rehabilitation and restoration funding. They also replaced the small corrugated metal pipe that existed prior to the fire with a large grated-box culvert (foreground, left photo), to prevent future clogging like that which caused much of the damage during the August 2003 flood.

In some cases, land managers may determine that no rehabilitation or restoration projects are needed because a fire did not have adverse effects on any resources or infrastructure, or because the burned lands are likely to recover on their own. Under historical conditions, many forest and rangeland ecosystems have adapted to wildland fire, and the vegetation, insects, fish, and wildlife in such systems benefit from the kind of fires that occur there, surviving and regenerating after fires occur. Fires can benefit resources by recycling soil nutrients, renewing vegetation growth, adding material to streams that improves spawning habitat for fish, and sustaining ecological functions. For example, when ponderosa pine forests are adapted to wildland fires, frequent less-intense fires remove brush and small trees, which allows the large trees to survive and grow.

Recognizing the need to restore historic vegetation conditions to help reduce the risks of wildland fires, as well as the need to address adverse effects that can result from fires, in 2001 and 2002, federal agencies, states, and others developed a 10-year strategy and implementation plan. The strategy established four broad goals for wildland fire management: (1) improving fire prevention and suppression for those areas that need it; (2) reducing hazardous fuels, by mechanically thinning forests and using controlled burns; (3) restoring fire-adapted ecosystems and rehabilitating burned areas; and (4) promoting community assistance to help conduct

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fire management activities. The implementation plan established measures for showing progress toward each of the goals.

Around the same time, in fiscal year 2001, Congress began providing funds to the Forest Service and Interior specifically for postfire rehabilitation and restoration. The funding was greatest in 2001, and decreased after that, particularly for the Forest Service. To administer these funds and address its rehabilitation and restoration needs, the Forest Service relies on existing staff and programs, such as watershed improvement and recreation programs. On the other hand, BLM has a specific rehabilitation program and some dedicated staff to administer its funds. BLM's program initially included both emergency stabilization and postfire rehabilitation work, but since 2004 has been separated into two programs. BLM's rehabilitation program covers work up to 3 years after a fire and does not provide for subsequent postfire restoration work. The Forest Service manages its rehabilitation and restoration work through nine regional offices, and offices overseeing 155 national forests and 20 national grasslands across the nation. Each forest and grassland is divided into several ranger districts. BLM manages its rehabilitation program through state offices in 12 western states, including Alaska, that oversee field and district offices.

Both the Forest Service and BLM manage their lands for multiple uses, including timber production, wildlife, recreation, and wilderness purposes. Under the National Forest Management Act, the primary law governing the land management planning activities of national forests in the Forest Service, all national forests must have land and resource management plans for the lands they manage. Generally, these plans describe desired future conditions for lands and resources in various geographic areas within the forest, and identify strategies to maintain or achieve those conditions. Similarly, BLM field offices develop resource management plans under the Federal Land Policy and Management Act for the lands they manage. Like the national forests' plans, BLM plans identify specific desired outcomes and allowable uses and actions to achieve those outcomes. Generally, neither agency's plans identify strategies or actions specifically related to postfire recovery.

When agency officials identify needed projects—including postfire rehabilitation and restoration projects—they must ensure that the projects are consistent with these land management plans. In addition, if a project could have environmental impacts, the agencies are required to conduct an analysis of the potential impacts. Under the National Environmental Policy Act of 1969, agencies generally evaluate the likely effects of projects

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they propose using a relatively brief environmental assessment or, if the action would be likely to significantly affect the environment, a more detailed environmental impact statement. One purpose of this analysis is to ensure that agencies have detailed information available to inform their decision making. The agencies give the public an opportunity to comment on draft environmental assessments and impact statements. Also, the Forest Service and BLM have established procedures for administrative appeal of their decisions. As a general rule, once the administrative appeals process is complete, the public can litigate the relevant project decision in federal court.

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## Forest Service and BLM Differ in How They Plan Needed Rehabilitation and Restoration Work

The Forest Service and BLM use similar procedures to determine whether any rehabilitation or restoration work is needed after a wildland fire, but they differ in how they plan, prioritize, and fund needed work. These differences reflect the distinct approaches the Forest Service and BLM have adopted for managing postfire rehabilitation and restoration. The Forest Service has no national guidance for postfire rehabilitation and restoration, in part because it does not have a discrete program for such activities. Instead, the agency addresses its rehabilitation and restoration needs through existing programs, including its watershed, forest management, recreation, rangeland management, wilderness, and construction programs, among others. Forest Service regions and forests have discretion to determine how to plan, prioritize, and fund needed rehabilitation and restoration work in the context of these programs. To fund such work, the agency draws from several different appropriations.<sup>4</sup> On the other hand, BLM has a distinct program for postfire rehabilitation, and has issued national guidance for the program. Following this guidance, agency officials use a standard process to plan, prioritize, and fund rehabilitation work, nearly all of which is paid for with funds specifically designated for rehabilitation under the wildland fire management appropriation. BLM's rehabilitation program covers postfire work up to 3 years after a fire, and any subsequent restoration work must be addressed by other ongoing BLM programs, such as the wildlife and noxious weeds programs.

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<sup>4</sup>The Forest Service uses appropriations from sources that include its national forest system, capital improvement and maintenance, and wildland fire management accounts, as well as the Knudsen-Vandenburg fund and the reforestation trust fund. GAO is exploring with the Department of Agriculture the availability of these appropriations for this purpose.

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## Forest Service Regions and Forests Have Discretion to Plan Projects Using Varied Procedures

The Forest Service has no national guidance on how to identify, prioritize, and fund postfire rehabilitation and restoration work. According to a headquarters official, the agency has not developed guidance in part because appropriations specifically designated for these activities—about \$12.8 million for fiscal year 2005 and \$6.2 million for fiscal year 2006—did not warrant development of a manual. Instead, the agency provides its regions and forests with wide latitude to use varied procedures that accommodate their diverse ecosystems, priorities, and unique circumstances.

The Forest Service allocates the appropriations designated for rehabilitation and restoration to its regions annually based on each region's proportion of Forest Service acreage severely burned over the previous 5 years. The regions, in turn, allocate these funds to forests, usually applying a prioritization system to select among project proposals and funding requests submitted by forests. In addition, Forest Service regions and forests use appropriations available for activities such as reforestation and construction to help pay for related rehabilitation and restoration work. According to agency officials, relying on these other funds gives regions and forests the flexibility to determine their priorities while considering needs on burned lands as well as in other areas, and to accommodate needs that arise after unpredictable events in addition to fires, such as hurricanes. The Forest Service does not keep track of how much rehabilitation and restoration work is funded through these programs.

According to agency officials, the first step in planning postfire rehabilitation and restoration projects is for forest and district-level staff to determine whether any such work is needed, by comparing postfire conditions with prefire and desired conditions. Typically, immediately after a wildland fire is contained, field officials assemble an interdisciplinary team made up of specialists such as foresters, wildlife biologists, hydrologists, botanists, and soil scientists, among others, to conduct an on-the-ground evaluation of the burned area. Officials use this evaluation along with satellite photographs of the burned area, for example, to assess a fire's effects on the land and resources. Finally, agency officials compare these postfire conditions with historical photos and data on prefire conditions, and with descriptions of desired conditions detailed in forest plans and other guidance documents.

Agency officials told us that, in many cases, no rehabilitation or restoration work is needed. According to the officials, there are various reasons that natural recovery may be sufficient, and active rehabilitation

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and restoration efforts may not be needed. For example, some fires burn in areas adapted to wildland fires and leave natural resources no worse off than before the fire, or benefit resources, for example, by stimulating vegetation growth or increasing denning and foraging habitat. When fires also do no damage to infrastructure such as fences or campground facilities, there is usually no need for any active rehabilitation or restoration, according to agency officials. In other cases, agency officials said rehabilitation or restoration may not be needed if the burn is not severe; the burned area is inaccessible due to topography, legal access, or other issues; or the fire burned in a management area where such work is precluded, such as a wilderness or roadless area.<sup>5</sup>

Often, forest officials determine that postfire rehabilitation or restoration is needed to repair damage to resources or infrastructure, or to prevent further damage from occurring after postfire rainstorms. The officials must then determine what projects are needed. Many Forest Service regions have no specific guidance for this step, and officials rely on the guidance available in program handbooks and legislation. For example, the trails management handbook includes guidance for planning projects, such as how to assess trail conditions against height, width, and other trail construction standards, depending on whether the trail is designated primarily for use by hikers or by pack animals as well. In addition, some laws include requirements or provisions that guide agency officials' actions when planning projects. For example, for projects significantly affecting the environment, the National Environmental Policy Act requires agency officials to evaluate the environmental impacts of the proposed project and alternatives to the project in an environmental impact statement. Implementing regulations for the act require the agency to provide opportunities for the public to comment on the draft statement. In accordance with other laws, agency officials assess whether any cultural resources, such as archaeological sites, will be affected by their proposed

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<sup>5</sup>The Wilderness Act of 1964 defines wilderness as areas of undeveloped federal land retaining their primeval character, without permanent improvements or human habitation. The act provided that wilderness areas would be designated by Congress and directed federal agencies to protect and manage such lands to preserve their natural condition. The act generally prohibits road construction and the use of motorized equipment within wilderness areas. The Roadless Area Conservation Rule, issued by the Forest Service in 2001 and in effect during most of the period we reviewed, generally prohibited road building, timber cutting, and certain other activities in inventoried roadless areas, which are roadless areas identified in a series of analyses conducted prior to the 2001 rule. A new roadless rule, issued in 2005, does not include the same prohibitions as the earlier rule, but forest plans may still restrict activities in roadless areas.



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actions, and whether any threatened or endangered species—or their habitat—will be affected.

Once forest officials determine that rehabilitation or restoration work is needed, they have various approaches to documenting a need for the work, depending in part on legislative requirements, as well as the severity, complexity, and extent of the fire's effects; available funding; anticipated level of controversy; and established regional or forest procedures. In some cases, forests prepare rehabilitation and restoration planning documents that describe and analyze all needed projects for a given fire, and cover time periods up to 9 years or longer. According to agency officials, such plans are useful when a wildland fire has widespread, severe, or complicated effects over a large territory and officials anticipate needing extensive analysis and planning efforts to determine project needs, costs, and time frames. Agency officials told us they also use comprehensive formal plans when they expect their actions to be controversial, so that the rationale for their decision is clearly documented. On the other hand, sometimes agency officials do not prepare such planning documents because they do not have enough funding or they believe the funds are better spent elsewhere. They may instead prepare separate shorter plans in each of the program areas affected, or create a simple spreadsheet listing needed projects and estimated costs, for example. In other cases, officials do not prepare any planning documents even if they believe rehabilitation or restoration work is needed, because they do not expect to receive funding to cover the costs of the work.

The Pacific Northwest region, unlike other Forest Service regions, issued standardized guidance for its postfire rehabilitation and restoration activities in December 2005, to be used by forests in the region beginning in 2006. The guidance established a uniform process to be followed by all forests in the region when assessing rehabilitation and restoration needs after wildland fires or other disturbances. It is intended to be instructional as well as to ensure consistency among forests' project proposals, so that regional officials can compare them equitably when deciding how to allocate funds.

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Generally all of the regions follow similar processes to prioritize and fund projects, although the specifics vary widely.<sup>6</sup> Typically, forests submit project proposals and requests for postfire rehabilitation and restoration funding to regional officials annually.<sup>7</sup> In most regions, officials prioritize the proposed projects, often according to a predetermined set of criteria, and fund the highest-priority projects. Many regions include projects that will protect human safety among the top priorities, but beyond this similarity, priorities differ from region to region. For instance, the Southwestern region places a higher priority on repairing and replacing infrastructure needed for forest management, because such infrastructure will not recover naturally. Reforestation in the Southwestern region is lower priority, according to agency officials, because over time, the trees will grow back naturally. Also, agency officials at one forest in the region told us that efforts to plant seedlings in the forest's dry climate tend to have high failure rates especially during periods of drought. On the other hand, the Northern region emphasizes restoration of natural resources, including reforestation. Northern region officials said that in their region, without active reforestation efforts, less desirable species of trees would become dominant in some locations, perpetuating an undesirable cycle of fires. In some regions, officials consider the forests' priorities as well. For example, many forests consider boundary-marking projects among their lowest priorities, but for forests where logging operations are conducted adjacent to or on Forest Service land, such projects are important to protect against trespass. While most regions follow similar processes from year to year, some regional officials told us that in years when their funding allocations were relatively low—enough to fund only one or two projects, for example—they did not use a formal procedure to solicit and fund project proposals because the amount of funding did not warrant such an effort.

In addition to rehabilitation and restoration funds, some regions allocate portions of other funds to help forests pay for projects that are not funded with rehabilitation and restoration funds. For example, the Southwestern region uses 50 percent of its share of the reforestation trust fund to pay for

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<sup>6</sup>Because the Forest Service's Alaska, Southern, and Eastern regions do very little, if any, postfire rehabilitation and restoration, they do not have formal processes for prioritizing and funding projects.

<sup>7</sup>In the Northern region, rather than submitting project proposals, forests are directed to input project needs and funding requests into the National Fire Plan Operations and Reporting System, a national fire management database. Regional officials then query the database to assess total regional needs and select projects for funding.

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needs after wildland fires in the region, and directs moneys from the roads and trails fund to eligible rehabilitation and restoration projects.<sup>8</sup> Some agency officials said that these funds, distributed at the discretion of regional officials, can be particularly important for forests with smaller budgets that provide little flexibility to accommodate unpredictable expenses.

When funding is not available from the region, forests use funds for programs such as watershed management, wildlife, and road construction to pay for related rehabilitation and restoration projects. The budget process for these funds begins up to 2 years in advance of when the funds are actually needed, so agency officials must plan ahead, and any rehabilitation and restoration projects funded through this process must compete with normal program needs for funding. Once the budget process is complete, there are ways to fund rehabilitation and restoration projects even if they were not in the original budget request. Sometimes funded projects are less costly than anticipated, and the resulting savings can be directed toward needed rehabilitation or restoration projects that were not in the budget. Alternatively, forest officials may determine that some unexpected postfire rehabilitation or restoration needs are higher priority than certain projects already in the budget, and direct the budgeted projects' funds to the rehabilitation or restoration work, deferring the work originally planned.

Some Forest Service officials said they rely on sources of funding other than appropriations specifically designated for rehabilitation and restoration to pay for a significant portion of needed work. For example, in 2003, the first year after the Biscuit fire in Oregon, Forest Service officials told us they spent a total of about \$7 million on rehabilitation and restoration work; about \$2 million, or 29 percent, of the total was rehabilitation and restoration funding, while the remaining 71 percent of funds came from other sources. To complete needed work, Forest Service officials said that in addition to appropriations specifically designated for rehabilitation and restoration, they use appropriations designated for activities such as watershed improvement, road maintenance and repair,

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<sup>8</sup>In 1980, Congress created the reforestation trust fund by directing a portion of tariffs on imported wood products to provide dedicated funding for reforestation and related treatments. The roads and trails fund, established in 1913, authorizes use of a portion of Forest Service receipts (for example from the sale of timber and grazing permits, and the collection of recreation fees) for the construction and maintenance of roads and trails.

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and recreation management, as well as receipts from salvage timber sales and funding from other sources such as states and private parties.

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## BLM Follows a Standard Process to Plan Rehabilitation Projects

BLM has a standard process to identify, plan and fund any needed postfire rehabilitation projects, guided by Department of the Interior policy and a draft BLM handbook. The handbook prescribes specific procedures, time frames, and rules for identifying, planning, and funding rehabilitation work. BLM's postfire recovery program, unlike the Forest Service's program, is limited to rehabilitation and does not include restoration. BLM pays for nearly all of its postfire rehabilitation work with rehabilitation funds within its wildland fire management appropriation, and funding for such work is available for only 3 years after a fire. According to Interior policy, any restoration needs remaining after this time are to be incorporated into ongoing programs of work in resource programs such as the wildlife, noxious weeds, and rangeland management programs.

The first step in planning postfire rehabilitation work is for agency officials in the field to assess whether any rehabilitation work is needed. BLM headquarters officials encourage field officials to do this immediately after a fire, at the same time they are assessing the need for emergency stabilization projects. As with the Forest Service, BLM field officials typically assemble an interdisciplinary team of specialists to conduct an on-the-ground evaluation of the burned area and compare the condition of the burned land to prefire and desired conditions. Generally, agency officials told us they rely on historical knowledge to determine prefire conditions, and on resource management plans and other planning documents, as well as professional judgment, to determine desired conditions.

In addition to its resource management plans, many BLM field offices have preapproved plans that outline the postfire work they would do if a wildland fire occurred on their lands. These plans, called Normal Fire Rehabilitation Plans, are prepared for a specified management area in advance of any fires, and describe typical projects that would be implemented under normal conditions after a fire. The plans detail the criteria for selecting each type of project and for determining when such projects are not needed, and provide guidance for developing a site-specific rehabilitation plan following a wildland fire. The handbook recommends that field offices develop Normal Fire Rehabilitation Plans to facilitate more efficient and timely approval of emergency stabilization and rehabilitation plans.

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In many cases, agency officials said they decide that no active rehabilitation activities are needed. For example, BLM officials told us that almost 10 million acres of land burned in Alaska between 2000 and 2004, but that little or no rehabilitation was needed because, for example, the lands were adapted to wildland fire. In other cases, agency officials said no rehabilitation was needed because the fire had no negative impacts and the site could recover naturally. When lands are adapted to wildland fire or a fire has no negative impacts, there may be enough plants remaining that the site can recover naturally as long as it is protected from further disturbances, according to the officials.

In cases where rehabilitation work is needed, the BLM handbook requires agency officials to identify and estimate costs for all rehabilitation projects needed during the 3 years following the fire, and document these elements in a plan. The plan is required, among other things, to describe each project, how it is compatible with approved land-use plans, and how it is related to damage or changes caused by the wildland fire. In addition, the plans must include a provision for monitoring the projects to determine whether they meet their objectives.<sup>9</sup> Besides requirements about the plan, the handbook provides guidance about which activities meet the definition of postfire rehabilitation and qualify for rehabilitation funds. This guidance is particularly important, according to agency officials, because BLM only recently separated its emergency stabilization program and funding from its rehabilitation program. In addition, field staff work with BLM state rehabilitation coordinators to clarify any questions they have while preparing rehabilitation plans. The plans must be completed before the end of the fiscal year during which the fire occurred, which, in some locations, means that agency officials typically have 1 to 3 months to complete their plans. Also, like the Forest Service, BLM must ensure that it meets the requirements of relevant laws, such as the National Environmental Policy Act and the Endangered Species Act, among others.

Once rehabilitation plans are complete, field officials submit them to agency officials in state offices and headquarters for approval. These officials review the plans to ensure that all proposed projects meet eligibility requirements for rehabilitation funding, and to assess the cost-effectiveness of the proposed projects. For projects that do not meet the

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<sup>9</sup>In fiscal years 2004 and 2005, monitoring of both emergency stabilization and rehabilitation projects was paid for through the emergency stabilization program, using fire suppression funds. In fiscal year 2006, BLM began to use rehabilitation funds to pay for monitoring rehabilitation projects.

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eligibility requirements or are judged to be too costly, state and headquarters officials return the plan to field officials for revisions and resubmission. In addition, reviewing officials may return a plan if projects seem inappropriate or imprudent for other reasons—for example if officials believe a proposed seeding technique will be ineffective for the context in which it is proposed.

Approval of rehabilitation plans is only the first step; the proposed projects must still be selected for funding. Funding for rehabilitation projects is allocated 1 year at a time, in a departmentwide process in which BLM's projects must compete with projects from the other Interior agencies. At the start of each fiscal year, a team representing all of Interior's land management agencies meets to allocate the department's rehabilitation funding. So far, Interior has been able to fund all needed projects that meet eligibility requirements, according to BLM officials. As a result, agency officials told us they pay for nearly all rehabilitation projects with rehabilitation funds. In the future, if there are more funding requests than available funding, the interagency team plans to assess the projects against a set of prioritization criteria and fund only the highest-priority categories of projects. The criteria, not yet finalized by the interagency team, may include factors such as whether the proposed project incorporates partners and addresses resource objectives.

Once projects are funded for a given year, BLM officials in the field begin implementing them. At the end of each of the first 2 years covered by the plan, officials must complete an accomplishment report recording the projects completed during the year and their costs, as well as a monitoring summary for the completed projects reporting whether they were successful and whether additional projects are needed. For any remaining work, officials must submit a funding request. After the final year, BLM requires officials to submit a closeout report to headquarters detailing the projects completed, their cost, whether they were successful, and any lessons learned.

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## Forest Service Lacks Data on Rehabilitation and Restoration Work; BLM Lacks Data on Restoration Work

With available information, neither the agencies nor we could reliably determine how much needed rehabilitation and restoration work has been completed for Forest Service and BLM fires that occurred between 2000 and 2004. The Forest Service does not know how much rehabilitation and restoration work has been completed because it does not maintain comprehensive data on such work. The agency only tracks rehabilitation and restoration work accomplished using appropriations specifically designated for such activities under the wildland fire management account, and does not collect data on such work paid for with other funds. BLM officials reported completing most needed rehabilitation work for fires between 2000 and 2004, but said they do not know how much restoration work is needed or completed because they do not track data on postfire restoration. We could not independently verify all of BLM's rehabilitation data because these data are commingled with the agency's emergency stabilization data for fires before 2004. Because the Forest Service had no national data and we could not verify BLM's data, we administered a survey to officials from both agencies to obtain information about how much rehabilitation and restoration work has been completed. However, we determined that the information provided in the survey was not sufficiently reliable to report because when we assessed a sample of responses, we found that in a significant number of cases, supporting documents were either unavailable or they did not substantiate the answers provided in the survey.

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## Forest Service Lacks Data to Know Whether High-Priority Needs Are Being Addressed

Forest Service officials acknowledged that they could not tell us what portion of the agency's nationwide rehabilitation and restoration needs have been addressed because they do not track such information on a national level. Field staff are only required to report accomplishment information for rehabilitation and restoration projects funded specifically with rehabilitation and restoration moneys, even though much of this work is funded through other agency programs. They are not required to report information about how much rehabilitation and restoration work is needed, although staff in some regions do so; they also are not required to report information about rehabilitation and restoration work completed using other funds. Consequently, there is no centralized source of information about all rehabilitation and restoration needs and accomplishments nationwide. According to a headquarters official, the Forest Service does not require forest officials to collect data on rehabilitation and restoration work because the agency does not manage such work under a single program; instead, the work cuts across multiple programs. Furthermore, the official said the Forest Service does not

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maintain data on needed work because agency officials do not expect there to be sufficient funding to pay for all of it.

Because the Forest Service does not have comprehensive data on rehabilitation and restoration needs and accomplishments nationwide, we administered a survey to agency officials in the field to collect this information, but determined that the information provided in the survey was not sufficiently reliable to report. The survey asked for qualitative information about rehabilitation and restoration needs and accomplishments for a random sample of fires that occurred between 2000 and 2004 and burned over 500 acres. After administering the survey, we requested supporting documents to validate a sample of responses. However, we found that a significant portion of the responses were not adequately supported. For example, in some cases, respondents mistakenly reported information about emergency stabilization projects rather than rehabilitation and restoration projects. In other cases, no documentation was provided to support survey responses, or the information in the documents contradicted the survey responses. Consequently, we determined that the data provided in the survey could not be reliably reported.

An interregional group of Forest Service officials reached a similar conclusion about the agency's rehabilitation and restoration data when it attempted to collect and report related information.<sup>10</sup> The group—tasked with developing an agencywide strategy for postfire recovery in 2004—found that they could not identify the agency's total rehabilitation and restoration needs and accomplishments because the agency did not maintain consistent, reliable data about such needs. The group noted that the Forest Service has a fire management database with the capacity to track rehabilitation and restoration needs and accomplishments, and that headquarters officials originally used the system to determine priorities and funding allocations.<sup>11</sup> However, they said that field staff rarely enter data into the system because headquarters officials no longer use it this way, now that they delegated the task of prioritizing and funding projects

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<sup>10</sup>U.S. Forest Service Interregional Ecosystem Management Coordination Group, "A Strategy for Post-Fire Recovery" (Dec. 3, 2004).

<sup>11</sup>The National Fire Plan Operations and Reporting System is an interagency system designed to assist field personnel in managing and reporting accomplishments for work conducted under the National Fire Plan, including hazardous fuels, rehabilitation, and restoration activities. Planned and completed activities may be entered into the system with funding sources.



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to the regions. Some regions have developed their own systems to track regionwide data, but because the systems are not consistent, the data cannot accurately be combined or compared across regions. The interregional group recommended that if agencywide consistency is needed for data on rehabilitation and restoration, the Forest Service should consider identifying the minimum data necessary and modifying existing or emerging systems to incorporate such information.

In our visits to seven national forests and telephone interviews with officials from all of the Forest Service regions, agency officials reported that varied amounts of rehabilitation and restoration work have been completed. For some fires, agency officials said they had completed all or almost all needed rehabilitation and restoration work, while for others, they told us that a significant amount of work remains to be done. For example, agency officials reported that almost all of the needed rehabilitation and restoration work is complete for the Diamond Point fire, which burned nearly 150,000 acres in the Payette National Forest in Idaho during the summer of 2000. According to one official, the only work that has not been completed for that fire is work that will not be needed until 15 or 20 years after the fire, such as clearing hiking trails when dead trees fall in the future. Similarly, agency officials reported completing all or almost all needed rehabilitation and restoration work for the 3,000-acre Thorn fire in the Wallowa-Whitman National Forest in 2000, and the 18,000-acre Fridley fire in the Gallatin National Forest in 2001, among others. In contrast, agency officials reported that a significant portion of needed rehabilitation and restoration work remains for the Bitterroot fires of 2000, which burned about 300,000 acres, as well as for the Bullock and Aspen fires of 2002 and 2003, which burned a total of about 115,000 acres in the Coronado National Forest. For the 2002 Red Waffle fire, which burned about 5,000 acres in the Custer National Forest, agency officials told us that almost none of the needed work had been completed. These examples suggest that, for at least some fires, a significant portion of needed rehabilitation and restoration work has not been completed. However, without comprehensive data, neither we nor agency decision makers know how common this situation is across the nation.

Furthermore, while we found that a substantial portion of needed work remains undone for some fires, it is unclear whether more should be done at this point because the Forest Service has no clear time frames for completing such work. Some Forest Service officials told us that, although they had not yet completed all of the rehabilitation and restoration work they believed was needed, they were not concerned because they planned to complete the work over the course of 5 or 10 years after the fire. Few of

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the agency officials we interviewed reported adverse effects that had already resulted from not completing projects. However, some officials expressed concern about future effects, such as compromised water quality and loss of forest habitat, that could result if needs were left unmet over the long term.

Given constrained budgets and competing priorities, a headquarters official explained that the Forest Service does not expect forests to complete every needed rehabilitation and restoration project; instead, forests are expected to complete the high-priority projects. However, agency officials do not know whether they have addressed the highest priority projects nationwide, because they do not track this information, either. In our interviews with officials in the field, we found that regions have addressed their priorities to varying degrees from year to year and region to region. For example, in 2004, the Intermountain region was able to fund the top 14 of its 20 priority categories, while the Southwestern region was only able to fund the top 2 of its 9 priority categories using rehabilitation and restoration funds.<sup>12</sup> As a result, the Southwestern region identified about \$5.2 million in unfunded needs that year, including about \$2.3 million in high-priority needs, according to an agency official. However, in fiscal year 2005, because the Southwestern region received about \$7 million in rehabilitation and restoration funds—an increase of more than \$6 million over the previous year—the region was able to address its backlog, agency officials told us. For fiscal year 2006, the region was allocated under \$1 million and expects once again to only address projects in its top 1 or 2 priority categories, leaving what agency officials estimate to be millions of dollars in needs unfunded. While some regional officials tracked such information, others did not, and none of the regions routinely reported such information to headquarters. Consequently, Forest Service officials make management and funding decisions without knowing, on a national scale, whether the agency is keeping pace with its high-priority rehabilitation and restoration needs.

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<sup>12</sup>Because Forest Service regions independently developed prioritization criteria, the regions have different categories, as well as a different ordering of the categories, and they are not directly comparable.

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## BLM Officials Report Completing Most Rehabilitation Work, but Do Not Know Whether Restoration Needs Are Being Addressed

BLM officials told us that, according to agency data, most rehabilitation work needed for fires that occurred between 2000 and 2004 has been completed. The agency requires field staff to report all rehabilitation needs to headquarters in rehabilitation plans and budget requests. BLM officials in each state office assemble and review the data on budget requests and allocations for all of the district and field offices within the state. Once rehabilitation work is funded, agency officials said there are only a few factors—such as unusual weather or other unanticipated events—that prevent the work from being completed. Consequently, agency officials infer that nearly all needed work that has been funded through fiscal year 2005 has been completed. In addition, BLM tracks nationwide data on the total number of acres that have been rehabilitated, and reviews the data for any anomalies, correcting errors when found. The agency reports this information to Congress each year in its budget request as well as in its annual report on public lands.<sup>13</sup> Further, one agency official reported that BLM is currently revising its performance measures, and is planning to report the percentage and number of acres identified in rehabilitation plans as needing rehabilitation treatments that actually received the treatments. The agency has begun to informally collect these data in fiscal year 2006 to prepare for reporting the information in the future.

While BLM collects data on nationwide rehabilitation needs and accomplishments, we could not independently verify the data because, for fires before 2004, the agency's rehabilitation and emergency stabilization data are commingled. In an effort to collect this information, we administered a survey to agency officials in the field. The survey we administered to BLM officials asked for qualitative information about rehabilitation needs and accomplishments for a random sample of BLM fires that occurred between 2000 and 2004 and burned over 500 acres. However, like the Forest Service survey, when we compared a sample of responses to supporting documents, we found that a significant portion of responses were not adequately supported. Specifically, we found that respondents sometimes reported information about emergency stabilization work rather than rehabilitation work. While we recognize that this could be a result of the relatively recent separation between the two programs in 2004, we determined that the data provided in the survey were not reliable.

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<sup>13</sup>Each year, BLM publishes a Public Lands Statistics report. In this report, BLM reports rehabilitation accomplishments combined with emergency stabilization accomplishments.

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In our visits to three BLM field locations and interviews with BLM officials from four state offices, agency officials consistently reported completing all or almost all rehabilitation work that was needed for fires that occurred between 2000 and 2004. For example, in Idaho, BLM officials told us that all of the agency's rehabilitation work identified as needed in the state during this time period has been funded, and that nearly all of the funded work has been completed. Several officials told us that the only incomplete work is that needed beyond the first 3 years after a fire, which is defined as restoration work. Agency officials in Oregon, Utah, and Nevada also reported completing nearly all needed rehabilitation work, with few exceptions—such as work that was hindered by uncontrollable events like weather, or work needed beyond 3 years after a fire.

Although BLM keeps close track of its postfire rehabilitation needs and accomplishments nationwide, and reports completing most of this work, the agency's rehabilitation program does not fund or track any restoration work—that is, work needed more than 3 years after a fire. Instead, Interior policy calls for any restoration needs to be addressed by other agency programs, such as the wildlife, noxious weed, or rangeland management programs. However, BLM officials we talked with did not know whether these other programs were addressing postfire restoration needs. Several BLM officials indicated that continued monitoring beyond the 3-year period is important in some cases to determine the effectiveness of projects that have been completed. One BLM analysis of postfire projects from 1999 to 2003 concluded that time and funding limits on monitoring prevented field officials from determining the success or failure of some projects. In some cases for which projects were known to be only partially successful, agency officials said that if they could identify and address the issue right away—for example, by seeding native plants so that invasive species could not expand—they could avoid losing their original investment.

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## Forest Service and BLM Officials Cite Different Challenges to Rehabilitating and Restoring Their Lands

Forest Service and BLM officials reported different challenges to their efforts to rehabilitate or restore their lands after fires. Forest Service officials cited a lack of funding, transfers of funding for fire suppression, and erratic funding levels from year to year as hindering their rehabilitation and restoration efforts. In addition, some Forest Service officials told us that controversy around certain types of postfire activities, market forces, and insufficient workforce made it difficult to address needed rehabilitation and restoration work. For BLM, headquarters and field officials told us that while they have completed most of their projects, they face challenges in achieving long-term success with some

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projects. Many of BLM's seeding and planting projects fail or are only partially successful when new plants do not become established because of drought, soil conditions, or planting techniques, for example. To address this issue, BLM officials said they are now monitoring rehabilitation treatments more comprehensively to learn why treatments are effective or not, and have begun developing standard monitoring protocols, a database to track project information and success rates, and a Web-based information-sharing network that will allow staff to share lessons learned.

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### Forest Service Reports Funding and Other Issues Hinder Its Rehabilitation and Restoration Efforts

According to Forest Service officials, various factors related to funding hindered their postfire rehabilitation and restoration efforts. Specifically, agency officials reported that a lack of dedicated funds, the transfer of funds to pay for fire suppression, and the low priority of one project compared with others competing for the same funds prevented completion of some projects. Regarding the lack of dedicated funds, several officials we interviewed cited the downward trend in funding for postfire rehabilitation and restoration, and commented that funding for other programs had not increased to compensate. According to a regional official, in 2004, forests in the Northern region identified about \$46 million in rehabilitation and restoration needs attributable to the previous year's fires, but the region had only about \$3 million in rehabilitation and restoration funds to allocate to the forests. Officials in several regions told us that, although their projects had been approved for rehabilitation and restoration funding, much of the funding was transferred to pay for fire suppression.<sup>14</sup> For example, after 307,000 acres burned in the Bitterroot National Forest in Montana, forest officials identified and received funding for about \$30 million in rehabilitation and restoration work in 2002. However, according to these officials, later that year most of the funding—about \$26 million—was transferred to pay for fire suppression elsewhere. Consequently, the forest did not have enough funding to pay for all of the

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<sup>14</sup>Although the Forest Service transferred funds from various programs to help pay for fire suppression in fiscal years 2002 and 2003, agency officials said they did not need to do so in fiscal year 2004 or 2005. Furthermore, in the Consolidated Appropriations Act for Fiscal Year 2005, Congress appropriated an additional \$400 million to the Forest Service as a supplemental appropriation for urgent fire suppression needs—which can be carried over from one year to the next if unspent—to help address suppression needs in unusually costly years and avoid the need to transfer funds from other land management accounts. For more information, see GAO, *Wildfire Suppression: Funding Transfers Cause Project Cancellations and Delays, Strained Relationships, and Management Disruptions*, [GAO-04-612](#) (Washington, D.C.: June 2, 2004).

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work, and as of March 2006, much of it still had not been done. According to agency officials, the situation was made worse because they had made assurances to the public, which expected the Forest Service to complete the work they planned.

In other cases, agency officials told us they were not able to complete some rehabilitation and restoration projects because they were lower priority than other needed work on the forest. For example, after a wildland fire at the Custer National Forest in Montana, officials told us that they needed to thin the forest to reduce the risk of a future fire causing severe damage. However, this fuels reduction project, located far from any communities, was not selected for funding at the regional level, and it was not funded by the forest because the forest's budget could only accommodate the highest-priority fuels reduction projects—where communities would be threatened if a wildland fire started.

In addition, during our field visits, officials told us that erratic funding levels hindered their ability to address postfire rehabilitation and restoration needs. Specifically, agency officials said that the amount of rehabilitation and restoration funding headquarters allocated to the regions has fluctuated dramatically from year to year, making it difficult to plan budgets. For example, the Southwestern region received about \$600,000 in fiscal year 2004, about \$6.8 million in 2005, and about \$900,000 in 2006. Based on 2004 funding levels, forests in the region did not expect to receive substantial funding in 2005. When about \$6.8 million became available, however, some Southwestern forests could not spend all of the money before the end of the year because they had not hired additional seasonal staff, prepared contracting or planning documents, or otherwise established the necessary infrastructure to spend the funds and implement needed work.

Agency officials reported that factors unrelated to funding also hindered their ability to address needed postfire rehabilitation and restoration work. Even if there were unlimited funding, some officials told us they would be limited by the size of their staff or other operational constraints, such as the length of their field season. For example, in 2005, the Apache-Sitgreaves National Forest received about \$2.4 million for needed rehabilitation and restoration after the Rodeo-Chediski fire. However, because of their limited staff and the time required to complete the contracting process, which they only initiated in February when they learned that they would receive the funding, forest officials said they were not able to spend all of the funds. Exacerbating the challenge, the Forest Service was implementing a new procurement system at the time, which

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officials said took additional time to learn. In other cases, agency officials anticipated workforce and operational limitations, and accounted for them by developing long-range plans with annual workloads that could be accommodated within such limitations. However, because these plans covered longer time periods, planned work was still incomplete several years after a fire. For example, at the Coronado National Forest in Arizona, officials planned to spread the needed work out over a period of 10 years or more, scheduling a feasible workload each year, given projected staff and infrastructure constraints.

Forest Service officials also noted that controversy about postfire activities presented challenges. General dissonance about the role of natural recovery versus managed recovery, as well as disagreement about specific decisions, such as whether to use chemical herbicides and whether to harvest burned timber as part of restoration efforts, created challenges for agency officials and sometimes prevented projects from being completed. Forest managers use herbicides to, for example, control the spread of invasive weeds or eradicate vegetation that competes with young seedlings planted to reforest burned lands. Its use is controversial, however, because herbicides can be harmful to native vegetation, wildlife, water, and soils. Harvesting burned timber is also controversial. Supporters say that the timber should be harvested to capture its economic value and remove its potential to fuel future fires, while critics say the burned trees should be left for wildlife habitat and to avoid any impacts that could be caused by harvesting operations.

Because of the controversy surrounding these issues, agency officials said they often invested more time and resources in developing defensible documents to support their decisions, which sometimes delayed project implementation. Also, appeals and litigation of such decisions sometimes caused projects to be delayed. For example, after a 2001 wildland fire at the Tahoe National Forest in California, the Forest Service spent a year preparing a plan, finalized in 2002, that proposed harvesting and selling burned timber both outside and within a roadless area to help finance needed rehabilitation work. The agency began harvesting timber outside the roadless area and had virtually completed doing so by July 2004. However, in response to a lawsuit, a federal district court issued a preliminary injunction in August 2004, prohibiting the Forest Service from harvesting timber inside the roadless area. In February 2006, the agency settled the case, agreeing not to harvest timber in the roadless area. By that point—4-1/2 years after the fire—agency officials said that the value of the timber had declined to the point that it was no longer feasible to sell it.

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Faced with repeated decisions about harvesting burned timber, some Forest Service officials expressed concern that there is insufficient scientific evidence to support one action or another, and further noted that little research is being done to address the question. In a 2004 report entitled “Strategy for Post-Fire Recovery,” an interregional group of Forest Service officials noted that there is “very limited scientific information on long-term effects of uncharacteristically severe fires, the effectiveness of post-fire rehabilitation and restoration treatments, or the impacts of post-fire timber harvesting.” Without such information, they concluded, “Policy choices are often based on ideology and emotion rather than objective scientific information.”<sup>15</sup> According to one Forest Service scientist, there is an urgent need for more information on salvage logging—especially information about the effects of logging operations under various conditions and in different geographic locations because such effects vary widely depending on the type and extent of logging, site conditions, and climatic conditions. Moreover, such research is needed to improve the models used by agency decision makers to predict the potential impacts of proposed actions such as locations and rates of erosion because, currently, none of them account for the effects of salvage logging on the postfire environment.

The 2002 Biscuit fire in Oregon, which has been a focal point for recent debates about harvesting burned timber, has also drawn attention to the role of scientific research. After the fire, a study was published stating that removing dead and dying trees from the Biscuit fire area would reduce the risk of recurring large-scale fires in the area.<sup>16</sup> Forest Service officials decided to offer 12 sales of burned timber as part of a larger recovery plan, one purpose of which was to reduce the risk of such fires. The sales were controversial and were the target of legal challenges, but the timber was ultimately harvested in 2004 and 2005. In 2006, a study was published concluding that salvage logging after the Biscuit fire may have been counterproductive to forest recovery goals in part because, during the logging operations, some seedlings were destroyed.<sup>17</sup> Release of the study

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<sup>15</sup>U.S. Forest Service Interregional Ecosystem Management Coordination Group, “A Strategy for Post-Fire Recovery” (2004).

<sup>16</sup>J. Sessions, R. Buckman, M. Newton, and J. Hamann, “The Biscuit Fire: Management Options for Forest Regeneration, Fire and Insect Risk Reduction and Timber Salvage” (unpublished report, College of Forestry, Oregon State University, Corvallis, Oregon, 2003).

<sup>17</sup>D.C. Donato, J.B. Fontaine, J.L. Campbell, W.D. Robinson, J.B. Kauffman, and B.E. Law, “Post-Wildfire Logging Hinders Regeneration and Increases Fire Risk,” *Science*, vol. 311 (2006).



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spurred additional controversy and media attention. In response, the study's authors issued a statement saying that "the controversy over the topic of postfire logging is indicative of how little is known about its effects." In a congressional hearing on the topic, other scientists and researchers told members of Congress that there is not a lot of peer-reviewed science on this issue, and a sustained commitment to such research is needed. Several bills pending before Congress contain provisions for research, pilot projects, and monitoring, related to the effects of postfire harvest.<sup>18</sup>

In addition to controversy, Forest Service officials told us that factors related to market forces also hinder their efforts to harvest burned timber after fires. For example, sometimes the trees burned in wildland fires are too small to be of any commercial value. Other times, a long distance to the nearest timber mill or difficult access to the burned timber reduces the cost-effectiveness of a project for the timber purchaser, especially because burned timber loses value over time as it deteriorates. In some locations, the small number of nearby timber mills can limit competitive bidding. For example, at the Eldorado National Forest in California, the Forest Service offered burned timber for sale in 2005 but received no bids on most of the sales because the only timber company close enough to harvest the trees was already busy with timber from previous sales. Agency officials said they were concerned that if too much time passed, the timber would lose value and the sale would no longer be economically viable. In the fall of 2005, they lowered the price of the timber and completed the sales. While agency officials acknowledged that market forces had sometimes hindered their ability to sell burned timber, they said this had not always been the case, and it was difficult to predict whether or how such forces might affect a sale.

To address challenges related to the controversy over salvage logging and in recognition of the shortage of related scientific research available, the Forest Service has begun to conduct such research in the past several years—for example, through its wildland fire research and development program. In addition, the Joint Fire Science Program—a partnership of six federal agencies, including the Forest Service—has called for and funded some research proposals in this area. In its October 2005 announcement,

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<sup>18</sup>For example, the Forest Emergency Recovery and Research Act, H.R. 4200, 109th Cong. (2005), and the National Forest Rehabilitation and Recovery Act, H.R. 3973, 109th Cong. (2005).

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the program specifically sought proposals from agency and university scientists “that evaluate the effects and effectiveness of postfire management activities, including but not limited to burned area emergency stabilization, rehabilitation, restoration treatments, and postfire removal of woody material (e.g., salvage logging, biomass utilization).” In May 2006, the program funded several studies in this area. For example, one Forest Service researcher received funding to study the effects of different salvage-logging techniques at a few sites and develop some guidelines for use by land managers. While we commend the Forest Service for taking these initial steps, it will require a long-term commitment to the issue to accumulate research that provides sufficient information about the effects of salvage logging under various conditions, including diverse geographic locations and ecosystem types, and different burn severities, logging techniques, soil conditions, species types, and other features.

To address challenges related to funding, Forest Service officials said they changed the formula for allocating rehabilitation and restoration funds to regions in fiscal year 2006, so that funding levels would be more stable from year to year, but did not request additional rehabilitation and restoration funds from Congress because of competing program priorities. The new formula for allocating funds considers the amount of lands burned in each region over the previous 5 years, in contrast to the old formula, which considered only the lands burned during the prior year. This way, if acres burned in a region fluctuate dramatically from year to year, funding levels do not follow the erratic pattern. Also, the new system considers only severely burned acres rather than also considering the total number of acres burned in each region, as did the old formula. According to agency officials, severely burned lands are more likely to need rehabilitation or restoration than are lands burned at moderate or low severity. Finally, agency officials plan to exclude wilderness acres beginning in fiscal year 2007 because, in many cases, wilderness lands need little or no active rehabilitation or restoration projects because they are managed to recover naturally. Agency officials said they have not requested more rehabilitation and restoration funding from Congress because, given the current environment of constrained budgets, they did not expect an overall increase in the agency’s budget and did not want to sacrifice other critical programs’ budgets. Also, the officials explained that by receiving relatively more funding for other programs, they maintained more flexibility to determine how to spend the funds. This way, if postfire rehabilitation or restoration work was the highest-priority work for a forest, it could direct its regular program funds to pay for it. On the other hand, if the forest had other higher-priority work needs, such as

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rehabilitating lands after a hurricane or repairing roads to meet basic safety standards, it could fund these needs.

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### BLM Cites Challenges to Ensuring Success of Completed Seeding and Planting Projects

Although BLM officials reported completing most of the agency's needed rehabilitation projects, some officials expressed concern that these completed projects were not always successful. BLM officials in several states told us that many of their seeding and planting projects did not successfully establish new vegetation because the seeds did not germinate, or germinated but later died. For example, after a 2002 wildland fire in Idaho, BLM officials seeded about 4,400 acres of land, but 3 years later, most of the plants had not survived. Field office officials speculated that this was due to several factors, including drought, competition from invasive weeds such as cheatgrass, poor seed viability, and an insufficient number of seeds. In an initial attempt to understand the extent of its planting challenge, a BLM official reviewed rehabilitation monitoring reports submitted after fires occurring from 1999 through 2003, and found that a significant portion of the projects were described as failures or as only partially successful. BLM officials qualified these results, emphasizing that success is a subjective standard, and cited a need for improved standards and guidance for determining and reporting success of rehabilitation projects. Nevertheless, the officials acknowledged that the low success rate should be a cause for concern.

According to BLM officials, a variety of factors can cause planting and seeding projects to fail or to be only partially successful. For example, BLM officials we interviewed frequently singled out lack of precipitation as a key factor causing projects to fail. In some BLM locations, agency officials told us that months can go by with little or no precipitation, and many species will not germinate without moisture. Also, there are technical factors that can influence a project's degree of success. Sometimes seeds do not grow when initially planted because they are not viable or the variety selected is not appropriate for the environment in which they are planted. Other times, it is because the seeds are damaged during application, or planted too late in the season or too deep in the soil. Alternatively, seeds may successfully germinate, but the seedlings later die because, for example, there are not enough available nutrients or moisture in the soil. The BLM official who reviewed recent rehabilitation-monitoring reports highlighted the poor success rates of sagebrush-planting projects that relied on aerial seeding, a technique to distribute seeds by aircraft (see fig. 3). For the aerial-seeding projects, agency officials estimated that more than half either failed or were only partially successful. Another study concluded that aerially seeding sagebrush

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following select Idaho fires was “not a reliable, effective seeding method,” at least in the sites studied. Sagebrush shrubs were not established on 23 of the 35 projects in the study.<sup>19</sup>

**Figure 3: A Helicopter Prepares to Aerially Seed a Burned Area after a 2005 BLM Fire**



Source: BLM.

When postfire seeding or planting projects are not successful, invasive weeds can spread, crowding out native species, increasing fire frequency, and displacing wildlife habitat. This is because after a wildland fire burns in a forest or rangeland, an opening is left for plants to grow, and if land managers do not successfully establish plants in such an opening immediately, invasive species—which multiply rapidly and compete aggressively with other plants for nutrients, water, and sunlight—often fill the void. Once they have arrived, invasive plants are hard to eradicate. Some invasive plants, such as cheatgrass, have increased the frequency of wildland fires in western grasslands because they add to fuel loads, become dry early in the summer when wildland fires are most common, and can grow back after fires. In some locations where cheatgrass has

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<sup>19</sup>BLM Idaho State Office, *ID Technical Bulletin No. 2004-01: Establishment of Aerially Seeded Big Sagebrush Following Southern Idaho Wildfires* (August 2004).

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invaded ecosystems that cannot handle frequent, intense fires, native plants and animals have been nearly eliminated. In other cases, failure of seeding or planting projects can directly result in a loss of wildlife habitat. For example, wildlife such as the sage grouse, pronghorn antelope, and mule deer are dependent on sagebrush for their survival, so when sagebrush projects fail, these animals lose their habitats.

BLM officials are aware of and concerned about the success rate of postfire planting and seeding projects. In an effort to learn more about and improve the effectiveness of these projects, BLM has taken several actions. Specifically, in fiscal year 2005, BLM began requiring field staff to monitor all rehabilitation projects for effectiveness, and document the assessment in a closeout report completed at the end of the third year of rehabilitation activities. In fiscal years 2004 and 2005, monitoring work was funded through the emergency stabilization program under the wildland fire operations account. According to a BLM official, this was to ensure that funding would be available for monitoring. In fiscal year 2006, however, BLM began to use rehabilitation funds to pay for monitoring rehabilitation projects, in accordance with agency policy. In addition, in response to a previous GAO recommendation, BLM is working with the Forest Service and the United States Geological Survey to develop standard monitoring protocols, so that agencywide monitoring data will be comparable and can facilitate learning. With consistent monitoring protocols, agency officials expect to be able to isolate some of the common factors that cause seeding projects to fail under various conditions. For example, they hope to identify seed types and planting techniques that work best in arid climates, with certain types of soils, or in competition with particular invasive weeds. In response to another GAO recommendation, BLM, the Forest Service, and the United States Geological Survey are also working together to develop a data system that can serve as a repository of information and lessons learned through implementing and monitoring rehabilitation projects.<sup>20</sup> The agencies have implemented a pilot to test the data system in Nevada, and they expect to begin development of the nationwide system in fiscal year 2008.

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<sup>20</sup>GAO, *Wildland Fires: Better Information Needed on Effectiveness of Emergency Stabilization and Rehabilitation Treatments*, [GAO-03-430](#) (Washington, D.C.: Apr. 4, 2003).

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## Conclusions

Faced with millions of acres of burned federal lands, the Forest Service and BLM have a daunting task in identifying and addressing postfire rehabilitation and restoration needs. Given the enormity of the task and the scarcity of funding to address needed rehabilitation and restoration work, the Forest Service has chosen to give its regions and forests the discretion to decide what, if any, rehabilitation or restoration work is warranted, given competing priorities. While we agree that a degree of freedom is appropriate, so that the agency can accommodate diverse ecosystems and unique circumstances, the Forest Service must balance this freedom with its obligation to be accountable to the public and Congress. Without complete information on the magnitude of its rehabilitation and restoration needs relative to its capacity to address them, the Forest Service can neither make informed funding decisions nor show Congress and the public whether it is keeping pace with the most critical postfire work. Because the Forest Service already has a system to capture and report some data on rehabilitation and restoration accomplishments, expanding its use might be a straightforward way to provide a more complete picture of the agency's high-priority rehabilitation and restoration needs relative to its accomplishments.

For its part, BLM has acknowledged that one limitation of its rehabilitation program is its 3-year time constraint, which precludes any subsequent restoration work from being implemented under the program. In some cases, the time constraint also limits the agency's ability to monitor rehabilitation projects long enough to ascertain whether they are successful, a critical shortfall given BLM's challenge with success rates. In recognition of this limitation, agency officials have said—and we agree—that the program could be improved by extending management and data-tracking efforts beyond the initial 3 years to better understand whether long-term restoration needs are being addressed.

With millions of acres of burned lands, the Forest Service and BLM face significant challenges in addressing rehabilitation and restoration needs. While there are no quick fixes for these challenges, there are some actions the agencies could take to smooth the way. BLM has already taken the first steps toward improving its understanding about how frequently its rehabilitation projects fail and why. The Forest Service could improve the foundation from which it makes decisions about postfire work that may be controversial, including postfire timber harvests, by conducting additional research in this area, so that such decisions can be informed by ample scientific evidence rather than the limited number of studies currently available.

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## Recommendations for Executive Action

To help Congress and the Forest Service make more informed funding decisions, and to help the Forest Service better address its high-priority postfire rehabilitation and restoration needs, we recommend that the Secretary of Agriculture direct the Forest Service to take the following two actions:

- Track and report to Congress all high-priority rehabilitation and restoration work needed and accomplished, regardless of funding source.
- Conduct additional research on the beneficial and harmful effects of postfire projects, including but not limited to, postfire timber harvests.

To help ensure that long-term postfire restoration needs are addressed on BLM lands, we also recommend that the Secretary of the Interior direct BLM to address postfire restoration needs that persist more than 3 years after a fire by establishing a procedure to transfer any incomplete work—including monitoring—from the rehabilitation program to other ongoing programs, and by tracking and reporting to Congress the status of all needed and completed postfire restoration work in those programs.

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## Agency Comments and Our Evaluation

We received comments on a draft of this report from the Forest Service and Interior. The Forest Service, in comments provided via email, generally agreed with our findings and recommendations. With respect to our recommendation to conduct additional research on the effects of postfire projects, the Forest Service noted that it will need to set priorities for this work. While we recognize that the Forest Service must balance competing priorities when allocating its resources, we continue to believe that such research warrants particular emphasis because of the heightened controversy surrounding some postfire projects, including postfire timber harvests, and the relative shortage of available scientific information in this area. The Forest Service also provided additional comments, which we have incorporated in this report where appropriate. Interior, in a written letter reproduced in appendix II, concurred with the report's findings and recommendations.

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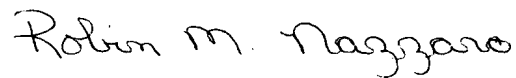
As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the report date. At that time, we will send copies to the Secretary of Agriculture, Secretary of the Interior, Chief of the Forest Service, and Director of BLM. We also will make copies available to others upon

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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. GAO staff who made major contributions to this report are listed in appendix III.

Sincerely yours,

A handwritten signature in black ink that reads "Robin M. Nazzaro". The signature is written in a cursive, slightly slanted style.

Robin M. Nazzaro  
Director, Natural Resources and Environment



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# Appendix I: Objectives, Scope, and Methodology

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The objectives of our study were to determine (1) how the Forest Service and the Bureau of Land Management (BLM) identify and plan postfire rehabilitation and restoration activities; (2) how much needed rehabilitation and restoration work the agencies have completed for wildland fires that occurred between 2000 and 2004; and (3) the challenges the agencies face in addressing their needs, and any actions they are taking in response.

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## Planning Rehabilitation and Restoration Activities

To learn how the Forest Service and BLM identify and plan postfire rehabilitation and restoration activities, we reviewed agency documents and interviewed officials in headquarters, regional and state offices, and local units. We collected and reviewed documents on policies, procedures, and practices relevant to rehabilitation and restoration activities in both agencies. These included interagency agreements, such as one establishing common definitions for rehabilitation and restoration, as well as departmental, agency headquarters, and regional or state guidance for nonemergency rehabilitation and restoration activities. We reviewed relevant portions of agency manuals and handbooks, documents detailing procedures for identifying needed postfire activities, as well as any documents describing prioritization and funding approval processes. For select fires, we reviewed environmental impact statements, needs assessments, rehabilitation plans, and other relevant planning documents. When we adjusted dollars for inflation, we used the gross domestic product (chained) price index, with 2001 as the base year.

We also visited regions and states with large numbers of acres burned by wildland fire—excluding Alaska, where the agencies conducted little or no rehabilitation or restoration work after wildland fires. For the Forest Service, we visited the Northern, Pacific Northwest, Pacific Southwest, and Southwestern regions to interview officials that manage lands in Arizona, California, Montana, New Mexico, North Dakota, Oregon, Washington, and parts of Idaho. In each of the four regions, we visited one or two forests and interviewed forest- and district-level staff. In addition, we contacted officials in Forest Service headquarters and all of the agency's regions by telephone to discuss how the Forest Service identifies, plans, and funds postfire rehabilitation and restoration activities. For BLM, we visited Idaho and Oregon to interview officials in BLM's state and field offices there. We also contacted, by telephone, officials in BLM's headquarters and Utah and Nevada state offices to discuss how they identify and plan rehabilitation activities.

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## Amount of Needed Rehabilitation and Restoration Work That Has Been Completed

To determine how much needed rehabilitation and restoration work the Forest Service and BLM have completed, we collected available national, regional, state, and local data on project needs and accomplishments, interviewed Forest Service and BLM officials at all levels to ascertain their subjective assessments of the extent to which they had addressed postfire rehabilitation and restoration needs, and reviewed relevant agency reports. We also met with field staff to discuss proposed and completed projects for select fires and conducted detailed reviews of these needs and accomplishments using a structured data collection instrument. In addition, we conducted a Web-based survey of agency officials in the field, but after checking a sample of survey responses against supporting documents, we determined that the information provided in the survey was not sufficiently reliable to report.

## Survey Design

We selected a stratified random sample of 276 fires from the population of BLM and Forest Service fires that burned more than 500 acres and occurred between 2000 and 2004. The sample was stratified by agency and by year (2000-2002 and 2003-2004), so that results could be generalized for each stratum as well as in the aggregate. To identify the universe of these fires, we combined two separate lists of fires obtained from the Forest Service and BLM. We excluded fires that occurred in Alaska because Forest Service officials reported little, and BLM officials reported no, postfire rehabilitation activity in Alaska during this period.

Our survey asked agency officials to provide qualitative information about needed projects, the portion of those projects completed, factors that hindered their ability to complete needed projects, and any effects associated with not completing projects. We surveyed Forest Service officials about both rehabilitation and restoration projects, but we surveyed BLM officials only about rehabilitation projects because BLM's postfire programs do not include restoration. Also, to account for BLM projects implemented before BLM separated its emergency stabilization projects from its rehabilitation projects in 2004, we requested that agency officials use the current interagency definitions of emergency stabilization and rehabilitation when providing information about all rehabilitation projects.

To identify potential survey questions, we interviewed Forest Service and BLM officials at headquarters and in the field, and reviewed agency documents and other reports. We took several quality assurance steps to minimize nonsampling errors, which can be introduced, for example, when respondents do not understand questions or do not have the information required to answer questions. Social science survey specialists

designed draft questionnaires, and we conducted six pretests with agency officials in the field. After each pretest, we conducted an interview to determine (1) the extent to which respondents interpreted questions and response categories consistently, (2) whether respondents had the necessary information to answer the questions, and (3) how long it took individuals to complete the survey. In addition, we asked headquarters officials with national responsibility for postfire work in each agency to review our draft questionnaires and provide comments. Based on the results of these pretests and comments, we made multiple revisions to the survey.

To determine to whom to send our survey, we contacted forest supervisors or natural resources directors in the Forest Service, and state office rehabilitation coordinators in the BLM, and asked them to identify the field staff most knowledgeable about rehabilitation and restoration for each fire in our sample. In a few cases—where we lacked timely contact information or the person we initially contacted referred us to someone else—we asked agency field officials to forward the survey to the appropriate person.

## Survey Administration and Data Verification

We administered the survey via the internet for 8 weeks between November 21, 2005, and January 13, 2006, and at the close of our administration period, we had received a total of 256 responses for an overall response rate of 93 percent. After the survey, we checked the survey data and verified the data analysis programming. We also verified select responses for 10 percent of surveys that we randomly selected from those that had been completed. Specifically, we verified responses to questions about the proportion of projects completed for a particular fire and the funding sources used to pay for such projects by contacting respondents and requesting supporting documents—such as project plans, accomplishment reports, and contracts—to compare their survey responses with information in the documents. Our verification revealed that a significant portion of responses were not supported by the documentation we received. As shown in table 1, we found that in 6 of the 26 cases, none of the responses we checked were fully supported; in another 6 cases, only some of the responses were supported; and in 14 cases, all were supported.

**Table 1: Verification Results for Survey Responses about Project Completion and Funding**

	All responses supported	Mix of supported, unsupported, and uncertain level of support for responses	No responses supported
Forest Service fires	5	5	3
BLM fires	9	1	3
<b>Total fires</b>	<b>14</b>	<b>6</b>	<b>6</b>

Source: GAO.

For example, sometimes responses were not supported because respondents had mistakenly reported information about emergency stabilization activities or funding, rather than rehabilitation and restoration activities or funding. Other times, respondents had either erroneously transferred the information from supporting documents to our survey, or had no documentation to support their answers. Overall, this outcome indicates that there is a degree of nonsampling error in our survey results that is not quantifiable, but which we determined is too great to ensure sufficient reliability.

## Challenges to Addressing Needs

To determine what challenges the Forest Service and BLM face in addressing postfire rehabilitation and restoration needs, and what actions, if any, they are taking in response, we relied on interviews with agency officials and agency documents. In our interviews with agency officials at all levels, we asked about challenges at the program level as well as the project level, and about actions the agencies are taking to address such challenges. During our visits to the field, we also observed rehabilitation or restoration project sites and discussed challenges officials faced in successfully completing those and other projects. We reviewed Forest Service and BLM reports describing agencywide challenges as well as select reports detailing challenges to addressing rehabilitation or restoration needs for a specific fire. To better understand some challenges agency officials reported, and some actions they are taking in response to challenges, we conducted additional interviews with agency research scientists, biologists, and ecologists, and reviewed relevant agency studies.

We conducted our work from May 2005 through May 2006 in accordance with generally accepted government auditing standards.

# Appendix II: Comments from the Department of the Interior



## United States Department of the Interior

OFFICE OF THE SECRETARY  
WASHINGTON, D.C. 20240

JUN 22, 2006



Ms. Robin M. Nazzaro  
Director, Natural Resources and Environment  
Government Accountability Office  
441 G Street, N.W.  
Washington, D.C. 20548-0001

Dear Ms. Nazzaro:

Thank you for the opportunity to review and comment on the Government Accountability Office's (GAO) draft report *Wildland Fire Rehabilitation and Restoration – Forest Service and BLM Could Benefit from Improved Information on Status of Needed Work* (GAO-06-670). The following general and specific comments are provided.

### General Comments

We appreciate the GAO's understanding of the Bureau of Land Management's (BLM) multiple-use mission to manage 261 million acres of public land, including 55 million acres of forests and woodlands, and concur with the GAO's findings and recommendations, as they relate to the BLM.

The GAO's recommendations reinforce the BLM's strategy of transferring any incomplete work, including monitoring, from the rehabilitation program to other ongoing resource management programs, such as range (and weed) management, monitoring, and restoration.

### Specific Comments

- Under current funding levels, the BLM's burned area rehabilitation needs are being met. Because restoration work is long term, it is assessed and funded separately.
- The BLM will clearly identify post-fire rehabilitation work that has not been completed and restoration work needed in subsequent years. This information will be provided to the line manager responsible for ensuring that rehabilitation is completed and restoration needs are identified and ranked in priority order.
- A performance measure for "Burned Area Rehabilitation" is being developed.
- In response to the GAO's comment on page 8, the BLM hopes to improve the success of planting techniques by improving data gathering and monitoring to identify optimal planting methods.

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Thank you again for your outstanding team that worked with the BLM on this assignment. If you have any questions, please contact Jack Hamby, Deputy Division Chief, Division of Rangeland Resources, on 202-452-7747, or Andrea Nygren, BLM Audit Liaison Officer, on 202-452-5153.

Sincerely,



R. M. "Johnnie" Burton  
Director, Minerals Management Service  
Exercising the delegated authority of the  
Assistant Secretary, Land and Minerals Management

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# Appendix III: GAO Contact and Staff Acknowledgments

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## GAO Contact

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

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## Staff Acknowledgments

In addition to the contact named above, David P. Bixler, Assistant Director; Carl Barden; Mark Braza; Sandy Davis; Christine Feehan; Rich Johnson; Alison O'Neill; Anthony Padilla; and Judy Pagano made key contributions to this report.

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