

Report by a Panel of the

**NATIONAL ACADEMY OF
PUBLIC ADMINISTRATION**

for the United States Department of the Interior

**STUDY OF THE
IMPLEMENTATION OF
THE FEDERAL WILDLAND
FIRE POLICY**

Phase I Report

**PERSPECTIVES ON CERRO GRANDE
AND
RECOMMENDED ISSUES FOR FURTHER STUDY**

December 2000



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EXECUTIVE SUMMARY

On May 4, 2000, National Park Service personnel at Bandelier National Monument ignited a prescribed fire. The burn quickly got out of control. It was declared a wildfire the next day and was given the name “Cerro Grande,” which is the name of the mountain where the fire was started. By the time the fire was contained—15 days later—it had burned 47,650 acres, forced the evacuation of 18,000 people from Los Alamos, New Mexico, caused serious ecological damage, destroyed 235 homes, and caused \$1 billion in damages. Fortunately, no lives were lost.

In response to this disaster, Secretary of the Interior Bruce Babbitt prohibited all agencies within the department from conducting prescribed fires. On June 12, 2000, he lifted the moratorium for all agencies except the Park Service. The secretary commissioned an investigation of the Cerro Grande Fire as well as a follow-up review of the investigation. In addition, the secretaries of Agriculture and the Interior established an interagency team to review the 1995 Federal Wildland Fire Management Policy, which is the policy governing the use of prescribed fire by federal agencies as well as other fire management activities.

Secretary Babbitt also asked the National Academy of Public Administration (the Academy) to study the planning and implementation of prescribed fires in the Park Service. The Academy is charged with examining the adequacy of the 1995 Policy and making recommendations to improve its implementation.

The Academy’s study is being conducted in two phases. Phase I was designed to focus on the Park Service and five major topics: (1) implementation of the 1995 Policy; (2) risk and accountability structures; (3) lessons that can be learned from comparable problem areas; (4) background data development; and (5) limited case studies. One of these topics—lessons learned from other problem areas—has been deferred largely to Phase II. This report is the final report on Phase I.

In Phase II, the Academy will expand its work to include other federal land management agencies. Four of the agencies—the Park Service, the Bureau of Land Management, the Bureau of Indian Affairs, and the Fish and Wildlife Service—are in the Department of the Interior. The fifth—the U.S. Forest Service—is in the Department of Agriculture.

Background on the Federal Wildland Fire Program

For much of the 20th century, federal land management agencies actively suppressed all fires on public lands. As knowledge of wildland ecosystems matured, however, it has become clear that suppressing all fires alters and weakens these ecosystems. As a result, good practice now requires advance planning for fire management on wildlands, and the intentional introduction of fire on some of these lands where dangerous build-ups of burnable vegetation has occurred and where natural burning has not been adequate to support other ecological benefits.

The practices of intentionally introducing fire on wildlands and managing naturally occurring wildland fires to allow them to serve beneficial ecosystem functions, are termed “prescribed fires.” Overall fire management plans for these areas indicate where burning is needed to achieve ecosystem health and fire safety goals, and specific prescribed fire plans establish the procedures for igniting and controlling fire on individual wildland sites.

The overall track record of the federal prescribed fire program has been very good. Since the prescribed fire policy was introduced by the Park Service in 1968, less than 2 percent of prescribed fires have escaped and gotten out of control. Nevertheless, fire is inherently dangerous. Prescribed burning of wildlands needs to be planned and conducted with great care to avoid loss of life, damage to property, and unhealthy consequences for ecosystems.

Study Methodology

This Phase I study is based on a review of the investigative reports on the Cerro Grande Fire, interviews with over 50 officials involved with administering the Federal Wildland Fire

Management Policy in both headquarters and field offices, and review of basic policy documents and statistics. Although the interviews and document reviews focused heavily on the Park Service, other federal agencies also were consulted to provide context. In particular, officials from all of the agencies involved in the Cerro Grande Fire were interviewed. These interviews took place in the Los Alamos area, as well as at the National Wildland Fire Center in Boise, Idaho, and the responsible regional centers in Albuquerque, New Mexico and Denver, Colorado.

Perspectives on the Cerro Grande Fire

The Academy panel responsible for this study reviewed the Cerro Grande Fire investigations conducted by others, conducted interviews with officials acquainted with that fire, examined related documents, and compared the Cerro Grande Fire with several other prescribed fires that escaped. Based on this work, the panel concluded that the most common causes for prescribed fires going out of control were:

- high winds
- inadequate “holding resources,” consisting of the onsite compliments of personnel and equipment provided when the fire is ignited to keep the fire within its planned area
- insufficient pre-treatment of the burn area to establish fire breaks and mitigate particularly dangerous situations before fire is introduced

Other contributing factors, noted in one of the other five cases examined, were:

- inadequate weather forecasting
- management pressure to conduct the fire even in unfavorable conditions
- lack of staff expertise

The Academy's review of the Cerro Grande Fire suggests that four factors could have helped to avoid or mitigate this disaster. These factors were: more cooperative planning, more accurate risk analysis, greater precautions to compensate for the higher level of risk that existed (compared to that which was identified), and more effective management of the fire.

Recommendations for Further Study

The bulk of the Phase I study was devoted to detailed examinations of the National Park Service implementation of the 1995 Federal Wildland Fire Management Policy. These examinations focused on:

- coordination with other federal agencies, with interagency coordination groups, and with affected state, local, tribal and private stakeholders
- management accountability and evaluation systems
- planning, operating, and funding systems
- human resources

Based on these examinations, the Academy panel recommends that Phase II of the study focus on the following five issues:

1. Accountability for program management and implementation of the Federal Wildland Fire Management Policy by each of the affected agencies and their stakeholders
2. Interagency program coordination and policy implementation systems that can more fully integrate the wildland fire management activities of the land management agencies and the affected state, local, and tribal governments, as well as private landowners
3. Program analysis and evaluation mechanisms that can strengthen program management within and among the agencies

4. Risk analysis and mitigation methods that are more precise and more effective than those currently being used
5. Human resources systems that can meet future challenges

Phase II of the study will be broader than Phase I. It will focus on: (1) understanding how wildland fire programs work in other federal land management agencies; (2) assessing the capabilities of these agencies to implement the Federal Wildland Fire Management Policy; (3) fostering the exchange of lessons learned among these agencies; and (4) introducing lessons learned by federal and non-federal organizations that administer other types of programs facing high-risk situations involving decisionmaking under stressful conditions. The intent of Phase II is to recommend options that could assist federal agencies to improve their operational capacity to implement the Federal Wildland Fire Management Policy.

CHAPTER 1 INTRODUCTION

PURPOSE OF THE STUDY

On May 4, 2000, National Park Service (NPS) personnel at Bandelier National Monument ignited a prescribed fire. The burn quickly escaped prescription and got out of control. It was declared a wildfire the next day and was given the name “Cerro Grande.” By the time the fire was contained—15 days later—it had burned 47,650 acres, forced the evacuation of 18,000 people from nearby Los Alamos, New Mexico, caused serious ecological damage, destroyed 235 homes, and caused \$1 billion in damages. Fortunately, no lives were lost.

In response to this disaster, Secretary of the Interior Bruce Babbitt prohibited all agencies within the Department of the Interior (DOI) from conducting prescribed fires. On June 12, 2000, he lifted the moratorium for all agencies except NPS.¹ The secretary commissioned an investigation of the Cerro Grande Fire as well as a follow-up review to the investigation. In addition, the secretaries of the Interior and Agriculture established an interagency team to review the 1995 Federal Wildland Fire Management Policy.

Secretary Babbitt also asked the National Academy of Public Administration (the Academy) to study the planning and implementation of prescribed fires. The Academy is charged with examining the adequacy of the 1995 Policy, especially with respect to the use of prescribed fires, and making recommendations to improve its implementation. The Academy’s study is being conducted in two phases. In Phase I, the focus is on NPS and five major topics: (1) implementation of the 1995 Policy; (2) risk and accountability structures; (3) lessons that can be learned from comparable problem areas; (4) background data development; and (5) limited case studies. In Phase II, the Academy will expand its work to include other federal land

¹ In August of 2000, Secretary Babbitt gave the NPS authority to grant exemptions to the moratorium, but only under tightly controlled conditions. These exemptions allow the NPS to conduct high-priority prescribed fires that are low-risk. The agency is still prohibited from setting fires near homes or other structures, and it must have the resources and manpower available to deal with the “worst-case scenario.”

management agencies. Four of these agencies—NPS, the Bureau of Land Management (BLM), the Bureau of Indian Affairs (BIA), and the Fish and Wildlife Service (FWS)—are in the DOI. The U. S. Forest Service (USFS) is in the Department of Agriculture (USDA). One of the Phase I topics—lessons that can be learned from comparable problem areas—has been deferred largely to Phase II.

THE FEDERAL LAND MANAGEMENT AGENCIES' FIRE PROGRAMS: HISTORICAL DEVELOPMENT

For much of the 20th century, federal land management agencies actively suppressed all fires on public lands. This policy was adopted with the best of intentions, but over time its “success” altered ecosystems and increased the risk of more serious wildfires. By suppressing all fires, the agencies interfered with the naturally occurring process of frequent low-intensity fires and less frequent high-intensity stand replacement fires. This interference caused the accumulation of large quantities of burnable vegetation, including dense small diameter tree stands, vast undergrowth, accumulated dead materials, and less fire-tolerant species. This accumulation also reduces the diversity of age classes within the timber stands, and increases the risk of wildfires that do serious damage. The problem is particularly acute in the western United States.²

Fire suppression is not the only cause of altered ecosystems and fuel build up. Other important factors include: overgrazing, past timber harvesting methods, and invasion by non-native species. Experts agree, however, that “the primary factor contributing to unhealthy forests in the region has been a decades-old policy of suppressing fire in the national forests, particularly in those which depend on frequent fires.”³

² U.S. General Accounting Office. “Western National Forests: Catastrophic Wildfires Threaten Resources and Communities.” Statement of Barry T. Hill, Associate Director, Energy, Resources and Science Issues, RCED, 1998.

³ *Ibid.*

Prescribed Fire: What It Is, How It Is Used

In the 1960s, federal land management agencies began to recognize the shortcomings of the long-standing suppression policy.⁴ In the process, they also began to look more favorably on *prescribed fire* as a wildland management tool. In this sense, a prescribed fire is a “deliberate and carefully planned periodic burning of a selected site.”⁵

The 1995 Federal Wildland Fire Management Policy links the use of prescribed fires with achieving resource management goals through the use of the fire management plan. Essentially the policy makes clear that in order for wildland fire, whether wild or prescribed, to be used for resource management purposes, there must be a fire management plan in place. Absent such a plan, wildland fires must be suppressed (rather than managed) and prescribed fires are prohibited. Prior to this, wildland fires that were allowed to burn under controlled circumstances were called natural prescribed fires.

Land management agencies conduct prescribed fires for several reasons. Prescribed fires reduce accumulated fuel loads to decrease the likelihood of severely damaging wildfires. They also prepare sites for re-planting and natural vegetative regeneration, and they can improve wildlife habitat and result in a more sustainable ecosystem. Planned fires also reduce “the potential for negative health impacts resulting from the smoke of unplanned, uncontrolled wildfires.”⁶

⁴ In 1963, the “Leopold Report” to the secretary of the Interior acknowledged the ways that fire suppression had altered park ecosystems. In 1968, NPS policy was changed to let park personnel set prescribed fires and allow lightning fires to burn. Sequoia and Kings Canyon National Parks established a prescribed natural fire program (where managers allow lightning fires to burn under prescribed conditions), while some other parks began experimental prescribed burn programs. Despite some opposition within the agency, there was a “gradual increase in recognition of the effects of fire exclusion and the importance of restoring fire as a process” (Parsons & Botti 1996).

⁵ National Park Service, 2000.

⁶ *Ibid.*

The Track Record of Prescribed Fires

In the aggregate, prescribed fires conducted by federal land management agencies have a solid record, with about one percent of them getting out of prescription.⁷ Because many of the prescribed fires that escape are in wild areas, they do little harm to people or property. Disastrous incidents like Cerro Grande are relatively rare.

However, when a prescribed fire escapes and causes serious damage, it can undermine support for the entire prescribed fire program. This was especially true in 1988, when several prescribed natural fires in Yellowstone National Park (the largest being the North Fork Fire) were initially allowed to burn, got out of control, and resulted in serious damage. At the time of the fire, 26 parks had active prescribed natural fire programs and many others had active management-ignited prescribed fire programs. DOI responded to this incident by imposing a moratorium on all prescribed natural fire programs. To reactivate these programs or begin new ones, park officials had to follow what critics referred to as “onerous new implementation guidelines.” Not surprisingly, both the number of prescribed fire programs and the number of acres burned declined dramatically after this major fire in Yellowstone. Only three parks—Voyagers, Sequoia-Kings Canyon, and Yosemite—had active prescribed natural fire programs by 1990. From 1983 to 1988, NPS burned an average of 32,135 acres per year in prescribed natural fire programs. The annual average number fell to 3,708 per year between 1990 and 1994.⁸

The attitude toward prescribed fire had improved by 1995, when the Federal Wildland Fire Management Policy explicitly recognized fire as a vital component of ecosystem management and encouraged prescribed burning. As Table 1 indicates, the number of acres treated with prescribed fire has increased significantly since that policy was adopted.

⁷ A recent analysis by The Nature Conservancy reported that 0.5 percent of its prescribed fires got out of control.

⁸ Parsons, David and Stephen J. Botti “Restoration of Fire in National Parks.” USDA Forest Service General Technical Report INT-GTR-341. 1996.

Table 1
Acres of Land Treated with Prescribed Fire by Federal Land Management Agency

Agency	1995	1996	1997	1998	1999
Forest Service	570,300	617,163	1,097,658	1,489,293	1,379,960
Bureau of Indian Affairs	21,000	16,000	37,000	48,287	83,875
Bureau of Land Management	56,000	50,000	72,500	200,223	308,000
National Park Service	62,000	52,000	70,000	86,126	135,441
Fish and Wildlife Service	209,000	180,000	324,000	285,758	300,508
Total	918,300	915,163	1,601,158	1,889,564	2,240,105

Source: National Interagency Fire Center. (2000). *Prescribed Fire Statistics*.

Although the long-term trend is toward more prescribed burns, several caveats should be noted. In a typical year, anywhere from one-half to two-thirds of the acres treated are in the southern United States, so the national statistics by themselves can be misleading. In addition, the number of acres burned by wildfire in a typical year is significantly higher than the number burned by prescribed fire. In 1999, for instance, the agencies burned 2.2 million acres with prescribed fire. That same year, wildfires burned about 5.6 million acres. Consequently, the federal land management agencies—both individually and collectively—have continued to spend much more on wildfire suppression than on managing prescribed fires. As Table 2 reveals, the agencies spent more than five times as much in 1999 for wildfire suppression as they spent on prescribed fires (current dollars).

Table 2
Expenditures on Wildfire Suppression and Prescribed Fire by
Federal Land Management Agencies
(\$ in thousands)

Year	Wildfire Suppression	Prescribed Fire
1995	\$340,050	\$20,446
1996	\$679,168	\$29,550
1997	\$256,000	\$36,146
1998	\$328,526	\$70,793
1999	\$523,468	\$99,104

Source: National Interagency Fire Center (NIFC). *Prescribed Fire Statistics.*

On a per-acre basis nationwide, prescribed fire costs less than wildfire suppression. But the costs of prescribed fire vary considerably by region and within regions. Burns in the southeast cost much less than burns elsewhere. Costs also vary by agency. In 1999, agency costs ranged from \$25 per acre to \$75 per acre. These data are important for budgeting, but should not be taken as indicative of agencies' relative efficiency in conducting prescribed burns because of the very different characteristics of lands being managed and for other reasons.

RECENT DEVELOPMENTS

In the months following the Cerro Grande Fire and this year's extraordinary fire season in the western United States, three developments have significantly altered the policy and program landscape of fire management: (1) the report to the President by the secretaries of Agriculture and the Interior, *Managing the Impact of Wildfires on Communities and the Environment*; (2) the interagency policy review commissioned after Cerro Grande; and (3) the fiscal year (FY) 2001 Appropriations Act for the Department of the Interior and the Forest Service, which dramatically increased funding for fire management.

The 2000 Fire Season

The fire season of 2000 was one of the worst in the nation's history. By late October, wildfires had burned almost 7 million acres nationwide, destroying 852 structures. This is almost twice as high as the 10-year average of 3,786,411 acres. By late October, total fire suppression costs had reached almost \$900 million.⁹

The 2000 fire season harmed local and regional economies and damaged the environment. Montana Governor Racicot estimated that businesses in his state lost \$3 million a day because of wildland fires. Idaho Governor Kempthorne estimated that businesses there lost \$54.1 million over the fire season. Idaho also sustained approximately \$12.5 million in agricultural losses and \$12 million in watershed restoration costs.¹⁰ "Economic impacts arise both directly from fire damage and indirectly from changes in local economic activity, such as a drop in tourism. Both direct and indirect effects of the wildfires have exacted a heavy economic toll on many local, often rural, communities."¹¹

Ecologically, this year's wildland fires burned a wide range of public and private lands, from forested ecosystems to semi-arid rangeland. In some cases, the fires burned over entire watersheds that are vital to public water supplies. Because of the intensity of some of these fires, many ecosystems may change in significant ways. For example, cheat grass and similar non-native species that create more intense fire risks and disrupt natural systems often established themselves in burned areas.¹²

⁹ NIFC National News, 2000.

¹⁰ Report of the Secretaries of Agriculture and the Interior, 2000.

¹¹ *Ibid.*

¹² *Ibid.*

The Secretaries' Report to the President

On September 8, 2000, the secretaries of Agriculture and the Interior presented a report to the President entitled *Managing the Impact of Wildfires on Communities and the Environment*. Requested by President Clinton, this report presented a series of recommendations for “how best to respond to this year’s severe fires, reduce the impacts of these wildland fires on rural communities, and ensure sufficient firefighting resources in the future.”¹³ In addition to these long-term issues, the President asked the secretaries to identify immediate actions that federal agencies could take to reduce the risks facing communities in wildland/urban interface areas and to prepare managers as well as firefighters for “extreme fire conditions in the future.”

In their report, the secretaries articulated four long-term objectives:

1. **Restoring and rebuilding the communities harmed by this year’s wildfires.**

In order to accomplish this objective, the secretaries committed to assessing the economic needs of communities, and using existing authority to “assist individuals and communities in rebuilding their homes, businesses, and neighborhoods.” They also committed to restoring damaged landscapes through watershed restoration, soil stabilization, and revegetation.

2. **Investing in projects to reduce fire risk.** The report acknowledges the importance of making “significant investments to treat landscapes through mechanical thinning and prescribed fire” in order to reduce fire risks. It envisions a collaborative effort between agencies at the federal, state, and local levels to expand fuel treatment programs. Specifically, the report states that the departments will establish locally led, interagency “integrated fuels treatment

¹³ Report to the President, 2000.

teams at the regional and field levels,” develop markets for small diameter material, and allocate necessary funds.

3. **Working directly with communities.** The report acknowledges the need for federal agencies to collaborate with local communities, especially in areas such as reducing fire hazards near homes and restoring damaged landscapes. According to the report, accomplishing this objective will require the departments to help expand community participation, increase local capacity, and “learn from the public.”
4. **Establishing accountability within the fire program.** The report recommends the establishment of “a Cabinet-level coordinating team”—chaired jointly by the secretaries—“to ensure that the actions recommended by the Departments receive the highest priority.” At the regional level, they recommended that integrated management teams from the two departments “take primary responsibility for implementing the fuels treatment, restoration, and preparation program.”¹⁴

The Interagency Policy Review

After the Cerro Grande Fire, the secretaries of the Interior and Agriculture established an interagency review team to re-examine the 1995 Federal Wildland Fire Management Policy. The team is expected to conclude that the policy is sound, but also to recommend some modifications. The most important recommendation is likely to clarify the 1995 Policy by explicitly embracing a “fire is fire” policy. This recommendation would allow land managers to evaluate any fires on their land according to established fire management plans, and then act in accordance with the plan. Under such a policy, *how* the fire starts would not be important in determining how it should be managed. What would matter most is the *context* within

¹⁴ *Ibid.*

which the fire is burning and whether a fire management plan has been approved for the area. If there is no fire management plan, then the fire would have to be suppressed.

From a layperson's viewpoint, however, the panel notes that how the fire starts makes a big difference in how the public perceives any damage that results. Any adverse results from a wildland fire that is deliberately ignited is likely to be blamed on whoever started it.

The interagency team also concluded that other relevant federal agencies—the Department of Defense (DOD), the Department of Energy (DOE), and the Federal Emergency Management Agency (FEMA)—should be included as cooperators in this policy because of their substantial land holding and disaster responsibilities. The team also concluded that no integrated oversight mechanism exists to ensure that the 1995 Policy will be implemented.

Increased Appropriations for the Agencies' Fire Management Programs

The FY 2001 Interior and Forest Service Appropriations Act substantially increased funding for all the land management agencies' fire programs. In FY 2001, the NPS (which this Phase I report focuses on) will be fully funded at the normal-year readiness and performance capability level. In previous years, the agency was funded at 80 – 85 percent.

PHASE I METHODOLOGY

The Academy's study team conducted interviews with key stakeholders in: (1) the area of the Cerro Grande fire including Los Alamos; (2) Albuquerque, NM, (3) Denver, CO; (4) Boise, ID; (5) Boston, MA; (6) Washington, DC; (7) Emmitsburg, MD; and (8) Philadelphia, PA. In the Los Alamos area, the team visited the Bandelier National Monument in order to gain a first-hand perspective on the Cerro Grande Fire, and also interviewed officials at the city of Los Alamos, the Los Alamos National Laboratory (LANL), the Santa Fe National Forest (SFNF), and the Forest Service's regional office in Albuquerque. The team also conducted

interviews with staff at the Forest Service's and NPS' regional offices in Denver, and NPS regional staff located in Boston and Philadelphia. In Boise, the team interviewed officials at the National Interagency Fire Center (NIFC)¹⁵ who represented all the cooperating federal agencies and the National Association of State Foresters. In Washington, DC, the team interviewed officials from DOI, NPS, the National Aeronautics and Space Administration (NASA), the Congressional Research Service, and the General Accounting Office (GAO). In Emmitsburg, the team met with a staff member of FEMA's National Fire Academy.

As noted earlier, Phase I examined five major topics: (1) implementation of the 1995 Policy; (2) risk and accountability structures; (3) lessons that can be learned from comparable problem areas; (4) background data development; and (5) limited case studies. Very briefly, the following methods were employed to address these five topics. For the *policy implementation task*, the Academy team interviewed field personnel at NIFC, NPS regions, and the Bandelier National Monument to determine whether there is broad agreement with the 1995 Federal Wildland Fire Management Policy and a general acceptance of prescribed fires and systems of accountability for implementing the policy. For the *risk and accountability structure task*, the team looked at NPS' risk management procedures and accountability structure. In addition to interviewing officials in DOI, the team conducted interviews with officials in NASA to learn how they manage risk. For the *comparable problem area task*, the team conducted a preliminary literature review to determine how comparable problems are handled in such areas as fire suppression, urban fires, and space incidents. For the *data development task*, the team obtained and reviewed records, databases, and studies developed for NIFC, NPS, and USFS. For the *limited case study task*, the team compared the Cerro Grande Fire to other prescribed fires that became wildfires in the Bandelier National Monument and a few other locations.

The central purpose of Phase I was to identify issues and develop hypotheses that merit further study in Phase II. In this regard, the methodology used for Phase I has certain limitations. First, the study team interviewed approximately 50 people, a sizable number; yet many more

¹⁵ NIFC is described in Chapter 3.

individuals will need to be interviewed in Phase II before final conclusions can be drawn and recommendations for substantive change made. Second, by necessity, the study team's interviews have been confined largely to NPS personnel in the western United States.¹⁶ Before reaching general conclusions in Phase II, the study team will interview officials of each federal land management agency and visit locations in a wider cross-section of the nation.

ORGANIZATION OF THIS REPORT

Chapter 2 provides an overview of NPS' fire management program. It describes NPS' mission and how the agency is organized to meet the program's objectives. It also provides the Academy panel's perspectives on the Cerro Grande Fire. Chapter 3 describes NPS' efforts to implement the coordination goals of the 1995 Policy and provides the panel's assessment of those efforts. Chapter 4 discusses NPS' systems to evaluate the fire management program and to hold agency officials accountable for program outcomes. Chapter 5 discusses planning and funding concerns within the fire management program, including the role of risk and complexity analyses and the impact of weather. Chapter 6 discusses human resources management issues within the fire management program, including staffing levels and workforce development activities. Chapter 7 identifies the issues that the Academy panel recommends for further study in Phase II.

¹⁶ See Appendix B for a list of persons interviewed during Phase I of this study.

CHAPTER 2

THE NATIONAL PARK SYSTEM AND ITS FIRE MANAGEMENT PROGRAM

Although Congress designated the Yellowstone National Park in 1872, there was no system of national parks until Congress enacted the National Park Service Organic Act on August 25, 1916. That act created the National Park Service as a bureau within the Department of Interior. Its objective was to “promote and regulate the use of the Federal areas known as national parks, monuments, and reservations...by such means and measures as conform to the fundamental purpose to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment for the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.”¹ Using its authorizing legislation and subsequent legislation (such as the Historic Sites Act of 1935 and Section 110 of the National Historic Preservation Act), NPS has identified its central responsibilities as threefold: preservation, research, and education.

There are numerous designations within the National Park System. Most familiar are the national parks, which now number 54. These are generally large natural places having a wide variety of attributes, at times including significant historic assets. Hunting, mining, and other consumptive activities are prohibited in the parks. Some of the other designations include national monuments, national preserves, national historic sites, national battlefields, national recreation areas, and national seashores. The term “park” is used in this report to mean all of these different types of designations.

Altogether, there are 379 units in the National Park System; they encompass approximately 81 million acres in 49 states, the District of Columbia, American Samoa, Guam, Puerto Rico, Saipan, and the Virgin Islands. The largest unit is the Wrangell-St. Elias National Park and Preserve in Alaska. With 13,200,000 acres, it constitutes more than 16 percent of the entire National Park System.

¹ National Park Service Organic Act, 1916 – 16 USC 1

Compared to the other major federal land management agencies, NPS is the smallest with 81 million acres. BLM manages 270 million acres; USFS manages 191 million acres; and FWS manages 91 million acres. Other federal agencies that manage smaller, but still significant, amounts of land include DOD (38 million acres), the Bureau of Reclamation (9 million acres), and DOE.

THE NPS APPROACH TO USING FIRE

NPS' mission of preserving the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of this and future generations leads it to view the use of fire differently from other federal agencies with one exception. The exception is the Forest Service when it manages formally designated "wilderness areas." In those cases, the Forest Service is required to be as "light on the land" as NPS. It cooperates with a wide range of governmental and non-governmental partners to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout this country and the world to preserve nature as much as possible.² Several NPS staff interviewed for this study said an important element of the NPS mission is to restore the ecosystem to its "pristine" state (defined as the condition of the land before European settlement, when the natural fire cycle prevailed). Prescribed fire is one tool that NPS uses in managing the land to achieve this objective.

NPS uses prescribed fire to meet specific land-use or resource management objectives, including fuel treatment and reduction, site preparation, seedbed preparation, species conservation, forest stand thinning, wildlife habitat improvement, livestock forage enhancement, watershed stabilization, maintenance of ecosystem health, and numerous others.³ Using prescribed fire to achieve these objectives is a well-accepted and firmly established

² www.nps.gov/legacy/mission.html

³ National Park Service, *Prescribed Fire Planning, Implementation, and Evaluation Procedures Review*, August 12, 1999, p. 3.

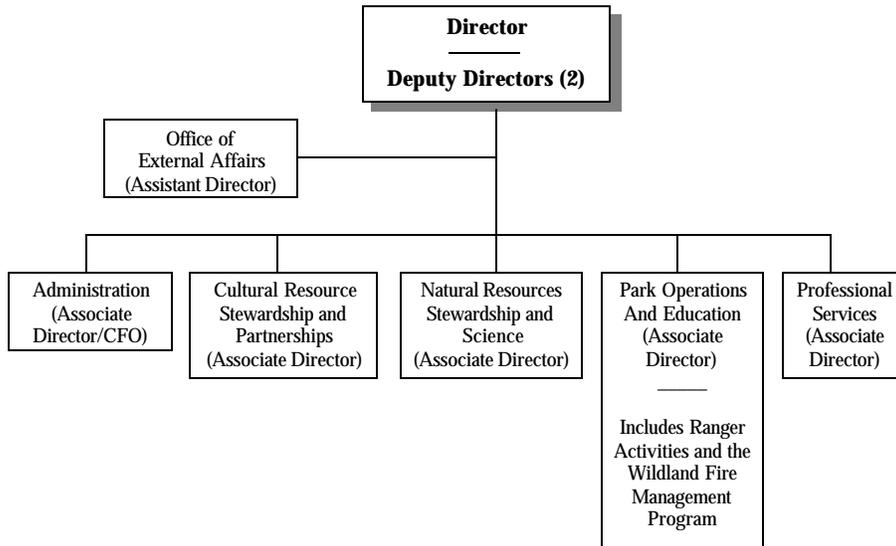
practice that is utilized by many federal, tribal, state, and private land management agencies. The use of prescribed fire appears to complement NPS' "light on the land" philosophy toward treating its lands. This phrase characterizes the reluctance within NPS to rely on mechanical or non-natural means to accomplish land-use or resource management objectives because those alternatives have adverse consequences for natural ecosystems. NPS makes exceptions to this approach in urban interface areas. The other federal land management agencies regularly use mechanical means in their land treatment efforts outside wilderness areas.

Although all the federal land management agencies are stewards of natural resources and watersheds, NPS is more exclusively focused on protecting nature. The other land management agencies have missions with multiple-use underpinnings. For example, USFS oversees timber harvesting on its land, and BLM oversees mining and grazing activities on its lands.

NATIONAL PARK SERVICE ORGANIZATION

With its many parks located throughout the country, NPS has always been a decentralized agency. In 1995, NPS restructured itself to reduce the size of its regional and support offices, move more resources out to the parks, and further decentralize decisionmaking authority to park superintendents. The restructuring grouped the parks into 16 clusters nationwide. Each cluster has a support office. Park and support office superintendents report to one of seven regional directors. The regional directors report to an NPS deputy director, who reports to the director. The director, deputy directors, seven regional directors, and five Washington Office associate directors form the NPS National Leadership Council. The council is the executive decisionmaking group that establishes overall policies and provides direction to the agency. Figure 2-1 depicts the NPS headquarters organization.

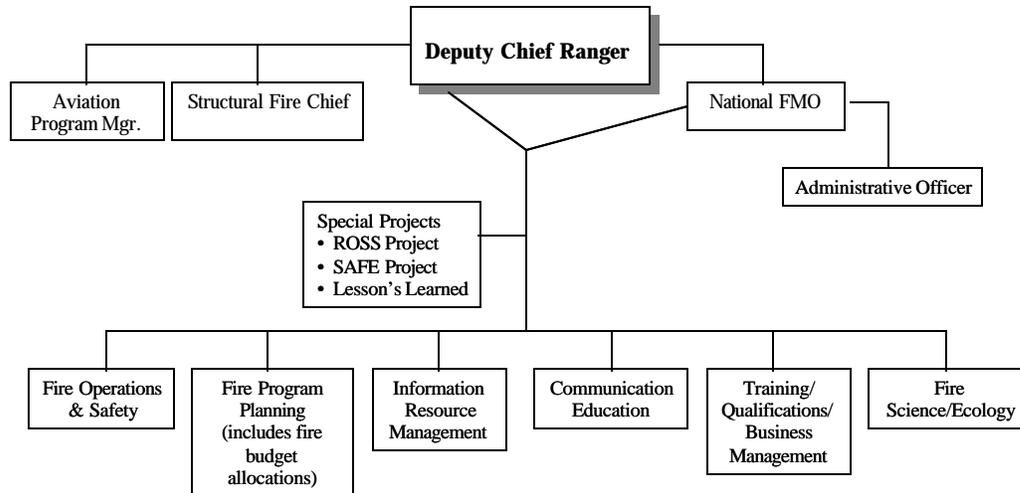
**Figure 2-1
NATIONAL PARK SERVICE
Headquarters Organization**



Responsibility for NPS’ fire management program rests with the Associate Director for Park Operations and Education. To provide national leadership, NPS established the Fire Management Program Center (FMPC) which is located at the NIFC in Boise, Idaho.⁴ FMPC exercises no line authority over regional or specific park fire management programs. Instead, it influences program outcomes primarily through policy formulation and interpretation, strategic initiatives, interagency coordination, and budget allocations. As of September 2000, NPS had assigned a staff of 34 to FMPC. Figure 2-2 depicts the FMPC organization.

⁴ NIFC is discussed in Chapter 3.

Figure 2-2
NATIONAL PARK SERVICE
Fire Management Program Center
(In Boise, Idaho)
September 2000



Primary responsibility for planning and implementing the agency’s fire management program rests with park superintendents. The 1994 restructuring gave park superintendents significantly greater management authority and responsibility within the park, including much of the line authority that had once belonged to the regional fire management officers (RFMOs). Regional offices now are responsible for overseeing park activities and coordinating park budget requests for their fire management programs. Support offices provide technical, scientific, and programmatic support to the parks. If a park requests help, support office staff can assist with planning the park’s fire management program.

One goal of the 1994 restructuring was to move personnel from NPS’ central offices to the field units so the latter would have the staff needed to carry out the additional responsibilities delegated to park superintendents. But several NPS officials interviewed said parks did not receive additional staff. In fact, NPS officials indicated that because of the downsizing that occurred in the regional offices and support offices, the number of staff available to provide assistance to the parks and the level of their expertise has decreased.⁵ In the Intermountain Support Office, for example, five staff members currently provide fire management support to

⁵ According to one NPS official, staff levels in the regions have declined by 40 percent since the restructuring.

the region's 86 parks, and they are concerned about their ability to provide needed assistance to small parks.

THE 1995 FEDERAL WILDLAND FIRE MANAGEMENT POLICY

In response to the events of the severe 1994 wildfire season, the secretaries of Agriculture and Interior initiated a review of the Federal Wildland Fire Management Policy. The stated aim was to ensure that federal policies were uniform and that programs were cooperative and cohesive. An interagency steering group, whose members represented USDA and DOI, the U.S. Fire Administration, the National Weather Service (NWS), FEMA, and the Environmental Protection Agency (EPA), conducted the review. The final report was adopted by USDA and DOI and issued on December 18, 1995. It has guided federal fire management practices since then.

The 1995 Policy outlined nine guiding principles considered fundamental to the success of the federal wildland fire management program.⁶

1. Firefighter and public safety is the first priority in every fire management activity.
2. The role of wildland fire as an essential ecological process and natural change agent will be incorporated into the planning process.
3. Fire management plans (FMPs), programs, and activities support land and resource management plans and their implementation.
4. Sound risk management is a foundation for all fire management activities.
5. Fire management programs and activities are economically viable, based upon values to be protected, costs, and land and resource management objectives.
6. FMPs and activities are based upon the best available science.
7. FMPs and activities incorporate public health and environmental quality considerations.

⁶ Federal Wildland Fire Management Policy and Review, 1995, pp. 3-4.

8. Federal, state, tribal, and local interagency coordination and cooperation are essential.
9. Standardization of policies and procedures among federal agencies is an ongoing objective.

One key conclusion of the 1995 Policy was that past land-use practices and a century of fire suppression which have altered vegetation patterns and increased the threat of catastrophic wildland fires, now threaten the health of the ecosystem where fuel loads exceed historical conditions. The second principle of the 1995 Policy recognizes the key role of fire (both wildfire and prescribed fire) in correcting these conditions, and has elevated the importance of fire as a tool to manage federal lands.

The essence of the guiding principles is captured in 13 policy statements (see box on next page). The 1995 Policy discusses the principles and policy statements in five areas: role of wildland fire in resource management; use of wildland fire; preparedness and suppression; wildland/urban interface protection; and coordinated program management. Specific goals and actions are recommended for federal agencies within each area.

A major theme in the policy statements is that the former practice of suppressing wildland fires is to be replaced by one where wildland fires will be used for natural resource management purposes. To make this a reality, the policy recommends that every area with burnable vegetation must have an approved fire management plan based on land use and resource management goals.

Communication and collaboration are highlighted throughout the policy by provisions that recommend fire be integrated into land and resource management plans on a “landscape” scale that would often cross agency boundaries. Fire management planning, preparedness, suppression, fire use, monitoring, and research is to be conducted on an interagency basis with the involvement of all appropriate partners.

1995 FEDERAL WILDLAND FIRE POLICIES

1. **Safety:** Firefighter and public safety is the first priority. All Fire Management Plans and activities must reflect this commitment.
2. **Planning:** Every area with burnable vegetation must have an approved Fire Management Plan. Fire Management Plans must be consistent with firefighter and public safety, values to be protected, and land and resource management plans and must address public health issues. Fire Management Plans must also address all potential wildland fire occurrences and include the full range of fire management actions.
3. **Wildfire:** Fire, as a critical natural process, will be integrated into land and resource management plans and activities on a landscape scale, across agency boundaries, and will be based upon best available science. All use of fire for resource management requires a formal prescription. Management actions taken on wildland fires will be consistent with approved Fire Management Plans.
4. **Prescribed Fire:** Wildland fire will be used to protect, maintain, and enhance resources and, as nearly as possible, be allowed to function in its natural ecological role.
5. **Preparedness:** Agencies will ensure their capability to provide safe, cost-effective fire management programs in support of land and resource management plans through appropriate planning, staffing, training, and equipment.
6. **Suppression:** Fires are suppressed at minimum cost, considering firefighter and public safety, benefits and values to be protected, consistent with resource objectives.
7. **Prevention:** Agencies will work together and with other affected groups and individuals to prevent unauthorized ignition of wildland fires.
8. **Protection Priorities:** Protection priorities are (1) human life and (2) property and natural/cultural resources. If it becomes necessary to prioritize between property and natural/cultural resources, this is done based on relative values to be protected, commensurate with fire management costs. Once people have been committed to an incident, these resources become the highest value to be protected.
9. **Interagency Cooperation:** Fire management planning, preparedness, suppression, fire use, monitoring, and research will be conducted on an interagency basis with the involvement of all partners.
10. **Standardization:** Agencies will use compatible planning processes, funding mechanisms, training and qualification requirements, operational procedures, values-to-be-protected methodologies, and public education programs for all fire management activities
11. **Economic Efficiency:** Fire management programs and activities will be based on economic analyses that incorporate commodity, non-commodity, and social values.
12. **Wildland/Urban Interface:** The operational role of Federal agencies as a partner in the wildland/urban interface is wildland firefighting, hazard fuels reduction, cooperative prevention and education, and technical assistance. Structural fire protection is the responsibility of Tribal, State, and local governments. Federal agencies may assist with exterior structural suppression activities under formal Fire Protection Agreements that specify the mutual responsibilities of the partners, including funding. (Some Federal agencies have full structural protection authority for their facilities on lands they administer and may also enter into formal agreements to assist State and local governments with full structural protection.)
13. **Administrator and Employee Roles:** Employees who are trained and certified will participate in the wildland fire program as the situation demands; employees with operational, administrative, or other skills will support the wildland fire program as needed. Administrators are responsible and will be accountable for making employees available.

Source: Federal Wildland Fire Management Policy and Review, 1995.

Implementing the 1995 Policy in NPS

The Secretary of the Interior accepted and endorsed the principles, policies, and recommendations in the 1995 Policy and directed NPS to implement them. On November 17, 1998, the NPS director issued Director's Order 18 (DO-18): Wildland Fire Management to (1) institutionalize within NPS the new policies, organizational and operational relationships, and changes in statutory and reporting requirements reflected in the 1995 Policy, and (2) establish an NPS framework for implementing the report's principles, policies, and recommendations. In addition to the broad policy guidance contained in DO-18, Reference Manual 18 (RM-18) was issued by the Associate Director for Park Operations and Education. RM-18 provides detailed definitions and expanded guidance on all the information presented in DO-18.

In August 1998, the five major federal land management agencies released an interpretive guide to establish standardized procedures to guide the implementation of the 1995 Policy.⁷ Although uniformity among the agencies was not expected, the guide was designed to provide a broad overall framework within which agencies could operate consistent wildland fire programs.

Recent Emphasis on the Federal Wildland Fire Policy

As noted in Chapter 1, the severe wildfire season of 2000 has refocused attention on the 1995 Policy. President Clinton's August 8, 2000 request to the secretaries of Agriculture and the Interior to develop recommendations for how best to respond to this unusual event resulted in a report on September 8, 2000.⁸ The report recommended a nearly \$1.6 billion increase over the President's FY 2001 budget request of \$1.2 billion for the federal fire management program. This included additional funding of about \$340 million for fire preparedness resources; new funding of \$88 million to increase cooperative programs in support of local communities; and approximately \$390 million for fuels treatment and burned area restoration.

⁷ *Wildland and Prescribed Fire Management Policy: Implementation Procedures Reference Guide*, 1998.

⁸ *Managing the Impact of Wildfires on Communities and the Environment*.

In addition to the commitments by the two secretaries to restoring the damaged communities and landscapes, the report emphasized the need for the departments to:

1. establish a collaborative effort to expedite and expand landscape-level fuel treatments to reduce the fire risk associated with the accumulation of brush, small trees, and downed material in many forests
2. work with local communities to restore damaged landscapes and reduce fire hazards near homes and communities
3. establish a cabinet-level coordinating team to ensure that the actions recommended by the departments receive the highest priority

The secretaries also initiated a formal review of the 1995 Policy. The interagency group tasked with this review is expected to reaffirm its soundness and/or to suggest where additions or modifications may be needed. The review is expected to be completed in early 2001.

THE NPS FIRE MANAGEMENT PROGRAM

Since the 1995 Policy went into effect, fire increasingly has become viewed as a resource management activity and a part of ecosystem sustainability. However, not all parks have or need an active fire program because they are urban (like Washington, DC parks) or they do not have much in the way of burnable fuels (such as the Statue of Liberty or Dry Tortugas). Of the approximately 245 parks that have wildland, 46 parks receive dedicated funding for fire management program activities.⁹ The fire management resources at these parks also support fire programs in 110 additional parks. That leaves about 89 parks that might have wildland fires but no formal agreements for support from another park. If these parks have occasional fuel reduction projects or other fire-related activities, they can request support from their regional offices or from one of NPS' Prescribed Fire Support Modules.¹⁰

⁹ Resources for the fire management program are discussed in Chapter 5.

¹⁰ NPS' Prescribed Fire Support Modules are discussed in Chapter 5.

NPS has approximately 580 employees who work full time in its fire management program. The senior staff who manage the program are the fire management officers (FMOs). NPS has 53 full-time FMOs located in the parks, regional offices, and FMPC. They are supported by fire planners, fire management specialists, fuels use specialists, and others.

In addition to the fire management professionals, NPS staff from any discipline can seek certification to work on a wildland or prescribed fire. All personnel working on fire suppression and prescribed fire projects must meet qualification standards that have been established by the National Wildfire Coordinating Group (NWCG).¹¹ Qualified staff become part of the “Red Card” system.¹² These individuals form NPS’ “militia” for fighting wildland fires and conducting prescribed burns. There are approximately 5,660 individuals in NPS’ “Red Card” system.¹³ This number is equal to about one-third of all NPS employees.

Integrating the Fire Program into the Park

Fire management is only one of many programs for which park superintendents are responsible. Because wildland fire may contribute to or hinder the achievement of many park management objectives, it is important for the fire management program to be integrated into the park’s resource management plan for the various areas of the park.

The planning processes that occur within the parks are supposed to link the fire management program to the rest of the park’s goals and objectives. At the broadest level, each park has a general management plan that outlines long-term goals for park management. The life span of a general management plan is 10 to 15 years. The various program areas such as cultural resources and natural resources prepare more detailed plans that complement the general management plan.

¹¹ The NWCG is discussed in Chapter 3.

¹² The “Red Card” system is discussed in Chapter 6.

¹³ This figure includes the approximately 580 fire management staff.

Consistent with the 1995 Policy, DO-18 requires parks with burnable vegetation to “prepare a fire management plan to guide a fire management program that is responsive to the park’s natural and cultural resource objectives and to safety considerations for park visitors, employees, and developed facilities.” Without an approved FMP, “parks must aggressively suppress all wildland fires, taking into account the resources to be protected and firefighter and public safety.”

DO-18 specifies broad requirements for FMPs, and RM-18 outlines the procedures for developing the plans and their contents. According to RM-18, the FMP must directly relate to the park’s natural and cultural resource management plans and help achieve the resource management objectives of the park. It also must include a programmatic approach to the National Environmental Policy Act (NEPA) that covers all activities described in the plan. This eliminates the need for parks to develop separate NEPA documents for each project (such as a prescribed fire) that is addressed in the fire management plan.

Generally, an FMO is responsible for preparing the fire management plan. According to one FMO interviewed, a park will assemble an interdisciplinary team to develop the plan in order to ensure that it is compatible with the park’s natural and cultural resource management objectives. The park superintendent approves the FMP. However, according to RM-18, the regional office should review it for policy compliance and for technical and operational soundness. Each park is to review its plan annually to ensure that it continues to conform to current laws, objectives, procedures, and strategies.

Prescribed Fire Program

To conduct a prescribed fire, a park must have an approved fire management plan. Parks also must have an approved prescribed fire plan for each project.

Prescribed Fire Plan

The prescribed fire plan outlines the prescription for the fire. The prescription details the objectives of the burn and the parameters of numerous factors that could affect it. RM-18 outlines the following minimum elements for a prescribed fire plan:

1. description of the prescribed fire area
2. goals and objectives of the burn
3. range of acceptable results expected
4. assessment of the complexity and risk of the project
5. description of the implementation actions
6. provisions of interagency and intra-agency coordination
7. contingency actions if the fire exceeds prescription parameters
8. source of funding and estimated costs
9. compliance with smoke management and air quality requirements
10. monitoring
11. provisions for post-burn evaluation

One of the sub-elements under “description of implementation actions” is the burn organization, which lists the required management personnel and the positions they will fill. It also specifies the number of personnel needed to execute the burn. Several individuals interviewed indicated that estimating resources for prescribed burns is “more art than science.” Experience, technical knowledge, and “gut feeling” all play an important role in the resource estimation process.

Resources for a prescribed burn fall into two categories—holding resources and contingency resources. Holding resources are those on-site resources (staff, equipment, and such) that are required to meet the objectives of the burn and keep the fire within the plan’s prescribed boundaries. Contingency resources are not on-site when a prescribed fire is lit. They are

identified in the prescribed fire plan as the resources needed if the fire overruns the prescribed boundary and cannot be returned to prescription using the holding resources.

Obtaining Resources for Prescribed Fire

Prescribed fires are planned events. Like any other planned event, the park is responsible for identifying and acquiring the resources needed to carry out the burn. Sometimes, the park will need outside resources. Parks may establish agreements with neighboring land management agencies or state and local governments to obtain these needed resources. NPS also has eight Prescribed Fire Support Modules that may be called on to support prescribed fire operations.¹⁴ These modules are fire-control teams that are trained and experienced, as a unit, in planning and managing prescribed burns.

Particularly during the fire season, there may be heavy demands for fire-qualified staff and firefighting equipment and supplies, all of which are used to suppress wildfires as well as to control prescribed fires. The federal land management agencies have established nine Geographic Area Coordination Centers (GACCs) to coordinate and facilitate the movement of wildland firefighting resources throughout the country to meet these heavy demands.¹⁵ Each GACC has several dispatch offices that serve its geographic area. To obtain the services of an NPS Prescribed Fire Support Module, a park must make a request through a dispatch office.¹⁶

GACCs also play a key role in the acquisition of contingency resources. Although the contingency resources identified in the prescribed fire plan may not be needed, any unit planning a prescribed fire needs some assurance that they will be available, when needed, before lighting the fire. When a park or unit of another land management agency plans to light a prescribed fire, standard procedures require that it send a “standing order” to its dispatch office. The standing order allows the coordinating center to evaluate whether those

¹⁴ Prescribed Fire Modules are described and discussed more fully in Chapter 5.

¹⁵ GACCs are discussed in Chapter 3.

¹⁶ Other land management agencies also may request the services of an NPS Prescribed Fire Support Module.

contingency resources are likely to be available, communicate their availability to the agency, and expedite the dispatch office's processing of a request for those resources if the need arises.

The ability of the coordinating centers to provide resources for prescribed fires is dependent on the fire preparedness level established for the area, which is related to the level of wildfire activity underway. The five levels are defined as follows:

Preparedness Level I. There are optimum conditions for normal prescribed fire operations. Wildfire activity in the area is light, and large fires are of short duration. There is little or no commitment of the area and/or national resources to other fires.

Preparedness Level II. Zone and area resources are adequate to manage all known wildfires and prescribed fires. Numerous Class A, B, and C fires are occurring and a potential exists for escapes of larger fires for more than one burning period.¹⁷ Potential exists for frequent mobilization of additional resources from other zones.

Preparedness Level III. There is a potential for two or more zones to experience incidents requiring a major commitment of area/national resources. High potential exists of fires becoming Class D and larger. Multiple zones may be requesting resource priorities from the GACC.

Preparedness Level IV. Class D and larger fires are common and have the potential to exhaust both area and national resources. Competition exists for area/national resources.

¹⁷ The classes of fires relate to their size and seriousness. Class A fires are relatively small and manageable, while Class D fires are large and very serious.

Preparedness Level V. Several zones within the area are experiencing major fires and national resources are exhausted. Military resources have been committed within the area.¹⁸

The Impact of Organizational Culture and Philosophy

Several officials interviewed said that NPS' philosophy about treating the land lightly impacts its prescribed fire program. Compared to other federal land management agencies, NPS uses prescribed fire on a large proportion of acres under its jurisdiction. This may account for the observation by several individuals that NPS has an "aggressive" prescribed fire program. NPS also is less likely to perform pre-burn preparations such as mechanical thinning and fuel breaks to the same extent as other agencies under similar circumstances. In order to achieve ecological objectives, NPS also is more likely to plan a prescribed fire during the natural fire season, even though the chance for escape may be greater. This is consistent with a philosophy within NPS that restoring the natural fire cycle to the land is an important facet of its mission.

The culture within the fire community also impacts the prescribed fire program in NPS and the other land management agencies. Because it is a planned activity, there is an understandable perception that the agency has greater control over a prescribed burn than a wildfire. Certainly, the high rate of success for prescribed burns (estimated at better than 98 percent across federal agencies) may encourage agencies to "play the odds" against their prescribed fires becoming wildfires. As a senior USFS official noted, "We get so used to doing fire that we forget how serious it is."

¹⁸ *Southwest Area Mobilization Guide 2000*, p. 27-2

ACADEMY PANEL'S PERSPECTIVES ON THE CERRO GRANDE FIRE

The Academy staff focused on the Cerro Grande Fire to better understand prescribed fire operations and the issues surrounding the NPS fire management program. It also compared the Cerro Grande Fire with some brief summary information about five other escaped fires in national parks¹⁹ to gain a broader perspective on the factors leading to fire escapes.

Based on this information, the most common causes of prescribed fires going out of control were high winds, inadequate holding resources, and insufficient pre-treatment of the burn area. Other contributing factors (in one case each) were: an inadequate weather forecast, pressure to conduct the fire, and lack of staff experience.

The Academy's more detailed examination of Cerro Grande investigation documents suggests that more cooperative planning, more accurate risk analysis, greater precautions to compensate for the higher level of risk that existed (compared to what was identified), and more effective management of the fire could have helped to avoid or mitigate this disaster.

¹⁹ The other prescribed fires used for this analysis were: (1) Big Thicket Natural Preserve, Beaumont Texas; (2) Outlet escaped fire at Grand Canyon National Park, Arizona; (3) Sequoia and Kings Canyon National Parks, Three Rivers, California; (4) Shenandoah National Park, Luray, Virginia; and (5) Wind Cave National Park, Hot Springs, South Dakota.

CHAPTER 3 COORDINATION GOALS IN THE FEDERAL WILDLAND FIRE MANAGEMENT PROGRAM

The federal land management agencies have a long history of coordinating their fire management programs. Several groups have been established for this purpose, and a federal interagency policy now promotes coordination activities. Nevertheless, wide variations remain among agencies, geographic areas, and program functions in the extent to which coordination is achieved. This chapter explores these coordination issues.

COORDINATION GROUPS

The oldest coordination groups have focused largely on suppression of wildfires. More recently established coordination groups have focused on broader wildland fire issues at the national level, and on fire planning and cooperation at the local level.

Fire Suppression Coordinating Groups

The federal wildland fire management community has been a recognized leader for many years in interagency communication and cooperation for wildfire suppression. In 1965, BLM and USFS joined efforts to form the Interagency Fire Center. The center's purpose is to improve fire and aviation support for wildfire suppression in the Great Basin and Intermountain West. The Weather Bureau soon joined this venture. With the success of those efforts, NPS, FWS, and BIA also joined the center in the 1970s to become what is now known as the National Interagency Fire Center (NIFC).

Today, with DOI's Office of Aircraft Services having also joined the center, NIFC has participation by seven agencies. It is located in Boise, Idaho and is the nation's support center for wildland firefighting. The agencies work together at the NIFC location to coordinate and support joint wildland fire and disaster operations. NIFC's participating agencies are

responsible for exchanging information, support, protection responsibilities, and training. The leadership of the participating agencies has formed the Federal Fire and Aviation Leadership Council to facilitate their coordination efforts and provide consistent direction and guidance to all the participating agencies.

Wildland fires on federal land are initially managed by the local federal agency having fire protection responsibility for that land area. The field offices of participating agencies may work together, sharing personnel and equipment, to fight new fires and those that overpower the initial response. If a wildland fire grows to the point where local personnel and equipment are not enough, the responsible agency contacts its GACC for help. As mentioned in Chapter 2, these coordination centers are responsible for facilitating the movement of wildland firefighting resources within their geographic areas. When GACCs are unable to meet the requests for resources--because they are supporting multiple incidents or competing for resources with other regions--the requests for personnel, equipment, aircraft, and supplies are referred to the National Interagency Coordination Center at NIFC.

When the national fire situation becomes severe, NIFC activates its multi-agency coordinating (MAC) group, which consists of the directors of each of the federal wildland firefighting agencies located at NIFC. Sometimes, representatives from the General Services Administration, the U.S. military, state forestry agencies, and other nations also participate. Depending on the fire situation nationally, the MAC group helps set priorities for critical, and occasionally scarce, equipment, supplies, and personnel. Similar MAC groups also are formed at area-wide and local levels to help coordinate major fire activities. The local MAC group established for the Cerro Grande Fire stayed in place for the rehabilitation process.

Each GACC reports to an interagency board. In the southwestern United States, where much of the Academy staff's Phase I research was conducted, the GACC is the Southwest Area Coordinating Center (SWCC), based in Albuquerque, New Mexico. It reports to the Southwest Fire Management Board in Denver, which includes representatives from USFS, BLM, NPS, FWS, BIA, and the states of New Mexico and Arizona. The SWCC center

director is a permanent, non-voting member of the board. The agency representatives act on their agencies' behalf to plan, set priorities, and implement all current agency policies, directions, and standards for fire management activities within the Southwest Area. Through a memorandum of understanding, the board has been delegated specific fire management activities. The board establishes procedures and processes for sharing fire intelligence, selecting the Southwest Area Type I Incident Management Teams, and implementing cost-efficient fire training activities. The board also functions as, or provides personnel for, the area MAC when needed.

The National Wildfire Coordination Group

In addition to wildfire suppression efforts, several other groups help coordinate the various stakeholders on fire management issues. In 1976, the secretaries of the Interior and Agriculture created the National Wildfire Coordination Group (NWCG) to serve as a forum for developing recommended policies, guidelines, and standards to benefit the participating agencies. Each agency determines whether and in what manner it will adopt NWCG proposals. Participants in NWCG include members from USFS, BLM, NPS, BIA, FWS, and state forestry agencies (represented by the National Association of State Foresters).¹ NWCG meets three times a year. The secretaries also chartered Geographic Area Coordinating Groups (GACGs) to serve a similar role at the regional level. The boards of the GACCs function as the GACGs.

NWCG has 10 working teams that examine various issues related to fire management. The Fire Use Working Team² is one example. Its mission is to coordinate and advocate the use of wildland fire to achieve land management objectives; promote a greater understanding of the role of wildland fire and its effects; and recommend and maintain a fire-use qualification system. This working team meets twice a year. Its FY 2000 action plan

¹ Currently, there is a proposal to expand NWCG membership to the Defense and Energy departments and to FEMA and EPA.

² Formerly the Prescribed Fire and Fire Effects Working Team.

includes initiatives on the fire-use qualifications and certification system, air quality coordination, and fire-use education.

Local Coordination Groups

Federal land management agencies also have established interagency coordination groups at the local level. For example, in 1996 in the Los Alamos area, Bandelier, the Forest Service, LANL, the counties (including the county fire department which provides first response to LANL), the Pueblos, and the city of Los Alamos formed the Interagency Wildland Fire Group. This group meets every two weeks to discuss fire management issues, which may include planning, readiness, and operational aspects of the program.

POLICY GOALS FOR COORDINATION

The importance of coordination among federal land management agencies, and between federal agencies and state, local, and private land management partners, was reinforced in the 1995 Federal Wildland Fire Management Policy (1995 Policy). It emphasized that the policy's implementation should occur on a joint, interagency basis wherever possible to ensure consistent application; and that each agency should coordinate with other federal agencies and the affected tribal, state, and local partners. Seven goals in the 1995 Policy speak directly to the need for coordination and cooperation among these parties:

1. Federal planning for land management (to which fire management planning is linked) should be a collaborative effort, which includes all interested partners working together to develop and implement management objectives that cross-jurisdictional boundaries.
2. Agencies collectively and cooperatively should develop and maintain an organization that can effectively plan and safely implement prescribed fire and fuel management programs.

3. Wildland/urban interface fire protection policies should be compatible among federal agencies and promote partnerships with tribal, state, and local governments and the private sector.
4. Federal agencies should address wildland/urban interface protection needs in the vicinity of their lands through collaborative planning, analysis, and action among the stakeholders.
5. Fire protection agreements and partnerships should be developed, approved, and promoted to clarify responsibilities and to provide for pre-fire hazard and risk mitigation activities, in addition to suppression preparedness.
6. Public fire protection roles, responsibilities, and activities within the wildland/urban interface should be identified through a partnership among federal, tribal, state, local, and private entities.
7. Federal agencies should create and maintain a coordinated federal fire information database that supports critical decisions related to the fire management program.³

For some of these goals, the policy outlines specific coordination actions that the land management agencies are to take. For example, under the first goal listed above, the policy states that the federal agencies will:

- create a system for coordination and cooperation among land managers and regulators that allows for early collaboration in the development of land management plans; encourages land managers and regulators to enter into agreements that set forth the actions each will take before and during the time fire is reintroduced in their area of responsibility; and continues ongoing efforts to jointly develop compatible, ecosystem-based, multiple-scale, interagency land management plans

³ Federal Wildland Fire Management Policy & Program Review, December 18, 1995, pages 10, 15, 26, 27 and 32. Some paraphrasing for purposes of clarity has been added.

- jointly develop criteria for evaluating ecosystem condition by ecosystem type and prioritize areas for the reintroduction of fire to meet resource objectives and reduce hazards
- jointly implement ecosystem-based fire management programs to accomplish resource or landscape management objectives when consistent with land management plans⁴

Under the second goal listed above, the policy states that federal agencies will:

- jointly develop programs to plan, fund, and implement an expanded program of prescribed fire in fire-dependent ecosystems
- seek opportunities to enter into partnerships with tribal, state, and private land managers to facilitate the planning and implementation of landscape-scale prescribed burns across agency boundaries
- jointly develop simple, consistent hiring and contracting procedures for prescribed fire activities⁵

For the sixth goal, the policy directs federal agencies to:

- utilize the National Wildland/Urban Interface Fire Protection Program, which includes DOI, USDA, FEMA's U.S. Fire Administration, the National Association of State Foresters, the National Association of State Fire Marshals, and the National Fire Protection Association, to focus on wildland/urban interface fire protection issues and actions
- utilize the Western Governors' Association as a catalyst for involving state agencies, as well as local and private stakeholders, to develop an implementation plan to achieve a uniform, integrated, national approach to hazard and risk assessment and to fire prevention and protection in the wildland/urban interface

⁴ Ibid. pages 10-11.

⁵ Ibid. page 15.

- work with states to develop viable and comprehensive wildland fire hazard mitigation plans and performance-based partnerships⁶

In August 1998, the land management agencies issued the *Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide* to help establish standardized procedures for guiding the policy's implementation. However, it does not contain specific guidance for implementing the policy's coordination goals.

VARIATIONS IN ACHIEVING COORDINATION

A number of officials interviewed commented that there is extensive coordination and cooperation in the fire management program, including the use of prescribed fires. Several of them took exception to the investigative team's and GAO's findings that there was a lack of interagency coordination on the Cerro Grande Fire.⁷ Thus, there appears to be a difference of opinion about whether there is adequate coordination and cooperation. To some officials it seems to mean meetings and discussions; to others it means joint decisionmaking, partnerships, or consistency among the decisions of multiple agencies and other parties.

Clearly, there are many forums where the federal land management agencies and state and local stakeholders meet and discuss fire management issues. In some cases, parks work together closely with their federal and local counterparts. For example, the legislation that created the El Malpais National Monument in New Mexico requires that BLM work closely with NPS.⁸ The current FMO at Bandelier is assisting El Malpais and the BLM Albuquerque Field Office to develop a joint fire management plan for the area that will encompass both the El Malpais National Monument and BLM's adjoining El Malpais National Recreation Area.

⁶ Ibid. page 27.

⁷ Cerro Grande Prescribed Fire May 4-8, 2000 Investigative Report, May 18, 2000 p. 17. Fire Management Lessons Learned from the Cerro Grande (Los Alamos) Fire, GAO/T-RCED-00-257, pp. 7-8.

⁸ Originally, the park was BLM land.

At NIFC, one staff member has been working to institutionalize joint fire planning efforts by getting agreement on a national fire planning process that would facilitate preparation of joint fire management plans by the federal land management agencies. The proposal is currently under review.

In addition, NPS representatives at the park level meet with neighboring stakeholders in the fire management arena. In Los Alamos, for example, Bandelier staff meet regularly as part of the Interagency Wildland Fire Group to discuss resource-based issues, including prescribed fire. When planning a prescribed burn, Bandelier uses the group meetings to inform its neighbors about the upcoming burn, identify available resources that could assist with the burn, and discuss other issues related to it. However, Bandelier does not share its prescribed burn plans with the group or involve them in planning its prescribed burns.

Unclear Definition of Coordination

The terms “coordination,” “cooperation,” and “collaboration” are not explicitly defined in the 1995 Policy or in the implementation guide, and the expected outcomes of these activities are not described beyond the recommendation that all affected parties should work together to develop and implement management objectives.

It appears from reviewing the events surrounding the Cerro Grande Fire that the Bandelier staff met with the other stakeholders--including LANL, SFNF, and the affected state, local, and tribal governments--and informed them about the upcoming prescribed burn. During the initial investigation of the Cerro Grande Fire, SFNF officials told the investigation team that they had serious concerns about Bandelier’s proposal to light the prescribed fire. However, the SFNF participants attending the interagency meetings did not voice those concerns at the meetings. That forum was not perceived by the Forest Service officials as a forum for collaborative planning.

Thus, it appears that a more precise definition of coordination is needed. That definition should clearly set forth expectations for consistent and supportive decisionmaking by the partners and cooperators.

Incentives for and Barriers to Coordination

Incentives for and barriers to effective coordination appear to be working against each other. On the positive side, land management agencies generally recognize that they cannot fully accomplish their fire management goals independently, and the magnitude of the fire season in 2000 demonstrated just how much the federal agencies depend on one another and on the resources of state, local, and international organizations. BLM, in particular, practices coordination extensively in the development of its prescribed fire plans because most BLM land is covered under use agreements with private parties. Coordination on prescribed burns routinely culminates in written agreements among BLM, the land users, and other affected neighbors.

However, a number of officials told the Academy staff that coordination works well in many places, but not in others. They indicated that the level and type of coordination are largely dependent on the individuals involved, their personalities, and the level of trust and respect among field officials in the land management agencies. These factors may promote effective coordination at the local level or serve as barriers to it.

Differences in agency missions and their organizational cultures and philosophies also can create barriers to coordination. For example, the legislation to acquire the Baca Ranch⁹ requires NPS and USFS to develop a joint land management plan. One senior NPS regional official noted that it was obvious during those negotiations and the development of alternatives “just how different we were philosophically.” Those differences led to a disconnect when the agencies tried to jointly develop land use strategies. Joint plans also must fit into the

⁹ The Baca Ranch is private land adjacent to the Bandelier National Monument and SFNF. After trying to acquire the land for a number of years, the federal government recently succeeded. The legislation needed to make the acquisition possible, requires not only a joint land management plan, but also management of the land by a nine-person trust that includes the superintendent of Bandelier and the forest supervisor of SFNF.

framework of the agencies' other planning documents, including the general management plans for specific parks and forests that guide how these lands are to be managed. To accommodate the outcomes of joint planning initiatives, these agency plans may have to be amended—an onerous task.

Another barrier to effective coordination is the amount of time it takes. Particularly when there are cultural or philosophical differences between agencies, the process to reach mutual agreement on land-use strategies can be difficult and lengthy. The Academy staff heard repeatedly that staff capacity within the land management agencies is already being stretched to achieve agency mandates. The additional time needed to effectively coordinate with stakeholders may reduce the staff's willingness to undertake the cooperative efforts envisioned in the 1995 Policy.

One example of how some of these barriers to coordination manifest themselves in daily operations is the rehabilitation efforts following the 1996 Dome Fire that started in the Santa Fe National Forest and spread into the Bandelier National Monument. Usually, a single Burned Area Emergency Rehabilitation (BAER) team is ordered to perform the necessary restoration efforts after a fire. In this case, however, Bandelier and SFNF each ordered a BAER team. There were some conflicts over the replanting efforts and an agreement to mitigate the disturbance to the peregrine falcon habitat in Bandelier. According to a senior USFS official, the fact that Bandelier and SFNF ordered their own BAER teams indicated that there was not sufficient agreement or trust between the organizations for them to cooperate on the rehabilitation project.

IMPLEMENTATION OF THE 1995 POLICY'S COORDINATION PROVISIONS

As discussed in Chapter 2, an interagency effort is underway to assess the implementation of the 1995 Policy. In their September 8, 2000 report to the President, the secretaries of Agriculture and the Interior indicated the need for improved coordination and cooperation in

the federal fire management program. Three of their five key points address the need for coordination.¹⁰ Based on the research to date, the Academy panel's preliminary assessment of the policy and its implementation is as follows:

- The 1995 Policy is basically sound. Everyone with whom the Academy staff spoke supported this finding. However, they also said that the policy had only been partially implemented and that there may be areas where it needs to be strengthened.
- More specifically, the policy's provisions for interagency coordination and cooperation have been left to individual agency discretion. There is no interagency mechanism in place to facilitate or ensure that the 1995 Policy's coordination and cooperation goals are implemented.
- Within NPS, the agencywide leadership and oversight needed to ensure consistent implementation of the cooperative efforts intended by the 1995 Policy appear to be lacking. NPS does not have a management system that holds agency officials accountable for implementing the coordination provisions in the 1995 Policy, and it has not developed outcome measures for evaluating its implementation performance. There also does not appear to be a structure in NPS that is responsible for ensuring that the coordination recommendations in the policy will be implemented. Finally, NPS did not develop an agencywide program to train staff in the new policy and the implications for managing the parks' fire management programs.

In a broader sense, the issue of fire management program coordination extends well beyond federal agencies. The 1995 Policy outlined a number of areas where tribal, state, local, and private entities need to be involved in the discussions and decisionmaking processes dealing with fire management. With respect to the wildland/urban interface, for example, the 1995 Policy states that the primary responsibility for fire management rests at the state and local

¹⁰ See pages 2-4.

levels, but that no single entity can resolve and manage all interface issues. Yet, it is clear that cooperation among federal, state, local and other entities is essential. According to several officials interviewed, state and local governments as well as other neighbors are an integral part of many coordination efforts currently underway by the land management agencies. NPS and other land management agencies are meeting with local communities to increase awareness of their interrelated responsibilities for mitigating the fire danger in the wildland/urban interface areas. Yet, this does not appear to be a commonly accepted practice, even though it would be expected from reading the 1995 Policy.

The introduction of smoke into the air as a result of prescribed fires also is raising coordination concerns among federal land management agencies' neighbors, state and local governments, and regulatory agencies. Land management agencies' prescribed fire activities must comply with laws designed to protect the environment, such as NEPA and the Clean Air Act. However, it does not appear that regulators have been included consistently in the cooperative efforts that have taken place to date.

Contrary to some suspicions, it appears that environmental agencies are not necessarily opposed to controlled burns. Friction with the environmental community may arise as much from lack of discussion as from fundamental policy differences.

CONCLUDING OBSERVATIONS

During Phase II of the Academy study, the panel believes that the research should focus on the following hypotheses suggested by its Phase I research:

- Coordination provisions in the Federal Wildland Fire Management Policy of 1995 have been implemented only partially among federal land management agencies for the development of fire management plans and prescribed fire plans.

- There is no interagency management system in place to implement the 1995 Policy in a coordinated way across agencies.
- The interagency and intergovernmental dimensions of the 1995 Policy call for difficult changes in traditional program practices and implementation activities in many agencies, and for new partnerships with regulatory agencies and with a wide range of other governments and private stakeholders.
- There is no central interagency leadership that represents the fire community consistently and effectively to the federal land management agencies in a way that holds them accountable for implementing the 1995 Policy. The question remains, are there practical means to strengthen this leadership?
- Required coordination with state, local, and tribal governments and with other affected or potentially affected parties on fire management plans, prescribed fire plans, and urban interface issues has not been adequately implemented.

The panel's Phase II research would continue to explore the implementation of the coordination and cooperation requirements of the wildland fire management policy within NPS, and would expand its focus to include the other federal land management agencies, the state, local and tribal governments, and other affected parties. It also will identify and examine other program areas where interagency coordination and cooperation have been achieved successfully. This research on the means of coordination and cooperation will contribute to a fuller understanding of agency accountability for working with other parties, interagency consistency in implementing the wildland fire management policies, training of federal employees to enable them to be more proficient in using coordination techniques, and education of federal land management agency managers about the importance of coordination.

CHAPTER 4

ACCOUNTABILITY AND EVALUATION SYSTEMS FOR THE NPS' FIRE MANAGEMENT PROGRAM

The 1995 Federal Wildland Fire Management Policy established several goals for the federal land management agencies. This chapter discusses the mechanisms NPS uses to hold agency officials accountable for implementing the 1995 Policy, and the systems in place to evaluate NPS' overall prescribed fire program.

LACK OF ACCOUNTABILITY IN THE NPS FIRE MANAGEMENT PROGRAM

The responsibility for the NPS fire management program rests with the NPS Director. He in turn has delegated these responsibilities to the regional directors. The regional directors have re-delegated them to the individual park superintendents whose parks have burnable vegetation. The NPS Director's Order 18, dated November 17, 1998, defines the fire management program and implementation responsibilities.

DO-18 and RM-18, require all parks with burnable vegetation to prepare an overall fire management plan, which should be used to support the agencies' land and resource management plans. FMPs provide parks the means to assess their geographic areas and consider whether and how fire can be used to manage the ecosystems of the land and further the objectives of other park programs and activities. However, not all parks with burnable vegetation have approved fire management plans. Without an approved FMP, parks may not conduct a prescribed fire or use wildland fires to achieve ecological and other benefits.

In view of the clear direction given in DO-18, and the importance of the plan in achieving ecological objectives, the Academy staff explored why some parks did not prepare them. One factor, discussed in Chapter 2, is the highly decentralized nature of NPS. Although other individuals and organizations have policy, budget, and coordination as responsibilities, park superintendents have line responsibility for all aspects of park management and operations, and

establish their own priorities to a very large extent. Thus, fire management must compete with other areas for the superintendent's attention, with the result that fire management issues and development of fire management plans go unattended in some cases. Although park superintendents report to regional directors, regional oversight appears to be quite limited, and some regional offices have not required parks with burnable vegetation to develop fire management plans.

When a park develops a plan, the regional director reviews and approves it to indicate that it has been completed. But the regional officials we talked to indicated that this review is more procedural than substantive; it does not signify that the plan's quality has been evaluated. Regional officials also said that few operational evaluations are conducted of parks' fire management programs. For the Intermountain Region, for example, they said that it has been several years since such a review was conducted in any of its parks. This lack of regional review contrasts with the practice followed prior to the reorganization of NPS in 1994. At that time, regional oversight visits were common, even though not specifically required.

The NPS does not have an effective agency-wide system for assessing performance and holding agency officials accountable for the fire management program.¹ NPS also does not have a system for rewarding superintendents who are implementing the 1995 Policy, and who have active fire management plans and programs in their parks. In addition, there appear to be no adverse consequences for superintendents who do not ensure the preparation of fire management plans.

Several factors may discourage having an active fire management program. First, the program requires considerable effort. After completing an FMP, the park must prepare a separate plan for each prescribed fire, request project funding from the FMPC, and convince often reluctant communities in surrounding areas of the value of prescribed fire. Achieving the required coordination also may be difficult and time consuming, and park resources may be inadequate

¹ Academy staff learned recently that one NPS region has developed, and is using, an accountability mechanism that some officials believe could be used in all regions. The fire program is included in it.

to fully develop the program. In addition, prescribed fire is inherently risky. No matter how well the fire is planned and implemented, it may get out of control—perhaps killing or injuring people and destroying property. Without proper incentives and clear performance goals, it is understandable why some superintendents place a low priority on an active fire management program.

LACK OF DATA AND ANALYSIS FOR SYSTEMATIC EVALUATION OF THE WILDLAND FIRE PROGRAM

NPS does not have a systematic method for evaluating the prescribed fire program. Required data are not always collected; there is no agency-wide analysis of the data already collected; and additional data elements would be needed to adequately evaluate the success of the wildfire management program. Different records are required for different types of fires, including prescribed fires that remain under control, prescribed fires that escape, and naturally caused wildland fires.

Prescribed Fire Records

FMPC maintains a record of all FIREPRO approved projects for prescribed fires in each park. Once a project is submitted to FMPC and approved, it is assigned a project number and budget allocation. Parks complete DOI Form 1202 on each of these projects, which highlights the relevant budget statistics, including the number of acres to be burned and the planned cost per acre. The form also has a narrative section where park officials describe the project's current status. After the prescribed fire is conducted, the park submits a final report that documents the actual number of acres burned and the cost per acre. It also may include a narrative that describes relevant information pertaining to the burn.

Currently, there is no systematic analysis of these data, other than the budget information. An analysis of the existing data could be made to determine a park's record on completing planned prescribed fires, and comparing the actual costs per acre with planned costs. These limited

data would allow NPS to compare parks and regions, and evaluate the overall size and cost of the fire program being implemented.

However, data on the Form 1202 reports would have to be expanded to support performance analyses on the effects and outcomes of the prescribed fire. This additional information would enable NPS to answer questions such as: Were the objectives of the prescribed burn achieved, and did park personnel experience any problems during the burn? To what degree were the predictions made for the fire actually realized and what deviations from those predictions were experienced? Analysis of these data could help NPS officials determine the success of the program and whether the assessment methodology itself is valid.

Wildland Fire Records

Another type of report is required for each wildland fire that occurs naturally within a park, as well as for each prescribed fire that escapes its planned boundaries. These reports are the result of reviews performed by review teams in accordance with Chapter 13 of RM-18 which contains instructions for conducting them. It sets forth the purposes of the reviews, who initiates them under different conditions, the membership of the review teams, the contents of the review report, a list of questions to be considered by the review team, and instructions for where to file the reports.

The reviews are intended to be constructive critiques aimed at determining the facts related to the specific wildfire. They are expected to identify commendable actions, techniques, and decisions as well as areas that need improvement, and to resolve operational issues. They are not intended to be punitive.

Wildland fire reviews may be initiated by the park superintendent, the regional director, or the Associate NPS Director for Park Operations and Education, depending on the severity of the fire. Reports requested by park superintendents (for less serious fires) are sent to the regional fire management officer, who may forward them to FMPC if deemed appropriate. Reports

requested by regional directors and the NPS Associate Director (for the more serious wildfires) are sent to the FMPC automatically. However, FMPC maintains no master file of wildfire reports, and the information is not captured in a database that could provide program analysts and managers with valuable information about lessons learned and long-term trends.

Although the Cerro Grande investigation, commissioned by Secretary Babbitt, followed the RM-18 requirements for a wildfire review, it was criticized because premature statements were made by officials that indicated they had concluded that the fire was caused by “human error,” even though broader systemic problems may have caused or contributed to the escape. Also, the investigative team took less than a week to do its work, including only two days of interviews. In other investigations of escaped fires, the process takes as long as a month or two. Finally, the investigation was conducted while the fire was still burning—people had been evacuated from their homes, and everyone was under considerable stress. A more thorough board of inquiry was convened in Fall 2000, but its report had not yet been made public as of the end of December 2000.

The NPS should reevaluate its RM-18 requirements for wildfire reviews to ensure that they provide independence and adequate time to the investigative team, and that the procedures will be followed in a manner that reinforces confidence in the system. The National Transportation Safety Board may provide a potential model on which to base an improved prescribed fire investigation procedure.

Because the findings from all wildfire reviews are not entered into a database, park officials may not be learning valuable lessons they may contain. Sending review reports for all wildland fires—not just the most damaging ones—to FMPC, and putting this additional information into a database, would enable senior line managers and others to learn from successes as well as from failures.

The new NPS Center for Lessons Learned could be charged with maintaining the database and developing workshops for officials in the fire management program based on actual

experience. This Center, located in Marana, Arizona, could be strengthened to provide this information. Currently the Center is still getting organized and started; providing it with data relating to lessons learned from successful and unsuccessful fires—judged in terms of meeting resource management and fuels reduction goals--could be very useful to the Center as it begins operating.

USING PERFORMANCE DATA TO STRENGTHEN ACCOUNTABILITY

In addition to using the data reported from these two different types of reports to develop lessons for improving the management of future wildland fires, these data could be used to hold managers accountable for results. A routine information system would be needed for this purpose. It would have to be specific enough to answer questions such as whether the fuels reduction and resource management goals outlined in the park's fire management plan were being achieved; or if not, why not? Current information is not sufficient to assess performance in this manner or to establish accountability for it.

Currently, the issue of personal accountability is raised only when a significant problem occurs. In these cases, it would be useful to have information on individuals' performance history preceding the event. Because those data are not now available, it is difficult to know whether there were warning signs of pending problems, whether the responsible officials should have realized such an event was likely to occur, and/or whether they were responsible for the problem.

Even when things go "right" in a park's fire management program, the lack of a performance measurement system hinders good management. Without it, rewarding deserving employees is difficult, and management is deprived of one of its strongest tools for encouraging desired performance--establishing role models.

CONCLUDING OBSERVATIONS

Based on the Phase I research, the panel believes that systematic data collection and program analysis within the fire management program should be significantly strengthened to measure and evaluate program performance, guide future program direction, and support management accountability systems. During Phase II, the panel believes that the research should be focused on the following hypotheses:

- Current program data collection and analysis is sporadic, incomplete, and does not produce the information needed to help direct the fire management program and establish effective accountability.
- Without sound program analysis, which identifies and evaluates the factors leading to both success and failure, it is not possible to adequately judge the efficiency and effectiveness of the fire management program and establish accountability, or to adequately revise and update risk analysis methodology used in planning prescribed fires.
- There is no agency-wide system for assessing performance and holding agency officials accountable for the fire management program. To be most effective, program analysis and evaluation should be linked directly to periodic program, management, and budget review processes, including the planning and reporting processes established pursuant to the *Government Performance and Results Act*.
- Valuable lessons learned, from both successful and unsuccessful fires, are not being developed and applied systematically to future program activities and the updating of training curriculums.² The new NPS Center for Lessons Learned could be strengthened to provide this information.
- Care should be exercised in developing better data, to recognize and accommodate (by practical means) the diverse reporting forms, needs, and practices of the different organizations that generate needed data.

² See Chapter 6 for a discussion of wildland fire training programs and needs.

The Academy's Phase II research to follow up on these preliminary findings would include examinations of program evaluation efforts, management information systems, and management accountability mechanisms in other federal land management agencies, and lessons learned in other fields that might be instructive for the federal wildland fire management program.

CHAPTER 5 PLANNING, OPERATING, AND FUNDING THE FIRE PROGRAM

During Phase I, the Academy staff explored several planning, operational, and funding issues in the NPS fire management program. This chapter examines these facets of the prescribed fire program, including the risk assessment tools used to help plan a prescribed fire, the role weather plays during a prescribed burn, and resource estimates for a prescribed fire. It also discusses broader resource issues related to prescribed fire planning, including the budget process.

PLANNING PRESCRIBED FIRES

As noted in Chapter 2, a park must have an approved prescribed fire plan before it may conduct such a fire. One of the elements of the plan is an assessment of the project's complexity and risk. The Cerro Grande Fire has raised questions about the adequacy of the methods used to assess the risk of prescribed fires. The prescription for that fire called for burning approximately 1,000 acres in three phases. In the end, the fire consumed over 47,000 acres and destroyed 235 structures. It also invaded and caused significant damage to the Los Alamos National Laboratory. While budgeted to cost \$32,400, the fire led to a loss of approximately \$1 billion. The prescribed fire plan depicted the operation as having "low to medium" complexity and a "moderate" relative risk.

Risk and Complexity Analysis

Identifying inherent risks is a critical aspect in planning prescribed fires. RM-18 provides agency-wide guidance in NPS for quantifying risk in the project assessment section of the prescribed fire plan. The guidance for assessing risk has two parts. The first part requires a complexity rating that measures the difficulty anticipated in managing the fire. The second part requires a risk assessment that measures the relative likelihood of the fire going out of

prescription and escaping. The proposed fire is assessed using the methods contained in the recently issued *Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide* (1998).

Inadequate Identification of High-Risk Situations

As previously noted, “complexity” is supposed to address the relative difficulty of managing the planned prescribed burn to keep it from escaping prescription. Although the NPS complexity rating addresses threats to boundaries, it does not address the value of neighboring assets placed at risk by a prescribed burn, and that factor is only one of 12. Even though it is weighted so that it can contribute up to 12.5 percent of the potential complexity rating, a boundary breach is not an over-riding factor, even in extremely complex situations with the potential for very high losses.

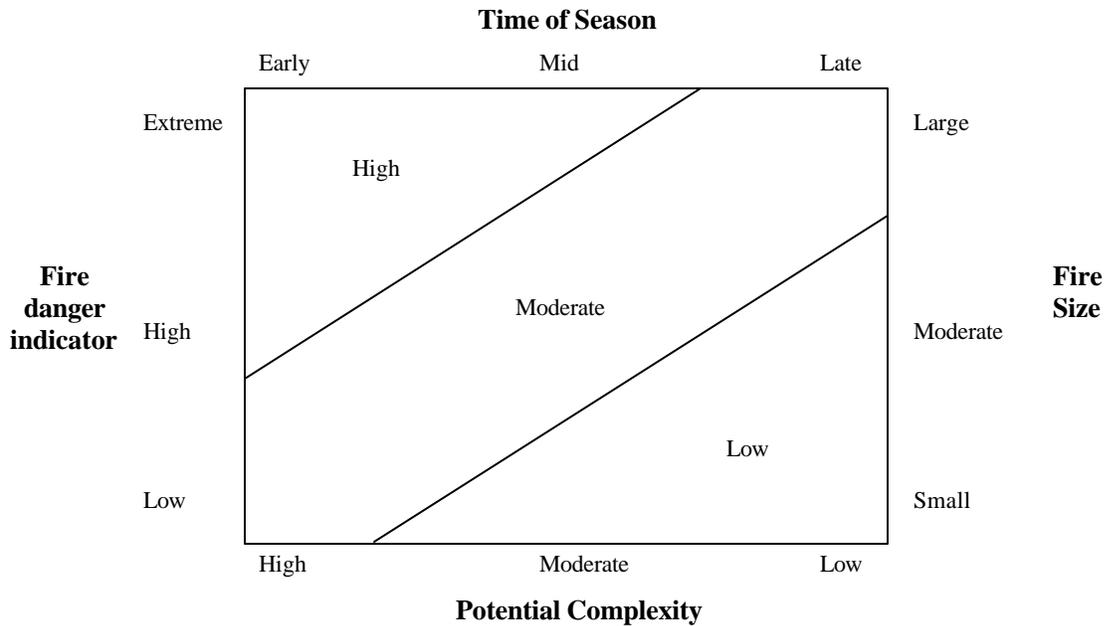
Another qualitative procedure is used to consider the likelihood of a fire escaping, the potential consequence of the event, and the technical difficulty required to deal with the event.¹ The overall rating is done by assigning low, medium, or high ratings to each of these elements, and aggregating them to determine a summary qualitative assessment.

The relative risk rating is established using four factors: time of season (wildland fire season), potential complexity, fire danger indicator, and planned fire size.² The rating is determined by graphing the four factors on a single two-dimensional diagram (Figure 5-1). Each side of the chart represents one of the four factors and each factor is divided into areas of low, medium, and high risk. The intersection of the two lines—that connect the top and bottom factors, and the right and left factors—determines the relative overall risk. Although this methodology addresses the relative risk of an escape, it fails to address the potential consequences of the escape because it ignores the value of neighboring assets placed at risk by a prescribed burn.

¹ From *Prescribed Fire Complexity Rating System Guide*, developed by National Wildfire Coordination Group Prescribed Fire & Fire Effects Working Team.

² An index used in determining fire danger for a given area based upon weather forecasts and the area situation.

Figure 5-1: Wildland Fire Relative Risk Rating



Fire professionals at NIFC and other locations visited acknowledged that the existing risk and complexity analysis procedures fail to adequately address the consequences of an escaped prescribed burn. As described in the Academy’s interviews, an escaped prescribed burn (called a wildfire and subject to suppression using wildland fire procedures) may not do great damage in “back country.” However, escapes in areas that have higher population densities are inherently more risky because of the added threats to life and property. Wildland/urban interface areas³ are the types of locations where this risk is high.

³ Wildland/Urban Interface: an area where structures and other human development meet or intermingle with undeveloped wildland. Taken from “A Report to the President In Response to the Wildfires of 2000,” page 8, dated September 8, 2000.

Tendency of Risk Analyses to Become Routine

Risk and complexity analyses are tools that the land management agencies have developed to help make decisions about any kind of fire, including prescribed fire. Some land management officials expressed concerns that “fire officials only see the numbers” generated from the analyses and do not sufficiently factor in experience and judgment when making decisions about prescribed fire. These officials said that “tools” cannot replace the knowledge of fire management professionals who have been intensively trained over many years by actual experience. As noted above, the current risk assessment methodologies do not adequately consider the potential adverse consequences of a prescribed burn. If the responsible line officer does not know the right questions to ask about a planned prescribed fire event, the risk of adverse consequences is increased substantially.

Special Procedures for High-Risk Prescribed Fires

Currently, local park superintendents approve prescribed fire plans for high-risk burns without higher review and without necessarily putting into place any special precautions to mitigate the risk. Examples of high risk situations that may deserve special attention are areas containing urban interfaces, special natural or archeological resources, or particularly hazardous materials that need protection from release. High risks also may result from unusual weather conditions and cycles.

Most of the fire management officials interviewed said revised procedures are needed to better differentiate the actual risk involved in prescribed burns. High-risk prescribed fires require special attention in their planning and implementation. There was broad agreement among those interviewed that once high-risk situations are identified, appropriate operational tactics should be developed and applied, using sufficient resources to ensure that the likelihood of an escape is reduced to an acceptable level. This will increase the cost of these burns, but the extra costs are small when compared to potential suppression costs and the adverse consequences of an escape such as the Cerro Grande Fire.

Weather: A Major Factor in Prescribed Fire

Weather is a major factor in any fire. Relative humidity can determine the probability that a prescribed burn will start. If the relative humidity is lower than forecast, fuels will be drier, thereby increasing the likelihood that a fire will burn out of prescription. High atmospheric instability and dryness (measured by the Haines Index) can allow fires to burn “hotter” and spread faster, quite apart from wind. Knowledge of wind velocity and direction also are critical to planning and executing prescribed burns. High winds increase the speed a fire moves and the intensity of the burn. Accurate forecasts help the fire manager to defend against the critical effects of wind. Every fire expert interviewed said that unforecasted high winds are the major cause of prescribed fire escapes.

These and other elements of weather information are contained in “spot” forecasts that NWS provides to fire management officials to help them plan and manage prescribed burns. In addition to spot forecasts, NWS provides several other meteorological forecasts to support land management agencies⁴:

- **Red Flag Warning.** A Red Flag Warning is issued when forecasted weather conditions together with existing environmental conditions could result in extreme fire behavior or, as in the case of dry lightning, extensive fire starts within 24 hours.
- **Fire Weather Watch.** A Fire Weather Watch is issued when Red Flag conditions are expected within 72 hours.
- **Presuppression Forecast.** Presuppression forecasts are issued once or twice daily during the fire season. This is a narrative forecast of upcoming weather conditions for use in planning for suppression of wildfires.

⁴ Source: NWS Fire Weather Program, <http://www.nws.noaa.gov/om/fire.htm>

- **Land Management Forecast.** These narrative forecasts are issued outside fire season and are used in planning for a variety of land management activities.
- **National Fire Danger Rating Forecast.** This is a forecast issued for a selected observation site. These forecasts are used as input for the National Fire Danger Rating System which generates indices that are used to determine the fire danger for a given area and to plan for the necessary human and other resources needed to fight wildfires.
- **Spot Forecasts.** These site-specific forecasts are issued at the request of user agencies. They are generally used for the planning and safe control of prescribed burns. Spot forecasts also may be requested by fire managers planning the suppression of a wildfire.

NWS has approximately 60 fire meteorologists who specialize in forecasting fire weather and support major wildfire suppression by providing weather advice at the incident command centers. Generalist NWS forecasters, who provide all types of forecasts such as public, aviation, marine and other, usually provide the forecasts for prescribed fires.

NWS provides fire weather forecasts through its regional offices. Generally, the agency fire manager will ask the dispatcher to obtain a spot forecast. NWS provides the forecast to the dispatcher, who forwards it to the fire manager. Occasionally, a prescribed fire burn boss will talk directly to the weather forecaster providing the spot forecast.

Localized forecasts are difficult to make in many geographic areas because the prescribed fire area is subject to variations in its micro-climate, and there are simply not enough fire meteorologists to go around. Elevation, terrain, and vegetation are just some of the factors that can produce localized weather variations. Understanding the local area is as important as understanding the longer-range forecasting models. Integrating this knowledge into a meaningful fire weather forecast for prescribed burns is a daunting task.

The Academy staff could not obtain data on the accuracy of weather forecasts supplied to the wildland fire management program. NWS has not conducted studies in this area. Although NWS officials said that they have asked for feedback from the land management agencies in order to help improve their forecasting, they have received very little. Often the feedback received is general in nature, such as “the burn went fine.” However, NWS officials interviewed believe that they could improve the quality of their forecasts if they could obtain hourly readings of field weather data for 24 hours prior to the start of a prescribed fire. This field data would be taken at the site of the planned fire to help the NWS forecaster assess the micro-climate. According to NWS officials, the response to such requests has been spotty.

Macro Weather Cycles

Several land management agency staff interviewed believe that their agencies are not adequately considering the major weather cycles of wet and dry years when planning and executing prescribed fire projects. Because much of the “art” of managing prescribed burns is experience based, experience gained in wet years may lead to overconfidence or miscalculations in dry years. And, because these cycles often occur over long periods of time (for example, 20 years of wet followed by several years of dry) and are localized, officials believe that fire managers need to be particularly well grounded in local conditions.

Some fire management officials also said that some years are “just too dry to safely burn.” In dry years, fires tend to burn with greater intensity and are harder to control. However, others contend that fire behaviorists can adequately analyze and predict fire behavior and, using these methods, prescribed burns can be planned and successfully executed even in dry years. Moreover, “hot” burns are sometimes necessary to achieve burn objectives, so the “window of opportunity” necessarily occurs when the risk is high. This also mimics natural fire cycles more faithfully, which is sometimes considered to be an important ecological goal.

NWS Resource Considerations

Fire meteorologists were in short supply during the extraordinary 2000 fire season. They spent a great deal of time in the field supporting the large number of wildfires. With funding for (and consequently the number of) prescribed fires increasing as a result of the 2000 fire season, the need for specialized forecasts will increase. NWS officials interviewed expressed concern about the small number of specialized fire meteorologists available to meet requests from the land management agencies. One individual suggested that NWS could establish a national network of regional fire meteorology centers to improve NWS' service to the fire management community.

Contingency Resource Issues

Contingency resources are a critical element of prescribed fire planning. The Academy staff found several issues related to them.

The Impact of Program History on Resources

When NPS began to develop its prescribed fire program in 1977, there was no separate funding available. The same people who were putting out wildfires began to introduce fire into the parks for resource management purposes. In the 1990s, as NPS was moving into ecosystem management, it began hiring dedicated fire management personnel, starting with the fire modules and later creating fire use management teams. Still, there was no dedicated funding source for the program. As a result, the prescribed fire program was established "on a shoestring." The thought process and culture in the agency was that it needed to be done with minimum resources. In the 1970s and 1980s, NPS developed ranges of costs per acre for prescribed burns, which are still being used for planning and budgeting fires.

This philosophy is not unique to NPS. A BLM official noted that BLM tends to use the least possible resources on prescribed fires in order to keep costs down because, historically, funds have been limited. According to one NPS official, all the agencies appear to be proud that they do prescribed fires inexpensively.

An issue that the program's history raises is that land management agencies, and NPS specifically, have planned their holding resources for prescribed fire at low levels, which may be placing too much reliance on contingency resources that may or may not be available when needed. Consequently, fire planners may be preparing risk assessments so that the resources required match those already available at the park.

Paying for Prescribed Fires

As discussed in Chapter 2, prescribed burns are considered planned projects and, as such, the agency performing the burn is expected to pay for the holding and contingency resources used. This process can become somewhat complicated when the park does not have the necessary resources within the park to conduct the burn. If a prescribed fire is large, the park will bring in outside resources. Among DOI agencies, there is a cross-billing mechanism that facilitates these types of resource transfers. But when a park needs to use USFS resources, the process is more cumbersome. There have been instances when USFS has not been reimbursed for resources they sent to a NPS prescribed burn. Some officials reported that as a consequence, USFS has become less willing to release their resources for NPS prescribed burns without a mechanism in place that ensures repayment.

Confusion About the Availability of Contingency Resources

There is some confusion over the definition, acquisition, and availability of contingency resources. The confusion exists both within NPS and among the various land management agencies. Some people believe contingency resources are for the purpose of keeping prescribed fire within the boundaries outlined in the prescribed burn plan, while others believe that contingency resources are only ordered when the prescribed fire escapes.

The dispatch activities surrounding the Cerro Grande Fire indicate that people had different viewpoints on SWCC's responsibilities for dispatching resources during the wildfire season. SWCC and some land management agency staff believe that it is the Park's responsibility to have contingency resources available.⁶ NPS staff interviewed believe that the coordinating center should acquire the needed contingency resources for the park when needed. SWCC staff believe that their policies and procedures are clear with respect to their responsibilities for dispatching contingency resources, even if they may differ from other coordination centers.

There also are differences in how people view the availability of contingency resources. Some NPS personnel spoke of contingency resources as those that are available in a short period of time, such as two hours. SWCC, on the other hand, noted that these resources are often not in the immediate geographic area, particularly during wildfire season. It may take several hours, or longer, to locate and transport the necessary resources to the prescribed fire location.

Another issue is that contingency resources are often "largely on paper" and "not really available." Oftentimes, multiple units have identified the same contingency resources in their plans. For example, in the Oregon Cascades, the window to perform prescribed burns is short and BLM will light 20 to 40 prescribed burns during that short period. In such cases, the various units are essentially relying on the same contingency resources if their holding resources cannot contain the fire. Their availability to all would not be possible if multiple prescribed burns escape.

Also, during wildfire season, contingency resources identified in a prescribed burn plan may be dispatched to suppress a wildfire at any time. As wildfires worsen and the preparedness level increases, more and more resources are devoted to suppressing fires. Consequently, fewer and fewer resources would be available to serve as contingency resources in the event a

⁶ This appears to be in conflict with how other GACCs view their role, and correspondence indicates that SWCC is being asked to change its procedures in these matters. It is, however, consistent with SWCC's written procedures.

prescribed burn escapes. Even if a unit coordinates with the dispatch office immediately before lighting the prescribed burn to check on the availability of the contingency resources, there is no guarantee that they will still be available if they are needed even two hours later, because they may have been dispatched to another fire. In some respects, the parks igniting prescribed burns are betting that the resources will remain available if needed. Particularly where prescribed fires are assessed as high-risk, there needs to be a way to reserve contingency resources in order to ensure their availability in the event the fire goes out of prescription.

Interoperability

Concerns have surfaced about interoperability between equipment and communications when crews from various agencies—federal, state, tribal, and local—are working together on a wildfire. As the occurrence of mixed crews increases, the concerns about interoperability grow. This is compounded by the transition to narrow band frequencies and digital communications equipment that is now occurring. With more coordination and cooperation required to treat the wildland/urban interface areas, this issue will need increased attention.

WILDLAND FIRE FUNDING AND RESOURCES

The land management agencies need a reliable supply of well-trained, skilled professionals to effectively manage their fire management programs. At their disposal are two types of resources—national resources⁷ and the federal land management agencies' own fire management resources. Nine GACGs (described in Chapter 2) manage the national fire

⁷ National resources are officially defined as Type I crews (hotshot crews), smokejumpers, smokejumper aircraft, advanced technology meteorological units, micro remote environmental monitoring systems, critical cache items, infrared aircraft, large transport aircraft, lead planes, modular airborne firefighting system, national commissary units, national interagency caches, national mobile food units, national shower facilities, NIRSC telecommunications equipment, air tankers, Type I and II helicopters, Type I incident management teams, national area command teams, and Fire Use Teams. NPS supplies two hotshot crews, two smokejumpers, and contributes to area command teams, several Type I incident management teams and fire use teams.

management resources. These dispatch offices send national resources on a request basis for fire management activity, including wildland fire suppression and prescribed fires. Ordering some types of national resources for prescribed fires would be inappropriate. For example, air tankers, which are quite expensive, are most effectively used for initial attack and suppression of large-scale fires. But other resources such as hotshot crews could be ordered for prescribed fires.

The funds that support the national resources are not part of the land management agencies' regular operating budgets. Congress appropriates these national resources separately. When NPS staff work on fire activities, their overtime and hazard pay are funded by the national fire suppression account.

Each federal land management agency receives a direct budget allocation to support its fire management program. As discussed in Chapter 2, NPS has approximately 580 full-time staff working in its fire management program. When fires occur, either wildfires or prescribed fire, fire-qualified personnel⁸ from throughout NPS work on fire teams as a collateral duty. The GACC or local dispatch centers control the assignments of NPS fire-qualified staff to out-of-park assignments.

For prescribed fire, NPS also has established eight Prescribed Fire Support Modules.⁹ Each module consists of seven fire specialists; four are permanent employees subject to furlough and three are seasonal employees. In addition, trainees or detailees may be attached to each module. The park FMO is responsible for supervising the module, and the regions in which they are located coordinate and track their use. Agencies can order a module through the dispatch centers just like suppression resources. The role of these mobile units is to assist parks across the nation with their prescribed fire programs. These teams do not perform fire

⁸ These employees have Red Card designations. Information on all fire-qualified staff is kept in a national database.

⁹ The eight Prescribed Fire Support Modules and their "seasons" are: Bandelier National Monument 3/19-9/9; Buffalo National River 1/24-7/28; Great Smoky Mountains National Park 1/31-7/28; Saguaro National Park 4/24-10/30; Whiskeytown National Recreation Area 4/24-11/3; Black Hills 4/23-10/21; Yellowstone National Park 4/24-10/21; Zion National Park 4/24-10/21.

suppression duties unless there is a particularly bad fire season. USFS has begun to develop similar teams, and BLM has expressed interest in the concept.

The FIREPRO Resource Model

FMPC staff at NIFC prepares and manages the NPS fire management budget nationwide. Budget formulation begins each spring when FPMC staff asks the parks to submit information, via the NPS regional offices, on what they want to accomplish in the upcoming year. FPMC staff then uses an automated workload analysis model—FIREPRO, which is designed to quantify the Most Efficient Level (MEL)¹⁰ financial support requirements for fire management activities at all organizational levels through analyses of workload and program complexity. FIREPRO converts the variables for the agency’s fire program into permanent and seasonal staffing allocations and budget support requirements for the following functional areas of fire management:

- permanent and permanent-less-than-full-time staffing for program management and oversight
- national coordination and support
- regional and system support office coordination and support
- temporary staffing and support for wildfire initial attack
- project funding for ecological prescribed burning
- project funding for hazardous fuel reduction
- temporary staffing and support for prescribed natural fire management
- temporary staffing and support for fire effects monitoring
- training
- capital equipment

¹⁰ NPS funding has been at 85 percent of MEL. In their report to the President, the secretaries of Interior and Agriculture noted that, “...the Departments have reassessed the assumptions and variables used in planning models to determine the resources needed to fight fires. They recommend funding 100 percent of this revised estimate of full preparedness.”

- interagency shared resources

Outputs from the base FIREPRO analysis are sent to each affected park.¹¹ This report displays the proposed permanent and seasonal fire management staff for each park, along with the funding required to support each position. Parks have until the end of July to review the analysis, identify errors, and/or request supplemental funding for special workload requirements falling outside the analysis. During this period, parks also request funding for fire-related capital equipment and for prescribed burn projects designed to meet goals for fuel-hazard reduction and ecosystem management.

Final FIREPRO allocation decisions are made in September and a final budget is sent to each affected park. This report displays staffing, full-time equivalent positions, support funding, and project funding by account number for the fiscal year beginning in October.

FMPC staff forwards the total budget request for the agency to BLM, which submits a single budget request to Congress for all DOI agencies. BLM performs a pass-through function for the other DOI agencies. It does not have oversight authority for the other agencies' budget submissions.

Withdrawing Money for Prescribed Burns Not Undertaken

Money is allocated within NPS each year for hazardous fuels reduction. In a given year, NPS field units spend only about 50 to 60 percent of the money budgeted for their prescribed burns. This relatively low rate of expenditure is often due to unfavorable weather conditions. If a prescribed fire is budgeted but not set by the end of the fiscal year, FPMC withdraws the money from the field unit. FPMC then reallocates these "no-year" funds to the next year. Although NPS may reallocate this money to the same park or project, it may decide to allocate the money to another project in another field unit. Through this policy, NPS has the flexibility

¹¹ Sixteen parks experience 75 percent of the total wildland and prescribed fire activity in NPS.

to allocate funds to field units that need them most. However, by the end of the fiscal year, some parks may have only one prescribed fire ready to conduct. The desire to “show results,” combined with NPS’ policy of withdrawing money at the end of the fiscal year, may pressure some park officials to conduct the fire. By so doing, park officials can assure NPS management that the park does, in fact, have an active prescribed fire program.

CONCLUDING OBSERVATIONS

Based on its Phase I research, the panel believes that risk identification, analysis, and mitigation methods in the wildland fire program need significant improvement. More specifically, improved risk measurement tools are needed, as are better methods to evaluate and respond more fully to strategic risk situations in both planning and operational decisions. Evaluation information derived from actual fires should be fed into the process of developing risk analysis procedures. This is particularly true with respect to factors such as weather forecasting and resource availability. Overall, risk management needs to be more fully integrated into fire management planning.

During Phase II the panel believes that the research should be focused on the following hypotheses:

- Current methods are not sufficient to identify high-risk situations.
- Consequences of serious adverse occurrences are not factored into the risk analysis.
- High-risk situations do not necessarily trigger increased levels of risk mitigation and are not subject to higher levels of management review that could facilitate broader accountability.
- Risk mitigation actions are not an explicit part of fire management planning.
- The comparative risks of not pursuing a fuel-reduction program are not considered.
- The marked increase in wildland/urban interface exposure makes improvements in risk identification and mitigation essential.

- The impact of human stress on the quality of operational decisions made in high-risk needs situations needs greater investigation.

The Academy’s Phase II research to follow up on these hypotheses would include examinations of how other organizations—in both land management and other programs—approach these planning, risk analysis, and resource issues. Exploration of the risk management program in NASA was begun in Phase I (see following box).

METHODS USED BY NASA ADDRESS HIGH-RISK OPERATIONS

The NASA risk management program was reviewed, in a preliminary way, for relevance to the wildland fire management program. In NASA, risk management “...is a continuous process that identifies risks; analyzes their impact and prioritizes them; develops and carries out plans for risk mitigation, acceptance, or other action; tracks risks and the implementation of mitigation plans; supports informed, timely and effective decisions to control risks and mitigation plans; and assures that risk information is communicated among all levels of a program/project.”¹ Risk management begins in the formulation phase with an initial risk identification and development of a Risk Management Plan and continues throughout the project’s life through the disposition and tracking of existing and new risks.

The requirements for risk management are contained in the document that defines the project management process requirements.² The NASA Associate Administrator for the Office of Safety and Mission Assurance believes that the risk management program leads the program to *agree on the acceptable level of risk with the stakeholders*. This provides a basis for *accountability* for project results. With the explicit identification of risk and mitigation plans, trade-offs can be made which lead to an agreed upon acceptable level of risk. This process helps managers prioritize their risks and focus the expenditures for mitigation.

The detailed procedures and guidelines for risk management are contained in a NASA document NPG 8705 which is currently being updated. This document defines the roles and responsibilities for implementing the risk management program, the requirements for a project risk management plan, the implementation steps in the risk management process, and the methods to use in documenting and communicating risk. This document provides the “how to” steps in implementing a risk management program.

During the interview with NASA senior safety and mission assurance management officials, it was emphasized that top management needs to embrace the risk management program for it to be successful. The program has evolved from the techniques employed in the early human space programs, such as Apollo, to the present time where it is used on all NASA development projects. The concept is viewed as flexible and leads to finding the level of risk acceptable to the project team and the outside stakeholders.

The risk management program described above applies to the development aspects of a project. Other similar techniques are used for operations. Risks are identified, mitigation plans are developed, and the mitigation plans are incorporated into operating procedures.

¹ NPG 7120.5A NASA Program and Project Management Processes and Requirements, effective April 3, 1998, par. 4.2.1.

² *ibid.*

CHAPTER 6

HUMAN RESOURCES FOR THE FIRE MANAGEMENT PROGRAM

Human resources management, important in any organization, is an especially key element in fire management because of the interagency nature of the program. Fire management teams, whether for prescribed fires or wildland fires, are often assembled on short notice and are formed largely using employees whose primary jobs are not in the fire program. Team members may be from several different agencies, operating under the guidance of a senior leader for the first time. The team operates within a formal Incident Command System (ICS), and frequently must perform under dangerous and stressful conditions where mistakes can be fatal. A constant supply of well-trained staff who follow uniform procedures and are led by experienced senior leaders is essential to the program's success.

This chapter discusses the ICS, as well as staff levels and workforce development activities in the NPS fire management program. It explores several workforce planning and development issues that will warrant further investigation in the other federal land management agencies during Phase II of the study.

THE INCIDENT COMMAND SYSTEM

The ICS provides an organizational structure for managing wildland fires that intensify and grow large enough to require the use of the fire fighting resources from many jurisdictions. In such cases, ICS places all the needed resources under the operational command of an on-site incident commander. The general characteristics of an ICS are:

- Unified command
- Common terminology
- Integrated incident communications
- Standardized plans and designated facilities for incident command headquarters

- Standardized plans for organization and management of tactical resources

To develop fire-qualified staff, NPS utilizes the ICS's qualification and certification standards. That system outlines minimum training, experience, and physical fitness standards for all staff engaged in suppression and prescribed fire activities. NWCG's *Wildland Fire Qualifications Guide, 310-1* describes these standards. NPS has included them in the DOI Incident Qualification and Certification System and has specified additional minimum qualifications for wildland fire positions not included in ICS. The system is known as the "Red Card" system because, as explained below, each qualified employee carries a red card showing the level of his or her qualification.

A key concept of the DOI Incident Qualification and Certification System is that it is performance-based. An individual becomes performance-qualified for a fire position through a combination of experience and education. The system requires NPS' fire management staff to independently evaluate each employee's performance and competency in their fire position. Park FMOs are responsible for entering and maintaining all park employee fire qualification data into the system and for ensuring that employees are trained, qualified, and certified at levels which meet pre-planned needs for initial and extended attack on prescribed fire projects. The FMOs also are responsible for reviewing employees' red cards annually.

STAFFING THE FIRE MANAGEMENT PROGRAM

A recent GAO study¹ highlights the problem of a dwindling firefighter workforce. GAO notes that the firefighter workforce is shrinking because many workers whose primary job responsibilities are not fire related are not interested in becoming qualified to fight fires as a collateral duty. In addition, GAO notes that the firefighting workforce is aging and many employees in this workforce are nearing retirement age. This suggests that if these positions

¹ GAO.RCED -99-233

are not refilled, land management agencies may not have enough qualified individuals to fill critical positions in the future.

A report, “National Fire & Aviation Management Workforce Needs Analysis” by the USFS (July 1997), makes a similar point. It states that a “lack of available and qualified fire personnel is critically hampering management of large fire situations and impeding progress in prescribed fire activities.” The report cites three elements of the problem:

- an aging workforce subject to heavy retirement potential in the near future
- a long training cycle (17 to 22 years for a Type II and 20 to 25 years for Type I incident commanders) which inhibits developing a new generation of firefighters
- employees who are qualified as firefighters but not available due to competing job demands and personal concerns such as family, dual careers, and low overtime pay

Under contract with NPS and USDA, The Brookings Institution also is looking into this issue. Their study, “Where Have All the Firefighters Gone?” will project the impacts of current workforce demographics, training cycles, and worker availability for wildland firefighting across federal agencies and the wildland fire community.

NPS is attempting to address some of these issues. In an effort to persuade supervisors to be more tolerant of employee absences during the fire season, the following guidance is included in Chapter 6 of RM-18, Fire Management Training:

Management at all National Park Service levels should recognize that employees trained and experienced in fire management possess skills that uniquely contribute to quality performance in other job areas. These employees receive extensive supervision and management training as part of the wildland fire curriculum. Those skills are equally applicable to management of other types of emergency incidents, and to routine supervisory and managerial duties (e.g., maintenance, interpretive, administrative, resource management, and protection positions among others). Simply stated, the benefits accrued by developing these skills are well worth the investments of time and fiscal resources.

Nevertheless, it will likely take more than written guidance to ensure implementation of this guidance.

In addition, FMPC has formed a Workforce Development Committee with staff from FMPC, several national parks, and FMOs from several parks and regions. Two of their current activities are directly related to concerns within the agency about staffing the fire management program:

- **Develop and implement an NPS Wildland Fire Staffing Plan.** This plan will identify fire management positions in parks, regions, and national offices as well as review and develop position management plans at all levels. A survey will be conducted for all NPS field personnel to determine organizational deficiencies and opportunities in the NPS wildland fire-workforce and organization (non-ICS). In addition, exit interviews are planned for departing fire management personnel in order to determine their reasons for leaving.
- **Completion of a comprehensive recruitment and hiring plan for NPS' wildland fire organization.** This initiative includes the identification of fire positions being recruited; an educational effort for recruiting teams; the addition of a recruitment element into national courses; and the development of a wildland fire recruiter training course. Also included is an inventory of career development opportunities and challenges facing fire management managers and staff.

Managerial Development and Succession Planning

There is evidence that the current human resources management systems for NPS and the other land management agencies are not adequately addressing managerial development and succession planning for fire management professionals. One NPS official said that budget constraints, which have inhibited the steady influx of new hires and promotions, have resulted in an experience gap in NPS' fire management program. There is a 15- year age gap between

the current group of senior fire managers, who are now approaching retirement age, and the next group of managers. This could translate to a group of senior managers with 15 years less experience in fire leadership.

Impact of Budget Increases on Staffing

The FY 2001 funding increase for the fire management program (\$1.6 billion) will serve to further highlight these staffing concerns. As part of this overall increase for the DOI and USDA wildland fire activities, the NPS fire management budget is increasing from approximately \$50 million to \$101 million. The resulting higher level of fire management program activity will require additional staff capacity. The need for additional staff will be particularly acute for the senior fire management positions that are key to executing an increased number of prescribed fire projects. Similar increases may be required in the number of FMOs or assistant FMOs needed to plan and oversee these activities. The number of prescribed fire modules and collateral duty staff also may need to increase.

NPS WORKFORCE DEVELOPMENT FOR FIRE MANAGEMENT

The fire management program relies on staff who perform suppression and prescribed fire activities as a collateral duty in addition to individuals who have chosen fire management as a career. Workforce development efforts for these two groups are markedly different.

Training for Incident Command Positions

FMPC administers the fire management training program for the NPS Incident Command System. FMPC coordinates NPS training efforts with other land management agencies via its representation on the NWCG Training Working Team. It also coordinates its work with the Employee Development and Human Resources Divisions within the headquarters Office of Administration.

NPS fire management training is based on criteria specified in the training curriculum approved by NWCG. The curriculum is designed around the fire management positions and performance standards outlined by NWCG. Course work is divided into three categories: entry level, intermediate, and national level training. FMPC approves nominations for the national level classes.

Most fire management training is conducted on an interagency basis. In the southwestern United States, the land management agencies use a zone training board concept for entry-level training. The agencies in each zone² have representation on a board that maps out the training schedule for that zone. The board identifies the courses, instructors, funding, and other needs for the zone's training schedule. Intermediate-level training is conducted at the Fire Use Training Academy in Albuquerque, NM and the National Interagency Prescribed Fire Training Center in Tallahassee, FL. The National Advanced Resource Technology Center in Marana, AZ conducts or coordinates national-level training. Class size and frequency limit the number of students that agencies may send to these training sessions each year.

Training Issues

The Academy panel has identified several issues in the training area.

- **Missing Courses.** The fire management curriculum focuses primarily on preparing incident commanders. This supplies leaders for a suppression-oriented fire program, but not for the broader fire management program. As a consequence, the current training program does not include some elements that are becoming more critical, such as building skills for interagency fire management planning and developing cooperative relationships. The 1995 Policy emphasizes that fire does not respect either geographic

² The term "zone" refers to the zones in SWCC. The Southwest Area that SWCC covers is divided into 10 zones. Each zone provides dispatch services for its geographic area. The zones also provide a focal point for other interagency fire-related activities such as training.

or organizational boundaries. Given the importance of an interagency approach to the fire management program, both in the planning and implementation stages, the program could benefit from training that provides guidelines, best practices, and interactive role playing in interagency planning and cooperation.

- **Management Responsibility.** There is a need to orient NPS managers, agencywide, to the importance of implementing the Federal Wildland Fire Management Policy effectively and efficiently throughout the National Park System. Field interviews revealed inadequate efforts up to now to educate NPS managers about this policy. The need for such education may increase in the future because of the negative publicity surrounding the Cerro Grande Fire and the rising pressures from Congress and other sources to redouble the efforts to implement the Policy.
- **Reliance on Classroom Training.** Current courses rely primarily on classroom training. There is little use of web-based training, and the use of simulation training is now limited to senior-level courses. Many classes, particularly the intermediate and national level courses, limit their class size and are held infrequently. This restricts the number of students who may participate each year, and lengthens the time required for staff to progress through the required classes to qualify for senior positions. Broader use of simulation training and other training methodologies such as web-based training could increase training opportunities.
- **Course Content Evaluation and Updates.** The fire management training program has no evaluation mechanism built into it to provide feedback on the impact of training. Given the importance of the training function to ensure that fire management personnel approach their work efficiently and effectively, there appears to be a need for such a mechanism to compare the actual outcomes of training with the intended outcomes. A training evaluation mechanism would provide the basis for course modifications when the desired outcomes are not achieved.

- **Continuing Education.** NPS has no formal means to ensure that fire staff remain current on the latest policies, practices, and procedures. The training curriculum does not include refresher courses where fire-qualified staff could learn about changes and new developments in the program. Also, as new courses are added to the curriculum, it may be wise to encourage previously trained personnel to take them.
- **Training Budget.** Each year, parks request training funds for the fire management program. But the program does not have a benchmark or standard for developing those requests either on an agencywide or an individual park basis. Each park FMO determines the level of training required each year, without any guidance on what constitutes minimum and desirable levels. As a result, there are variations among parks in the budgeted annual training hours for each employee. Budget requests range from 40 to 80 hours per employee per year.

Career Development in the Fire Management Profession

While there are pre-set training and experience requirements for incident command positions (e.g. burn boss), no such requirements exist to help advance full-time fire management employees to senior positions such as park FMO. Instead of providing a structured career development planning process, NPS leaves it to the individual employee to sort out career-enhancing professional development opportunities and course availability. The FMOs interviewed to date have a wide a range of previous work assignments. This suggests that there are no specific requirements in terms of past job assignments that lead to an FMO position.

Workforce Development Committee

As discussed above, FMPC has formed a Workforce Development Committee. In addition to the two staffing initiatives underway, the committee is currently examining the following workforce development areas:

- creation of a wildland fire employee development plan to include career ladders, a career counseling program, and a wildland-fire mentoring program
- identification of the cultural barriers and strengths within the fire management system, including a demographic study of individuals currently involved in the NPS fire management program

CONCLUDING OBSERVATIONS

Based on Phase I research, the panel believes that the NPS human resources management program should give greater attention to developing and retaining an adequate wildland fire workforce. During Phase II, the panel believes that the research should be focused on the following hypotheses:

- The current methods of meeting human resource needs for fighting wildland fires (using professional leadership drawn from a volunteer fire “militia”) may not be sustainable in the future.
- Recently enacted increases in the size of the wildland fire management program will require a substantial increase in human resources.
- The workforce size, composition, and cultural dynamics have resulted in declining desire to participate in the fire program “militia.”
- Current requirements for fire management planning and coordination are not sufficiently supported by training programs.
- Current requirements and methods for training and acquiring experience have created a 15 to 25 year process for reaching the top positions in fire management field command.
- Feedback from interagency fire management activities is not systematically reported, analyzed, and used to improve the fire management training program.

Phase II of this study would continue to explore these human resources management issues within NPS, and expand its focus to include other federal land management agencies and the state, local, and tribal governments. It would also explore how these issues have been dealt with in other comparable professions. These explorations may include issues in training and workforce development, pay issues, joint emergency management training with a broader range of cooperators, and workforce analysis.

CHAPTER 7

ISSUES RECOMMENDED FOR FURTHER STUDY

Research for Phase I of the Academy's study focused principally on the Cerro Grande prescribed fire at the Bandelier National Monument, and on prescribed fire practices in the National Park Service. Phase II of the study is to more broadly consider implementation of the interagency Federal Wildland Fire Management Policy by all the federal agencies that are governed by it.

The Phase I study was conducted from September to December 2000. During this brief period of time, perspectives were developed on the Cerro Grande fire. As discussed in Chapter 2, it appears that better risk analysis, greater precautions to compensate for the higher level of true risk that existed, and more effective management of the fire could have helped to avoid or mitigate the Cerro Grande disaster.

The key issues needing further study during the more extensive research period provided in Phase II, between January and September 2001, were also identified in Phase I. The interagency Federal Wildland Fire Management Policy establishes planning, coordination, risk management, interagency support, and other procedures designed to assist agencies in managing wildland fires safely as increasingly important tools for improving the ecological and fire safety characteristics of forests and other wildlands. Overall, this Policy is sound. However, as the preceding chapters have shown, some portions of the policy may need refinement, some are not being implemented adequately, and systems to hold managers accountable for implementing the policies are not adequate.

From this study's Phase I work, the Academy panel believes that the key issues that need attention in Phase II revolve around:

1. agency accountability for wildland fire program management
2. interagency implementation of the wildland fire management policy and program, including fuller coordination and cooperation with state, local, and tribal governments and affected private land owners
3. program analysis and evaluation to improve results of the wildland fire program
4. improved risk analysis and mitigation methods to help implement the federal wildland fire management policy more safely and effectively
5. stronger human resources management support for implementing the policy

The panel recommends that the key issues serve as hypotheses for further study of the land management agencies' capacity to implement the Federal Wildland Fire Management Policy during Phase II of the Academy's research for DOI. These hypotheses are based on limited research conducted in the fall of 2000, which focused principally on the National Park Service and the Cerro Grande fire.

1. **Agency Accountability for Program Management.** Accountability for fire management activities needs to be strengthened. Alternative methods need to be developed which will clearly assign responsibility and accountability for fire program implementation and success.

- The 1995 Federal Wildland Fire Management Policy has only been partially implemented.
- Among the provisions needing fuller implementation is the one requiring coordination and cooperation with state, local, and tribal governments and with affected private land owners.
- Senior line managers have not put systems and procedures in place to implement the existing policy by linking them directly to program management and results.
- Accountability appears diffused in the federal fire management program.

- Fire management plans have not been prepared for many burn units, thereby making those areas ineligible for prescribed burning.

2. **Interagency Program Implementation.** Federal fire program management across agency boundaries needs to be improved. Needed improvements include methods to integrate the Agriculture/Interior fire management programs, bring additional federal land managers into the program (including those in Defense and Energy), and better integrate the contributions of other cooperating agencies (including the National Weather Service, FEMA, and EPA). These improvements should be in addition to improving fire program management in the individual agencies, and should include forming partnerships with appropriate state, local, and tribal governments, as well as affected private landowners.

- The interagency and intergovernmental dimensions of the 1995 Policy call for difficult changes in traditional program practices and implementation activities in many agencies, and for new partnerships with regulatory agencies and with a wide range of other governments and private stakeholders.
- There is no central interagency leadership that represents the fire community consistently and effectively to the federal land management agencies in a way that holds them accountable for implementing the 1995 Policy. The question remains, are there practical means to strengthen this leadership?
- There is no interagency management system in place to implement the 1995 Policy in a coordinated way across agencies.
- Required interagency coordination of fire management plans and prescribed fire plans has not been fully implemented.
- Required coordination with state, local, and tribal governments and with other affected or potentially affected parties on fire management plans, prescribed fire plans, and urban interface issues has not been adequately implemented.

- Feedback from interagency fire management activities is not systematically reported, analyzed, and used to improve future activities.

3. **Program Analysis and Evaluation.** Fire management program analysis needs to be significantly strengthened. This function would collect data on prescribed and wildland fire operations and results, and analyze them to evaluate performance and guide future program directions.

- Current program data collection and analysis is sporadic, incomplete, and does not produce the information needed to help direct the fire management program and establish effective accountability.
- Without sound program analysis, which identifies and evaluates the factors leading to both success and failure, it is not possible to adequately judge the efficiency and effectiveness of the fire management program and establish accountability, or to adequately revise and update risk analysis methodology used in planning prescribed fires.
- Valuable lessons learned, from both successful and unsuccessful fires, are not being developed and applied systematically to future program activities and the updating of training curriculums. The new NPS Center for Lessons Learned could be strengthened to provide this information.
- There is no agency-wide system for assessing performance and holding agency officials accountable for the fire management program. To be most effective, program analysis and evaluation should be linked directly to periodic program, management, and budget review processes, including the planning and reporting processes established pursuant to the *Government Performance and Results Act*.
- Care should be exercised in developing better data, to recognize and accommodate (by practical means) the diverse reporting forms, needs, and practices of the different organizations that generate needed data.

4. **Risk Analysis and Mitigation.** Wildland fire program risk identification, analysis and mitigation methods need significant improvement, including weather forecasting and resource availability factors. Risk management needs to be more fully integrated into fire management planning. The risk management function needs to use risk measurement tools, as well as the methods to evaluate and respond to strategic risk situations more fully in both planning and operational decisions.

- Current methods are not sufficient to identify high risk situations.
- Consequences of serious adverse occurrences are not factored into the risk analysis.
- High-risk situations do not necessarily trigger increased levels of risk mitigation and are not subject to higher levels of management review that could facilitate broader accountability.
- Risk mitigation actions are not an explicit part of fire management planning.
- The marked increase in wildland/urban interface exposure makes improvements in risk identification and mitigation essential.
- The impact of human stress on the quality of operational decisions made in high-risk situations needs greater investigation.

5. **Human Resources.** Human resource management needs to be strengthened. This includes methods for determining workforce size and skill needs, securing and retaining the necessary workforce (possibly including contracting out), establishing training requirements, delivering training, and providing succession planning for fire management professionals.

- The current methods of meeting human resource needs for fighting wildland fires (using professional leadership drawn from a volunteer fire “militia”) may not be sustainable in the future.
- Recently enacted increases in the size of the wildland fire management program will require a substantial increase in human resources.

- The workforce size, composition, and cultural dynamics have resulted in declining desire to participate in the fire program “militia.”
- Current requirements for fire management planning and coordination are not sufficiently supported by training programs.
- Current requirements and methods for training and acquiring experience have created a 15 to 25 year process for reaching the top positions in fire management field command.

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1995 Policy	1995 Federal Wildland Fire Management Policy and Program Review
Academy	National Academy of Public Administration
BAER	Burned Area Emergency Rehabilitation
BIA	Bureau of Indian Affairs (Interior)
BLM	Bureau of Land Management (Interior)
DO-18	Director’s Order
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOI	Department of the Interior
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FMO	Fire Management Officer
FMP	Fire Management Plan
FMPC	Fire Management Program Center (NPS)
FY	Fiscal Year
FWS	Fish and Wildlife Service (Interior)
GACC	Geographic Area Coordination Center
GACG	Geographic Area Coordinating Group
GAO	U.S. General Accounting Office
ICS	Incident Command System
IMT	Incident Management Team
JFSP	Joint Fire Science Program
LANL	Los Alamos National Laboratory
MAC	Multi-agency Coordinating Group
MEL	Most Efficient Level
NASF	National Association of State Foresters
NEPA	National Environmental Policy Act

APPENDIX C

NFA	National Fire Academy
NFATSG	National Fire and Aviation Training Support Group
NFDC	National Fire Data Center
NFPA	National Fire Protection Association
NIFC	National Interagency Fire Center
NIRSC	National Incident Radio Support Cache
NPS	National Park Service (Interior)
NWCG	National Wildfire Coordinating Group
NWS	National Weather Service (Commerce)
OAS	Office of Aircraft Services (Interior)
RAWS	Remote Automated Weather Stations
RFMO	Regional Fire Management Officer
RM-18	Reference Manual
RO	Regional Office
SFNF	Santa Fe National Forest
SSO	System Support Office
SWCC	Southwest Area Coordinating Center
TES	Threatened and Endangered Species
USDA	U.S. Department of Agriculture
USFA	U.S. Fire Administration (part of FEMA)
USFS	U.S. Forest Service
WASO	Washington Area Support Office (NPS)



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