Fire Management and Ecosystem Health in the National Park System

Problem Analysis

National Park Service
Branch of Fire and Aviation Management

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CONTENTS

Interagency Management Review Team
South Canyon Fire

Fact Sheet, October 28, 1994

Following the tragic South Canyon Fire on July 6, 1994, in Colorado, an Interagency Accident Investigation Team was convened. The group released a report on August 22, 1994 that identified the causes of the accident and recommended actions that should be implemented to prevent similar future occurrences. An Interagency Management Review Team (IRMT) was appointed to take immediate corrective actions, develop an action plan for implementing the recommendations of the investigation report, and make recommendations on related fire program management issues.

The attached report of the IMRT has the concurrence and support and support of the directors of all the Federal wildland firefighting agencies It has also been accepted by the senior safety and health officials of the Departments of the Interior and Agriculture. Implementation of the report's recommendations will be accomplished in cooperation with all state partners in wildland firefighting operations.

The IMRT found a dire need to create a passion for safe firefighting practices to be generated by leaders showing a clear and steadfast commitment to safety. The team emphasized the importance of training and qualifications for agency manager sat all levels in wildland fire management. It also identified the need to more strongly emphasize accountability among agency leaders, fire managers and firefighters.

The IRMT took several steps to improve safety for firefighters during the remainder of the 1994 fire season. For example, the team requested that each wildland fire agency director personally convey the importance of agency management involvement in wildland fire suppression, particularly to emphasize that "Safety is Job #1." The team requested that each successively lower level of management convey the message to the next level until all employees in leadership and other fire suppression roles received the message.

The IMRT prepared a plan to implement more than 30 corrective actions that wildland firefighting agencies need to implement, most of which are expected to be implemented by next year's Western fire season. These actions will affect a variety of areas including the use of weather and fire behavior information, training and involvement of leaders and fire management personnel;, management of firefighting programs, and planning of firefighting operations for above-average fire seasons. Among other things, the team stressed the importance of having qualified personnel at all levels of wildland firefighting operations, including senior agency officials.

The team identified three major issues of fire management policy that have implications for firefighter safety and operational effectiveness: preparedness, fuels management, and wildland/urban interface. These areas have ramifications beyond the immediate scope of the report. However, the team strongly recommended that the Departments of the Interior and Agriculture take actions to address these issues.

In the report, the team identifies work groups and specific personnel from all wildland firefighting agencies as responsible for implementing the recommendations. The report sets deadlines for implementing each recommendation and calls for regular progress reports from each group.

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I. EXECUTIVE SUMMARY

As defined by the mission of the National Park Service, a healthy ecosystem is one whose components, such as species diversity and forest stand structure, are fluctuating within the range of variability that existed prior to European settlement. A healthy ecosystem is sustained by the free and unobstructed interaction of natural processes that influenced the formation of the ecosystem. These processes include climatic cycles, animal population dynamics, pathogens and fire.

Humans are a major biological component of park ecosystems because of their activities outside of park boundaries as well as in developed park areas. Consequently, the National Park Service recognizes that natural area and wilderness ecosystem components cannot be managed in isolation, and that natural processes such as fire cannot always be restored to within the natural range of variability throughout an entire ecosystem. In altered areas, the National Park Service's goal is to simulate the effects of natural processes where possible, and to minimize human impacts on the landscape where feasible. In historic areas, natural ecosystems may be sacrificed to the mission of preserving historic scenes, but even in these areas the stability and resilience of the altered ecosystem must be preserved.

Most forest ecosystems, and many shrub and savanna ecosystems, are dependent on fire to maintain their long-term stability. By disrupting the ecosystem-regulating effects of naturally occurring fires, and those set by Native Americans, fire suppression has created abnormal fuel conditions favoring unnaturally large and intense wildfires that further degrade the integrity of natural ecosystems and threaten life and property. Such wildfires are becoming increasingly common. The erratic and unpredictable behavior of these wildfires not only endangers firefighters lives but also may defy suppression efforts and cause a great increase in suppression costs.

Despite past and present mitigation measures, ecosystem health problems continue to worsen in many parks. A significant increase in prescribed fire will be required to reverse unhealthy conditions that have evolved over the past 120 years. Increasing prescribed fire and fuels management will require significant increases or reallocations in funding and staffing, along with the ability to overcome program constraints, including air quality regulations; resistance to the visual impacts of prescribed burning and fuel removal; fear of prescribed fire escape; National Environmental Policy Act (NEPA) requirements; impact mitigation measures required for sensitive species and cultural resources; and the routine cancellation of prescribed fire projects due to national wildfire preparedness requirements. Although the NPS strongly supports the goals of NEPA, the Endangered Species Act and other resource protection laws, we must strive to balance these goals and implementation requirements with those of ecosystem health.

In order to ensure that fire can play its role in ecosystem health, five recommendations are made:

1. INCREASE THE NUMBER OF ACRES OF PARK LANDS THAT ARE FUNCTIONING AS NEARLY AS POSSIBLE AS NATURAL ECOSYSTEMS.

2. REDUCE THE RISK OF SEVERE WILDFIRES IN AND SURROUNDING DEVELOPED AREAS WITHIN PARKS AND ALONG PARK BOUNDARIES.

3. PROVIDE INFORMATION ABOUT THE NATURAL ROLE OF FIRE IN PARK ECOSYSTEMS TO THE PUBLIC AND DECISION MAKERS.

4. INCREASE OPPORTUNITIES FOR INTERAGENCY PLANNING, PARTNERSHIPS, AND ABILITY OF ALL LAND MANAGERS AND STAKEHOLDERS WITHIN ECOSYSTEMS TO SUPPORT INTEGRATED FIRE MANAGEMENT ACROSS AGENCY AND PRIVATE LAND BOUNDARIES.

5. INCREASE ANALYSIS CAPABILITIES TO BETTER INTEGRATE FIRE INTO MANAGEMENT AND PLANNING DECISIONS, AND INCREASE OUR UNDERSTANDING OF KEY INDICATORS OF ECOSYSTEM HEALTH AND RESILIENCE.

II. INTRODUCTION

Mission: The National Park System manages 22.6 million acres of forests, and about 58 million acres of other ecosystem types. The forests can be subdivided into many diverse ecosystems, extending from the boreal forests of northern Alaska to the tropical forests of the Virgin Islands and Hawaii. Maintaining these forests in a healthy condition has been a long-standing policy of the National Park Service. The same is true of shrublands and grasslands, some of which are independent ecosystems, but many of which are integral components of larger ecosystems. Within natural zones, current management policies direct that:

> Natural resources will be managed with a concern for fundamental ecological processes as well as for individual species ... Managers ... will try to maintain all the components and processes of naturally evolving park ecosystems, including the natural abundance, diversity and ecological integrity of the plants and animals.

As defined by the mission of the National Park Service, a healthy ecosystem is one whose components, such as species diversity and forest stand structure, are fluctuating within the range of variability that existed prior to European settlement. A healthy ecosystem is sustained by the free and unobstructed interaction of natural processes that influenced the formation of the ecosystem. These processes include climatic cycles, animal population dynamics, pathogens and fire.

Humans are a major biological component of park ecosystems because of their activities outside of park boundaries as well as in developed park areas. Consequently, the National Park Service recognizes that natural and wilderness ecosystem components cannot be managed in isolation, and that natural processes such as fire cannot always be restored to within the natural range of variability throughout an entire ecosystem. In altered areas, the National Park Service's goal is to simulate the effects of natural processes where possible, and to minimize human impacts on the landscape where feasible. In historic areas, natural ecosystems may be sacrificed to the mission of preserving historic scenes, but even in these areas the stability and resilience of the altered ecosystem must be preserved.

The Natural Role of Fire: Most forest ecosystems, and many shrub and savanna ecosystems, are dependent on fire to maintain their long-term stability. Fire helps sustain ecosystems in the following ways:

- controls the types of plants that can grow in communities and fosters optimum diversity
- creates conditions necessary for regeneration of many fire-adapted species
- regulates the amount of fuel that accumulates so that the timing, burning pattern and intensity of wildfires remains within the normal range of variability controls nutrient cycles and energy balance in these systems
- impacts wildlife habitat by encouraging the growth of young shrubs and species diversity needed for bird and other species for food and cover
- maintains insect and disease populations at endemic levels
- impacts the productivity and stability of ecosystems

By disrupting the ecosystem-regulating effects of naturally occurring fires, and those set by Native Americans, fire suppression has created abnormal fuel conditions favoring unnaturally large and intense wildfires that further degrade the integrity of natural ecosystems and threaten life and property. Such wildfires are becoming increasingly common. The erratic and unpredictable behavior of these wildfires not only endangers firefighters lives but also may defy suppression efforts and cause a great increase in suppression costs.

This is especially true in those forests that evolved under a regime of frequent, low to moderate-intensity fires, such as the ponderosa pine and mixed-conifer forests of the West. For this reason, this problem analysis paper focuses on these ecosystems, rather than others that may also be dependent on fire. Within these forests, lightning fires generally burned a given area every 5 to 20 years. Now, extensive areas of these forests have not burned for over 120 years due to fire suppression activities. Fire exclusion in these forests has caused dramatic changes in species composition, diversity and stand structure from pristine conditions. Dangerously high living and dead fuel levels, altered insect and disease infestations, extensive forest stands blown down by wind and unnaturally high tree densities attest to the unhealthy condition of these forests.

Efforts To Restore Fire As An Ecosystem Process:

In order to reduce these hazardous fuel situations and restore natural, healthy forest ecosystems, the National Park Service has undertaken a program combining prescribed natural fire, management-ignited prescribed fire and mechanical fuel removal. Parks currently identify about 250 hazardous fuel reduction and ecosystem maintenance prescribed burning projects per year covering 200,000 acres. Only about 45,000 acres are actually treated each year due to funding and staffing limitations, and other program constraints. Another 21,000 acres are burned each year in prescribed natural fires (PNF). Current PNF area burned is less than the amount that should burn each year within prescribed natural fire zones because many of these fires are suppressed due to air quality concerns and lack of personnel to meet the long-term management and monitoring requirements. Strengthening the prescribed natural fire program is essential for preventing the hazardous fuels and ecosystem health problem from spreading into areas in which fires still occur within the natural range of variability.

Despite past and present mitigation measures, ecosystem health problems continue to worsen in many parks. A significant increase in prescribed fire will be required to reverse unhealthy forest conditions that have evolved over the past 120 years. Restoration of natural fuel conditions and fire regimes cannot occur quickly. Fire must be reintroduced carefully under prescribed weather and moisture conditions to ensure that its effects are within the natural range of variability and that the risks of escape are low. This effort must be supported by adaptive management feedback from strong fire effects monitoring programs and fire ecology research. It will take decades to fully restore natural conditions and reduce the destructive power and cost of wildfires in Western forests.

Within the vast natural and wilderness areas of many parks, prescribed fire is the only feasible tool for restoring forest health and it is by far the least expensive. Prescribed fire typically costs $20-$30 per acre, while mechanical fuel reduction usually costs $500-$1,500 per acre. The National Park Service program emphasizes prescribed fire because the ecological benefits of the fire process, such as nutrient recycling and habitat creation for many species that thrive in post-fire habitats, cannot be completely duplicated by mechanical manipulation of fuels and stand structure.

Increasing prescribed fire and fuels management activities will require significant increases in funding and staffing, along with the ability to overcome program constraints. These include: air quality regulations; resistance to the visual impacts of prescribed burning and fuel removal; fear of prescribed fire escape; National Environmental Policy Act (NEPA) requirements; impact mitigation measures required for sensitive species and cultural resources; and the routine cancellation of prescribed fire projects due to national wildfire preparedness requirements. Although the NPS strongly supports the goals of NEPA, the Endangered Species Act and other resource protection laws, we must strive to balance these goals and implementation requirements with those of ecosystem health.

The prescribed natural fire program can effectively maintain the natural fire process only if lightning fires are allowed to burn within designated zones whenever nature decides to ignite them. Similarly, in order to effectively reduce wildland fuels, management-ignited prescribed fires must be carried out at a time when most fuels burn. At present, the effectiveness of both of these programs is restricted by the priority of making personnel available for wildfire suppression mobilizations and by air quality regulations. Program scope can also be limited by the desire to avoid impacts to cultural and other sensitive resources, even though these resources may suffer much greater damage in future wildfires if hazardous fuels are not treated.

The expansion of these programs may depend on relaxing national and regional wildfire preparedness plans by allowing prescribed fire programs to continue during periods of significant wildfire activity, and by creating project-dedicated crews to carry out prescribed burning and mechanical fuel removal. We also need to expand and accelerate efforts to integrate resource protection requirements with natural process restoration.

III. OBJECTIVES

A primary goal of the fire management program in the National Park System is to integrate fire into sustainable naturally functioning ecosystems. At the same time, the National Park Service recognizes that human communities and values also must be sustained as part of the ecosystem. In some cases, this will require that natural ecosystem processes, such as fire, be constrained in order to accommodate park infrastructure, visitor services and public enjoyment of the park resources, and to protect special resources. With this caveat in mind, the fire management goal will be accomplished through the following objectives:

- Perpetuating, restoring or replicating natural processes (specifically fire) to the greatest extent possible

- Protecting human life and property from injury by fire both within and adjacent to park areas

- Promoting public understanding of fire management programs and objectives
- Promoting an interagency approach to managing fires on an ecosystem basis, and
- Encouraging research to advance understanding of fire behavior, effects, ecology, and management.

This problem analysis discusses issues relative to these objectives and makes specific recommendations for their accomplishment.

IV. ISSUES

The recognition that fire can play an important role in the achievement of land management objectives, including the maintenance of forest health, is an important step in the development of land management plans. This recognition forces managers to accept the premise that there is not a "no action" alternative. Any attempt to suppress all fires will usually replace small, frequent low intensity fires with infrequent intense fires. The escalating size and costs of wildfires across the nation in the last several years illustrates this trend.

This is not a newly discovered problem. The National Park Service has tried to implement an ecosystem-based fire management policy for over a quarter of a century. During that time over one million acres have been burned by prescribed fire. While these numbers look impressive, they are far below the area that would have burned under natural conditions. Many national parks and monuments were established by Congress or by the President with the intent of maintaining the natural character of the area. The maintenance of the periodic influence of natural fire on these areas is fundamental to both the intent of Congress and to the requirements of their ecosystems.

The National Park Service believes that the relationship between its fire policy and resource management objectives, which include the management of ecosystems, is sound. There is, however, a significant gap between the amount of prescribed fire which should be used to meet these resource objectives and the amount of burning actually done. It is critical to note that when such a gap occurs, the areas which are not prescribed burned are still essentially being managed under a suppression policy, and drift further away from healthy, sustainable conditions. Fire must be reintroduced on an ecologically significant scale in order to restore ecosystem components within the natural range of variability.

As an example, Yosemite, Sequoia-Kings Canyon, and Grand Canyon National Parks have calculated that between 10,000 and 20,000 acres burned annually in each park under natural conditions, with climatic fluctuations affecting the level of activity. A fire management

program designed to maintain the ecological integrity of these parks should also operate at about this level. Instead, the total area burned each year is only 20-30 percent of that which would have burned under natural conditions. Therefore, fuels continue to accumulate, fires continue to burn more intensely than occurred under natural conditions, and wildfires are more expensive to suppress.

These parks, and many others across the United States, provide useful barometers of the viability and feasibility of a fire policy based on ecosystem management. As many other agencies express a desire to integrate ecosystem management into their land management and fire management policies, it is useful to examine the issues which impede the National Park Service from achieving its own ecosystem-based fire policies, and from establishing interagency partnerships to manage fire on a ecosystem basis.

1. Air Quality Regulations

The National Park Service's program of applying prescribed fire on a landscape level to achieve ecosystem-based objectives has consistently conflicted with the language and implementation of the Clean Air Act and its revisions. This conflict arose because the Clean Air Act, which was designed to protect health and visibility from human-generated aerosol pollutants, also has been applied to natural baseline particulates produced by ecosystem processes. Particulate matter, and specifically PM-10, is a primary focus of regulation under these laws. Under some state implementation plans, PM-10 standards can be exceeded easily by even low particulate levels generated by small PNFs and management ignited prescribed fires. Management ignited prescribed fires conducted to restore or maintain ecologic integrity, reduction of hazard fuels, or forest health may be regulated under the same restrictions used for agricultural burns such as rice stubble.

The relationship between the Clean Air Act and prescribed natural fire is also a subject of debate between fire managers and air quality regulators. Fires of natural origin which are allowed by management to burn may also fall within agricultural burning guidelines and regulations. The result of this regulation is to restrict the size, frequency, and number of prescribed natural fires. In wilderness, suppression of lightning fires moves ecosystems in an unnatural successional direction, compromising the intent of the Wilderness Act and park resource management plans.

The net effect of restricting prescribed fire in the interest of protection of air quality may be to substitute relatively small impacts from prescribed fire for the inevitable greater impacts from large, intense wildfires. While prescribed fires can incorporate smoke management techniques into the operation, wildfires have no such consideration. Smoke impacts from prescribed fires can be reduced to some extent by burning during favorable smoke dispersal conditions, and by controlling the amount and type of fuel consumed.

The crux of the issue seems to rest on the interpretation by air quality regulators that smoke from prescribed fire can be regulated, while wildfire smoke is an act of God and cannot be regulated. Ironically, the essence of the argument by fire managers for the use of prescribed fire is that large damaging wildfires are not inevitable, can be significantly mitigated with the use of tools including prescribed fire, and in many areas are an artifact of human interference in the natural fire cycle.

Air quality regulations probably impose the greatest restriction on the use of prescribed fire in ecosystem management. This restriction will continue until the effects of wildfire smoke on human health are recognized as air quality degradation that can be mitigated, and that prescribed fire is the primary means to accomplish this. Regulators and managers need to find a balance between the conflicting goals of ecosystem health and air quality.

2. Threatened and Endangered Species

As prescribed fire programs have grown in size and activity, both the public and wildlife managers have expressed concern over the effects of burning on sensitive species and their habitat. It is not unusual for restrictions to be placed on timing, location, and size of prescribed fires in order to protect sensitive species. In some cases, successional trends produced by unnatural fire exclusion favor sensitive species. This in turn results in restrictions on the use of prescribed fire, and in the accumulation of fuels.

Ironically, the restriction on prescribed fire to protect habitat may lead to the habitat's destruction. It has been suggested that public opposition to the use of prescribed fire in the habitat of a sensitive species of gnatcatcher led to a wildfire which burned with sufficient intensity to destroy at least part of the bird's habitat. It is likely that the same circumstances will occur eventually in spotted owl habitat where the use of fire is restricted.

Much of the conflict seems to be based on two suppositions: that an area containing a sensitive species can be protected indefinitely from wildfire, and that the negative ecological effects of prescribed fire are greater than the negative ecological effects of fire exclusion. The resistance by the public and by managers concerned with sensitive species will continue until it is recognized that wildfires will eventually occur, and until the effects of fire exclusion are balanced against the effects of prescribed fire.

In some cases, sensitive species are dependent on recurring fires to create favorable habitat. This is especially true for many species of plants that pioneer recently burned areas. The presence of these species may be unknown because years of fire exclusion have prevented their reappearance.

The long-term fire effects monitoring programs now underway in many areas of the National Park Service will help provide managers with the information they need to understand the true impacts of fire on sensitive species.

3. Liability and Certification

Discussions about forest health, the need to reduce wildfire risk and suppression costs, managing fire on an ecosystem level arise out of a realization that the threat of wildfire is increasing with each year. Fire officials will often announce that each new fire season has the potential to be the worst ever. The vast amount of dead and dying trees are used to illustrate the fire danger and risk. The news broadcasts each fire season showing homeowners fleeing from wildfire, or returning to the charred remains of their homes, seem to confirm these forecasts.

The current condition of wildland fuels, and the public's perception of the risk associated with them, places enormous amounts of pressure on managers who attempt to use fire to mitigate this risk, or to maintain the integrity of fire-dependent ecosystems. Specifically, the risk associated with the use of fire and the chance of the escape of prescribed fire, generates questions of liability. The risk of escape may be mitigated partially by burning under very conservative or narrow conditions; this may reduce risk, but also may shrink the program's scope to below a significant level of activity. Also, as fuel conditions worsen with each passing year, it becomes progressively more risky to attempt to reduce those fuels by prescribed burning large areas.

Aversion to risk by both citizens and fire managers is a social impediment to the use of prescribed fire on an ecologically significant scale. This risk may be reduced somewhat by establishing laws that restrict or eliminate the liability associated with prescribed burning. Florida and Nevada have passed laws that limit liability, as long as burns are conducted within approved prescriptions; Florida also requires that a certified burn boss conduct the burn.

These laws have not been tested in court, and address state level concerns. Similarly, the definition of what constitutes an adequate prescription or a properly trained individual is also determined locally, in many cases. Interagency standards of certification and liability protection would address this issue in a more systematic and consistent manner.

4. Public Understanding

The public has been exposed to years of indoctrination that fire is bad. This has translated into a fear of prescribed fire, and to an objection to the visual effects of prescribed fire. With regard to the visual effects of fire on the appearance of an area, the public seldom has an opportunity or intent to revisit an area frequently enough to observe the recovery and successional trends which occur in succeeding years. Forests adapted to short fire return intervals recover quickly from fires within the natural range of intensities, and the effects of these burns may not be evident to the casual observer after four or five years. Conversely, the effects of intense wildfires will be evident for many years.

In areas in which fire has been suppressed for many years, the changes in structure and species composition can be significant and, to a resource manager, unnatural and undesirable. To the public, however, the dense vegetation can be aesthetically pleasing and appears, at least superficially, natural. Attempts to restore a more natural, open stand structure to a forest may meet with significant public opposition. Additionally, if prescribed fire is to be used at an ecologically significant rate and extent, members of the public may voice a concern that too much is being burned, at too fast a rate. Also, park visitors may be reluctant to support specific prescribed burns that interfere with their visitation plans, even though they may express general understanding and acceptance of the role of fire in ecosystem health. This is a prevalent social expression within our society. For example, although most people want roads to be maintained in good condition, many often complain about road maintenance projects that interfere with their activities.

The social effects of the program are therefore an important issue and a potential constraint on a program which seeks to use prescribed fire on a landscape level. Because of this, The National Park Service has been interpreting the ecological value of fire to the public in parks across the country since the 1960s. This interpretation has been based upon the findings of both research and monitoring programs.

Nonetheless, it is likely that the increased use of prescribed fire in the future will require a proportionally greater effort to inform the public of its purpose and benefits. Public acceptance of prescribed burning programs will affect the rate at which ecosystems will be restored with prescribed fire. Public resistance to further smoke impacts and burned trees will likely remain a major program impediment unless the NPS effectively articulates the expected benefits from reestablishing an ecologically significant role for fire. If the public becomes committed to the necessity of reestablishing healthy ecosystems, it will be more likely to accept occasional prescribed fire escapes.

5. Staffing/Funding/FTE Concerns

Accelerating prescribed burning activities requires a reevaluation of current budget priorities for presuppression and fire suppression activities. Clearly, recent reductions in budget and FTE ceilings have affected agencies' abilities to plan, prepare and execute prescribed fire programs. The current fire season illustrates that during severe wildfire years all wildland fire management agencies are stretched to (or beyond) the limit to respond simultaneously to protection needs of life, property, and natural resources. In these situations, long term plans to reduce fuels and promote ecosystem health receive lower priority than the immediate emergency needs of wildfire suppression.

Under fixed or declining budgets, management could continue to emphasize wildfire preparedness over prescribed burning and fuels management. This would result in hazardous fuels continuing to increase, and continued declines in ecosystem health. Alternatively, management could decide to reduce wildfire preparedness capability and shift scarce

resources and FTEs to the prescribed fire program management. This scenario would further increase the risks of severe wildfire damage to resources in the short term, because it will take years if not decades of concentrated effort to reverse the current trends toward more frequent high-intensity wildfires. During this period, risks to people, property and resources will remain high, making it unwise to reduce suppression capability prematurely.

Increasing fire management budgets and FTEs would allow managers to establish a proper program balance without sacrificing current wildfire suppression capabilities. An increased budget could permit the NPS to achieve the most efficient fire program level (MEL) identified by its FIREPRO analysis of program workload and complexity. This program level would require the creation of prescribed fire dedicated resources that would not be subject to suppression mobilization except during extreme emergencies. This scenario will provide the greatest commitment to resolution of the ecosystem health issue while still maintaining a necessary protection commitment.

Shifting or broadening funding authority will not in itself, resolve this issue. In order to attain significant progress, budgetary increases are the most viable solution.

6. Preparedness Plans

The current National and Area Preparedness Plans were established following the 1989 Fire Management Policy Review. The Plans represent a significant effort to ensure that fire managers consider the potential impacts of prescribed fire activities on suppression capability, and reduce the risk of prescribed fire escape. However, the usefulness of these plans now appears limited. At the time of their development, agencies were in the process of preparing new fire management plans and the guidance presented by preparedness plans assisted in decision making and program management in lieu of revised fire management planning documents.

The decision criteria, monitoring requirements and prescriptions described in revised fire management plans ensure that prescribed fires will not present unreasonable risks to local, regional and national preparedness capability. Management ignited prescribed burn plans define resource needs, prescription, and contingency actions necessary for the implementation of these projects. The creation of additional staffing and equipment dedicated to prescribed fire would further strengthen the ability of prescribed fire programs to proceed during periods when major suppression mobilizations were occurring to fight wildfires in other areas. Thus, preparedness plans have fulfilled their purpose in guiding long-term fire management accountability and now unnecessarily restrict or prohibit prescribed fire activities, even when these activities could be most effective. Under current preparedness plan restrictions, many parks and wildernesses are limited to natural fires of only small size, short duration, and little ecological significance.

Preparedness planning must be revised to permit prescribed fires to continue when local conditions are optimum, even though other areas may be experiencing very high fire danger and suppression resource commitment. Without this change, the increased use of management ignited prescribed fire and prescribed natural fire cannot be realized as a solution to ecosystem health problems in western forests.

V. Recommendations and Actions

Five general recommendations are presented with specific action items listed for each.

1. INCREASE THE NUMBER OF ACRES OF PARK LANDS THAT ARE FUNCTIONING AS NEARLY AS POSSIBLE AS NATURAL ECOSYSTEMS.

Action Items:

a. Define the magnitude of prescribed fire needed to accomplish ecosystem level burning in National Park Service areas, and develop a multi-year series of projects within each park to accomplish this program. This would provide valuable baseline information for working with regulatory agencies, the public, other fire management cooperators, and the budget process. This process is already in place in many parks, but needs to be expanded into others.

b. Reconcile the language within the Clean Air Act with the purpose and need for prescribed fire to restore and to maintain the integrity of fire-dependent ecosystems. This may require action from Congress, or direction to the Environmental Protection Agency.

c. Address the question of liability and certification at a national level to ensure consistency of approach and requirements.

d. Revise National and Area Preparedness Plans to permit continuation of prescribed fire activities by:

1.) Under Preparedness Level IV, remove statement, "Suspend declaration of Prescribed Natural Fires, except those that are of no significance or risk."

2.) Under Preparedness Level V, remove statement, "Curtail all new Management Ignited Prescribed Fires."

e. Utilize individual unit Fire Management Plans decision criteria, prescriptions, and Fire Situation Analyses (coordinated with other agencies) to guide designation and continued management of prescribed natural fires. Permit

Prescribed Burn Plan prescriptions and contingency plans to guide implementation of management ignited prescribed fire projects.

f. Increase fire management budgets and FTE ceilings to permit establishment of prescribed fire organizations capable of accomplishing greater workloads in prescribed fire and fuels management. Explore the concept of creating mobile tactical teams of expert prescribed burning personnel. These teams could be dispatched to help parks manage either prescribed natural fires or management ignited prescribed burns. The creation of these teams would comply with one of the recommendations of the Fire Policy Review Report, produced in response to the 1988 Yellowstone Wildfires. Mobile tactical teams, and other local staffing, will need to remain dedicated to prescribed fire projects even during the wildfire season in order to maximize the opportunities for prescribed fire.

2. REDUCE RISK IN AND SURROUNDING DEVELOPED AREAS WITHIN PARKS AND ALONG PARK BOUNDARIES.

Action Items:

a. Develop risk maps for each developed area and plans to mitigate those risks to an acceptable level. Use risk assessments to set priorities for project implementation.

b. Use the most appropriate method to reduce hazards in developed areas and along boundaries including prescribed fires and mechanical fuel removal.

c. Develop a system of incentives to encourage fire and park managers to take reasonable risks in favor of restoring the natural influence of fire. Currently, the incentives are in favor of acting conservatively and accepting the long-term risks of catastrophic wildfire.

3. PROVIDE INFORMATION ABOUT THE NATURAL ROLE OF FIRE IN PARK ECOSYSTEMS TO THE PUBLIC AND DECISION MAKERS.

Action Items:

a. Increase efforts to disseminate information about all aspects of fire through interpretive programs, media contacts, and agency training.

b. Develop areas to demonstrate the costs and benefits of allowing fire to play its role in naturally functioning ecosystems, including the effect of landscape scale prescribed burning on suppression costs over time.

c. Establish demonstration areas to test the limits of ecologically significant prescribed burning, with the intent to identify and overcome all barriers to achieving program goals and objectives. A demonstration area could be composed of a highly visible series of large burns planned and executed with major involvement by the public, interest groups and regulatory agencies.

d. Continue to monitor and, where needed, to conduct research to ensure that the information provided to the public concerning the effects of the program is accurate and current.

4. INCREASE OPPORTUNITIES FOR INTERAGENCY PLANNING, COOPERATION, AND ABILITY TO SUPPORT THE ECOSYSTEM CONCEPT.

Action Items:

a. Write memoranda of understanding between agencies to allow prescribed natural fires to cross boundaries and to allow the joint execution of management ignited prescribed fires.

b. Provide a clearinghouse for the exchange of information between agencies on burn proposals and ongoing prescribed fires. This may involve establishing electronic bulletin boards to share information on the scheduling and resource commitments for prescribed fires, and to facilitate obtaining permits from state air resource boards.

c. Initiate an effort to establish interagency ecosystem-based fire management plans that fully integrate the needs of fuels management, the ecosystem role of fire, and wildfire suppression needs on a landscape level. These plans would identify the Most-Efficient-Level fire organization for each geographic sub-unit in the planning area. Geographic sub-units would not necessarily correspond to agency administrative boundaries.

d. Where feasible, develop common interagency fire management planning and budget allocation systems. Utilize these analyses to geographic sub-units and ecosystem fire management needs assessments.

5. INCREASE ANALYSIS CAPABILITIES TO BETTER INTEGRATE FIRE INTO MANAGEMENT AND PLANNING DECISIONS.

Action Items:

a. Determine the natural range of variability of fuel loads, fire frequencies, and fire intensities for park areas. Incorporate this information into fire management planning and decision making.

b. Continue to support the development and testing of large fire growth models to facilitate understanding of fire regimes, improve long-range fire planning, and the selection of management alternatives for on-going prescribed natural fires.

c. Develop high resolution fuel model maps of park areas using remotely sensed and field data.

d. Provide information to update fuel maps using dynamic fuel models.

e. Develop models to extrapolate fire weather data from existing stations to remote locations.

f. Develop models to predict probable ecosystem conditions over time under various management strategies.

g. Expand standardized fire effects monitoring programs into all parks utilizing prescribed fire in order to evaluate the ability of these programs to meet long-term objectives relating to fuels management and reestablishing the natural ecosystem role of fire. Utilize this information for adaptive fire management strategies, in the continuing evolution of program knowledge and refinement.

Summary

The problems of ecosystem health and the restoration of a more natural role for fire in natural area and wilderness ecosystems are closely linked in many parks. This is especially true in forests that are adapted to a regime of frequent, low intensity fires, especially most of the ponderosa pine and mixed conifer forests of the West. The long-term exclusion of fire from these ecosystems has produced many deleterious effects, such as loss of biodiversity and fuel accumulations that increasingly lead to unnaturally intense and destructive wildfires. These wildfires are damaging park resources, threatening public safety, the lives of firefighters, and contributing to further deterioration in ecosystem health. The increase in destructive wildfires breeds more fear of fire, and reluctance to use fire aggressively as a management tool. Reversing this negative feedback situation will not be an easy task.

There are many social and regulatory barriers to a significant expansion of prescribed fire and fuels management programs. Nevertheless, restoring and maintaining healthy ecosystems along with the natural processes that regulate the stability and resilience of such systems is a part of the fundamental mission of the National Park Service. The recommendations presented in this problem analysis provide a framework for overcoming many of these barriers. Although none of them represent a change in NPS policy, they do provide the basis for developing local, regional, national and interagency strategies translating policy, goals and objectives into successful programs.

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