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Policy Tools for Wildland Fire Management: Principles, Incentives, and Conflicts

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Public perception of a fire "crisis" in the United States makes fire management a priority for both land managers and policy makers. Land managers focus on three major methods for resolving the current fuels build up problem: mechanical fuels treatment, the use of prescribed and naturally ignited fire, and fire suppression. Public policies create incentives for different fire management strategies, which encourage or discourage the use of these three management objectives. This analysis finds conflicts in fire policy and management practices to be relatively few and minor. Conflicts generally result from the inherent complexity of fire-prone ecosystems, which requires some flexibility in policy implementation and interpretation. The absence of reliable data to either support or deny the claims that conflicting policies, excessive litigation, or burdensome procedures are thwarting federal attempts to bring the fuel/fire crisis under control suggests that sweeping policy changes would be ill advised at this time.

I. INTRODUCTION

Researchers, politicians, and land managers have described a wildland fire "crisis" in the United States during the late twentieth and early twenty-first centuries. Decades of fire suppression in the west, primarily on federal lands, have led to a build up of fuels that, combined with an ever-expanding wildland urban interface, result in economically
and ecologically disastrous wildfires. In addition, significant fires (especially in the 2000 and 2002 fire seasons) and an expanding popular awareness of the resulting property damage have led the general public to become more attentive to fire issues and policy changes. It is now clear that the effective management of fire regimes will be a major challenge for land managers and policy makers for the foreseeable future.

Because of our new understanding of twentieth century forest management practices, priority is now generally given to minimizing fire risk with an emphasis on managing fire through fuel treatments rather than complete fire exclusion or suppression. Land managers have focused on two major methods for resolving the current fuels problem, namely mechanical fuels management (usually in the form of forest thinning) and the use of prescribed and naturally ignited fire ("wildland fire use") to restore a fire regime closer to historical pre-colonial conditions. For example, managers will aim to restore lower-elevation ponderosa pine forests to the high-frequency/low-intensity fire regimes that are widely believed to have existed before European settlement. However, fire suppression remains a high priority and a major activity for land management agencies at all levels of government, especially in the western United States.

Recent policy debates in the United States suggest that existing environmental policies often conflict with the effective use of these three fire management strategies (thinning, fire use, and suppression). Public dialogue, especially among agency leaders, has tended to simplify the interactions between fire management and public policy. Mechanical fuels treatment is often treated in public debate as a virtual panacea for restoring historical fire regimes, while federal environmental policies used to accomplish this goal are believed to delay or prevent thinning activities in sensitive areas and are often described as "unnecessary regulatory obstacles,"2 "layers of unnecessary red tape and procedural delay,"3 or "burdensome regulations."4 A 2002 U.S. Department of

to wildland areas. They give little thought to the wildfire hazard, and bring with them their expectations for continuation of urban emergency services.


Agriculture (USDA) Forest Service report titled "The Process Predicament" contends, "Unfortunately, the Forest Service operates within a statutory, regulatory, and administrative framework that has kept the agency from effectively addressing rapid declines in forest health."

Conflicts between public policy and fire management activities do exist. For example, our scientific understanding of wildland fire and fire regimes is evolving rapidly, and existing policies are not always sufficiently informed by this knowledge. Still, a much more comprehensive and accurate picture of fire-policy interactions is needed so that these conflicts can be resolved without seriously undermining otherwise functional policy. No single kind of fire management strategy will prevent all severe fires, restore all ecosystems to pre-colonial conditions, or halt the destruction of private property. Thus, it is important to explicitly examine the incentives and disincentives that different policies create with respect to wildland fire management.

The goal of this article is to untangle the complex interactions of policy and fire management. Policies relevant to fire management include not only the legislative, regulatory, and other non-legislative policy documents that guide fire management itself, but also the environmental regulatory policies that more broadly govern federal land management and environmental protection. Scientific knowledge on the role of fire in natural and anthropogenic landscapes is gradually being accepted as a guiding force for fire management. Thus, the first objective of this study is to compare the mandates of science with those of policy with respect to fire management, and the second objective is to find and describe any inherent conflicts within or among these relevant policies.

As a result, this study is essentially a qualitative version of classical content analysis. It is based on the idea that different policy tools create incentives for different fire management practices and that these incentives can be compared to show inherent conflicts among policies, scientific knowledge, and management. Following a review of fire management practices, the policies listed in Figure 1 and their implementing regulations (where applicable) were read closely with their applications to wildland fire and incentives for fire management.

Figure 1: Key Points of Federal Fire Management Policies

Although the policies directing federal wildland fire management focus on different priorities and are at times even directly contradictory, the following key points provide a concise synthesis of the goals outlined for fire management agencies:

- Protecting firefighter and public safety is the first priority in fire management;
- Fire management practices should aim to restore landscapes and rebuild communities, with particular focus placed on hazardous fuel reduction and on returning fire to fire-adapted ecosystems;
- Fire management practices should be based on existing land and resource management plans, economic viability, best available science, and principles of sound risk management;
- Public health and environmental quality should be considered in fire management planning; and
- Cooperation and coordination among numerous groups, including federal agencies; state, tribal, and local governments; international partners; and communities are the keys to effective fire management.

II. REVIEW OF ENVIRONMENTAL POLICIES AND POLICY TOOLS

Kolstad argues, "There are two basic questions in environmental policy: 'What is the right balance between environmental protection and use?' and 'How do we induce economic agents to use the environment in a fashion that we have determined is desirable?'" A wide variety of policy tools such as legislative documents like the Endangered Species Act, regulations and other administrative guidelines for implementation, court decisions that interpret and reinterpret laws, and federal and state agency programs and guidelines that actually implement and enforce policies are used to answer these questions and to manipulate the balance between environmental protection and use. Schneider and Ingram define policy tools as "the elements in policy design that cause agents or targets to do something they would not otherwise do with the intention of modifying behavior to solve public problems or attain policy goals." They also develop a typology of policy tools, including authority

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tools (those that rely exclusively on authority without the threat of sanctions), inducements and sanctions, capacity-building tools, hortatory tools, and learning tools. Federal environmental policy currently relies heavily on inducements, sanctions, and authority tools, although capacity-building tools are becoming more common.\textsuperscript{10}

Inducements and sanctions can be direct or indirect. One important way in which environmental policies attempt to manipulate the balance between protection and use is through the application of subsidies.\textsuperscript{11} The Healthy Forests Restoration Act provides direct subsidies for the development of industries that use what was previously considered unmarketable biomass from mechanical thinning projects.\textsuperscript{12} Indirect subsidies also exist in the form of environmental externalities.\textsuperscript{13} For example, by devoting substantial public funding to fire suppression, the federal government indirectly subsidizes development in the wildland-urban interface. Much of the inherent cost of building in a fire-prone wildland urban interface environment is borne by federal taxpayers rather than by the developers or residents.\textsuperscript{14}

Environmental policies and policy tools often provide incentives for specific management activities while also addressing other goals and values. Policy researchers are increasingly addressing the ways in which policy can foster or suppress citizen participation in the political process. Lowi suggests that different kinds of policies (which he defines as distributive, regulatory, and redistributive) make individuals and groups (versus political elites) more likely to involve themselves in the political process.\textsuperscript{15} Indeed, it is clear from everyday observation that different policies produce different patterns of democratic participation.

\textsuperscript{10} Id. at 93–95.
\textsuperscript{11} Myers and Kent define a “subsidy” as “a form of government support extended to an economic sector (or institution, business, or individual), generally with the aim of promoting an activity that the government considers beneficial to the economy overall and to society at large.” NORMAN MYERS & JENNIFER KENT, PERVERSE SUBSIDIES: HOW TAX DOLLARS CAN UNDERCUT THE ENVIRONMENT AND THE ECONOMY 5 (2001).
\textsuperscript{13} An externality occurs when “one person’s or firm’s actions affect another entity without permission.” KOLSTAD, supra note 8, at 90.
\textsuperscript{14} Other inducements and sanctions are less explicitly economic. A policy can create an incentive for a particular management activity by simplifying the administrative or bureaucratic process that managers must follow to carry it out. Conversely, a policy can provide a strong disincentive by creating a complex network of rules and regulations for managers to navigate. Of course, an even stronger disincentive is created when a management activity is explicitly forbidden, especially when accompanied by the threat of economic or other sanctions.
Schneider and Ingram argue, "Some policy designs encourage active responsible citizenship by providing arenas for participation and expectations that citizens will become involved."16 Conversely, "[o]ther designs obfuscate and complicate, leaving the response to policy largely in the hands of lawyers, scientists, and highly skilled policy entrepreneurs."17

Similarly, policy tools can be used to promote broad types of management strategies. For example, as the dominance of federal agencies in wildland fire management reaches the end of its first century, calls for a cohesive, comprehensive, and, above all, science-based policy are increasingly frequent. Franklin and Agee state, "Although there is a large base of scientific knowledge available for developing a national forest fire policy, it is largely ignored in current policy proposals."18 They suggest that such a policy should be based on scientific principles and data, including existing knowledge about historical fire cycles, anthropogenic influences on fuel regimes, and basic forest ecology along with complex issues such as the diversity of fire regimes in different ecosystems and the need for long-term fire planning.19 Similarly, Dellasala and others argue that "[s]cientific knowledge has a central role in both defining and resolving issues related to fire and fuels management,"20 and that "fire policy must be shaped by an emphasis on fundamental approaches to restoring or maintaining ecological integrity, [and] a real understanding of the nature and extent of all the risks to both humans and wildlands."21

Franklin and Agee also imply the need for interagency cooperation and communication in fire management.22 This goal is mentioned in nearly every recent fire policy document, but incentives for interagency cooperation are rarely explicitly stated. Unfortunately, at the present time there is little agreement on the characteristics of policies that encourage science-based management and interagency cooperation.

Values such as citizen participation, science-based management, and interagency cooperation are widely recognized as laudable goals in environmental and fire management. The development of these goals through federal fire policies is outlined in part III, and the incentives and
disincentives that are created by specific environmental policies are examined more closely in part V.

III. FEDERAL FIRE POLICIES: GOALS AND PRIORITIES

Fire management activities on federal lands are guided by a number of non-legislative policy documents (statements and initiatives) that have often followed severe fire seasons, when well-publicized large fires focused governmental and popular attention on wildland fire as a worrisome hazard. Perhaps as a result, the fire management policy landscape is not particularly cohesive. Documents are sometimes redundant and often contradictory, which presents a formidable challenge to resource managers in fire-prone ecosystems.

One such severe fire season occurred in 1994, when 34 lives were lost and more than 4.7 million acres burned.23 A working group was convened by Secretary of Agriculture Dan Glickman and Secretary of the Interior Bruce Babbitt to develop a common approach to wildland fire for the federal land management agencies.24 The resulting document was the Federal Wildland Fire Management Policy and Program (or Federal Fire Policy), which was intended to guide federal agencies in fire management planning.25 It outlined guiding principles, including the primacy of firefighter safety, the role of fire as a necessary and fundamental ecological process, and the need to make fire protection economically viable. Fire preparedness was emphasized over the more costly and dangerous suppression activities (discussed below in part IV), as was the need to reduce heavy fuel loads. As a result of the Federal Fire Policy, every burnable federal area was to have a fire management plan (FMP) outlining both the fire use and fire suppression activities to take place.26 FMPs were required to be consistent with firefighter and public safety, values to be protected, and public health issues and to address all potential wildland fire occurrences and include the full range of fire management actions.27 Although the policy was impressive in its attention to a variety of fire management strategies, its recognition of

25. Id.
26. Id.
27. Id. at 6.
fire's vital role, and its attempts to standardize fire-planning processes while allowing for variability across different fire-prone ecosystems, the policy was not fully implemented. Due to a lack of funding, interagency cooperation, and oversight, many federally managed areas had yet to complete satisfactory FMPs by 2001.  

Following the highly publicized escape of the Cerro Grande Prescribed Fire in May 2000, the 1995 working group reassembled at the Secretaries' request to conduct an analysis, review, and revision of the Federal Fire Policy. The outcome was the 2001 "review and update" document that replaced the 1995 Federal Wildland Fire Policy.  

Although the guiding principles of the policy changed very little, the working group found that implementation was inconsistent and incomplete and that the failure of federal agencies to fully implement the 1995 policy had significantly undermined its effectiveness.  

Later, extensive fires continued throughout 2000, with a total of 122,827 wildfires and more than 8.4 million acres burned by the end of the season. President Clinton asked Secretaries Babbitt and Glickman to prepare an overarching analysis of the wildland fire situation. This report became the basis for the National Fire Plan, which attempted to clarify priorities for fire management. Much of the National Fire Plan is devoted to allocating funding to various fire management activities. Annual budget appropriations for fire management in the USDA Forest Service and the Department of the Interior increased from $1.6 billion in fiscal year 2000 (the year before the National Fire Plan was initiated) to $2.2 to $3.2 billion for the years 2001 through 2005, with roughly half of that budget devoted to suppression activities, including fire preparedness and assistance to state and local fire departments. Other budgeted activities included research, hazardous fuel reduction projects,

29. See generally id.
30. Id. at 10 (follow "Chapter 2" hyperlink).
34. In FY 2001 and FY 2002, the total funds appropriated for wildland fire management programs were just under $2.9 billion and $2.3 billion, respectively. Estimates for later years are projected in the National Fire Plan. The numbers provided here include emergency appropriations for suppression efforts, which range from $320 million in 2002 to $1.1 billion in 2003. The Wilderness Society, The Federal Wildland Fire Budget: Let's Prepare, Not Just React (Mar. 2004), http://www.wilderness.org/Library/Documents/WildlandFireBudget.cfm.
and burned area rehabilitation. Thus, funding committed through the National Fire Plan contradicts the priorities of the 1995 Federal Wildland Fire Policy by significantly increasing fire suppression funding relative to funding for other fire-management strategies. The document’s language is also internally quite contradictory, emphasizing both the importance of aggressive fire suppression and the idea that “problem” fires are the result of suppression activities.

In 2001, based on the ideas of the National Fire Plan, an implementation plan was developed by a broad cross-section of governmental and non-governmental stakeholders and was generally referred to as the “10-Year Comprehensive Strategy.” The plan aimed to address the National Fire Plan priority of community involvement by designing a proactive, collaborative, and community-based approach to reducing wildland fires, as opposed to the more agency-centered approach, like the Federal Wildland Fire Policy. However, the first listed goal of the Comprehensive Strategy is to “improve suppression and prevention,” emphasizing again the contradiction between the priorities of the National Fire Plan and the Federal Wildland Fire Policy.

In August of 2002, near the end of a season in which extreme drought conditions predominated throughout the West, nearly seven million acres burned, and an estimated $1.6 billion were spent on federal fire suppression efforts, President George W. Bush and agency leaders...
unveiled the Healthy Forests Initiative, generally an initiative for wildfire prevention and stronger communities. The initiative emphasized the extreme, "catastrophic" nature of recent wildland fires and proposed that "[e]nhanced measures are needed to restore forest and rangeland health to reduce the risk of these catastrophic wildfires." The initiative strongly promoted the use of mechanical thinning and prescribed burning to reduce hazardous fuels. Throughout the document, fuel reduction was explicitly advocated not only as a means of protecting communities from wildfire but also as a necessary tool for restoring ecosystem health.

Another recurring theme in the Healthy Forests dialogue was the idea of an "analysis paralysis": in other words, the idea that the extensive procedural requirements of environmental and land management laws cause dangerous delays in hazardous-fuels reduction. This idea appears to have been developed in the unpublished Thomas report, which was drafted in 1995 to review the relationship between such laws and national forest management practices but was never released. In a 2002 USDA Forest Service report, the concept was described as a "process predicament" and was expanded to argue that the public and environmental groups were further delaying much-needed projects through the excessive use of administrative appeals and litigation.

A series of policy and regulation changes associated with the Healthy Forests Initiative have stressed these issues. Primary among these is the Healthy Forests Restoration Act, passed in 2003, aimed primarily to streamline the decision-making process for certain types of federal hazardous-fuels reduction projects and limit the potential for administrative appeals. The Act also established grants for innovations in biomass use, promoted research and planning around insect infestations, and established a program for the protection of rare forest types on private lands.

42. U.S. DEP’T OF AGRIC., supra note 5, at 13.
43. Id. at 27–29.
Two important rule changes also established alternative, less demanding processes through which some hazardous-fuels reduction projects could comply with the Endangered Species Act (ESA) and the National Environmental Policy Act (NEPA). The stated goal of these changes was to solve the “process predicament” for fire management activities that agencies see as both crucial and relatively benign.

In 2003, ESA joint counterpart regulations were developed for the activities covered by the National Fire Plan (generally mechanical fuel reduction and prescribed fire projects on public lands). These regulations establish an alternative process through which the federal agency proposing a project is allowed to determine whether or not listed species’ survival will be jeopardized without any formal or informal consultation with the agencies normally responsible for implementing the ESA. Instead, the U.S. Fish and Wildlife Service or National Marine Fisheries Service will provide any “training, oversight, and monitoring” needed for agencies to make their own determination.

Also in 2003, the USDA Forest Service and the Department of the Interior announced a change to NEPA implementation rules that listed some fire management activities as “categorical exclusions”: categories of actions that do not normally significantly affect the human environment and are therefore effectively exempted from the NEPA process. This categorical exclusion encompasses many of the smaller hazardous fuel reduction and post-fire rehabilitation projects on public lands.

Together, these policies represent a relatively comprehensive picture of the bipartisan, multi-stakeholder goals and priorities of federal fire management. The key points common to all of these policies are summarized in Figure 1. However, as this analysis has described, substantial contradictions exist among them. Franklin and Agee note that the United States has “no comprehensive policy to deal with fire and fuels and few indications that such a policy is in development.”

49. Id. at 68,257.
50. Id.
51. Id.
52. The more recent Healthy Forests Initiative and Healthy Forests Restoration Act are not considered in this analysis because those documents make direct and exclusive reference to the goals and priorities of the National Fire Plan and 10-Year Comprehensive Strategy and are implemented primarily through changes to existing environmental policies.
53. Franklin & Agee, supra note 18, at 59.
Instead, a series of disconnected and contradictory policies add complexity to fire policy and management. Many policy researchers suggest that unnecessarily complex and confusing policies tend to discourage public involvement in the decision-making process. Current problems with fire management, as described by resource managers, agency leaders, and decision makers alike, suggest that the same problem currently exists throughout the fire management process.

IV. A SCIENCE-BASED PERSPECTIVE OF FIRE MANAGEMENT PRACTICES

Wildland fire behavior is determined by several factors, including climate, weather conditions, and fuel type (distribution and abundance). The premise behind mechanical and fire treatments (often collectively referred to as hazardous-fuels reduction projects) is that humans can best influence the likelihood of ignition and the behavior of fires by modifying fuels. For a fire to ignite and burn, fine fuel moisture must be less than 30 to 40 percent and abundant amounts of fuels must be available. A rough figure for use in prescribed fires is 670 to 1120 kg/ha of fine fuels less than 3 mm in diameter, although wildfires are known to carry with as little as 340 kg/ha of fine fuels. However, the chemical and structural properties of fuels also greatly influence a fire's behavior. Particularly abundant, dense, or combustible fuels result in fires that are more intense and are more likely to show extreme behaviors, such as spotting, firewhirls, crowning, and long, fast runs. Intense fires can threaten species and landscapes that are better adapted to slow-burning, low-intensity fires, such as some ponderosa pine forests, and extreme fire behavior can make cultural resources and developed areas more difficult to protect. Heavy surface fuels, such as thick needle layers, can result in long-burning, low intensity fires, while dry grasses are consumed very quickly. Understory shrubs and small trees can act as ladders, carrying surface fires into the crowns of trees.

54. See, e.g., Hanna Cortner & Margaret Moote, The Politics of Ecosystem Management 19 (1999); Schneider & Ingram, supra note 9, at 81.
58. For a description of fire behavior, see U.S. DEP'T OF AGRIC., FOREST SERV., ROCKY MTN. RES. STATION, SCIENCE BASIS FOR CHANGING FOREST STRUCTURE TO MODIFY WILDFIRE BEHAVIOR AND SEVERITY 12-17 (Russell Graham et al., tech. eds., Gen. Tech. Rep. RMRS-
The most common strategies for managing wildland fire are mechanical treatments, controlled fire treatments (prescribed and natural-ignition "wildland fire use" fires), and direct suppression of fires. Each management tool has unique benefits and risks. Because many environmental and land management policies tend to favor or discourage certain kinds of management, an understanding of their relative values is crucial to the analysis of policy incentives.

Mechanical Treatments

Mechanical treatments aim to prevent specific kinds of fire behavior (most commonly crowning and other extreme fire behaviors) by altering the abundance, cover, or structure of fuels. The most common treatment is thinning, in which certain trees are removed to improve the quality of the remaining stand. Usually, thinning treatments remove small-diameter trees (commonly those less than nine inches diameter breast height) to favor a lower density of large trees over a higher density of small ones. However, thinning also may be used to open the crown by removing larger trees ("high" or "crown" thinning), or trees may be removed without regard for size, quality, or species to achieve a specified level of spacing. Other treatments may include the removal of understory shrubs and branches to prevent the accumulation of "ladder" fuels (described above) or the removal of needle litter from around the bases of trees or structures to prevent their ignition. A USDA Forest Service review of fuels modification states, "The most effective strategy for reducing crown fire occurrence and severity is to (1) reduce surface fuels, (2) increase height to live crown, (3) reduce canopy bulk density, and (4) reduce continuity of the forest canopy."

Although data on mechanical treatments are somewhat limited, they appear to be effective in reducing fire intensity and reducing the likelihood of canopy ignition under certain conditions. They are particularly useful in the wildland-urban interface, where concerns about smoke and threat to structures make fire treatments unappealing.

59. Although mechanical treatments and fire use projects generally have the common goal of altering fuels to reduce fire intensity, they are discussed separately here because the risks and benefits of each are substantially different. Many policies implicitly or explicitly favor one method over the other.
60. PYNE ET AL., supra note 57, at 405.
61. THEODORE DANIEL ET AL., PRINCIPLES OF SILVICULTURE 419 (2nd ed. 1979).
62. Id. at 420–23.
63. U.S. DEP'T OF AGRIC., SCIENCE BASIS, supra note 58, at 23–24.
Some recent observational and experimental studies suggest that thinning projects that remove only the smallest trees and leave larger trees in place are associated with the greatest reductions in fire intensity and crown fire occurrence. However, other types of mechanical treatments, including pruning lower branches and reducing surface fuels, can also be effective tools in reducing the likelihood of crown fires. More intensive mechanical treatments are also associated with a reduction in crown fires. This is particularly true when thinning of smaller trees is combined with other treatments, such as prescribed burning, slash removal, and removing fuels from tree bases.

Mechanical treatments in the wildland-urban interface are often the most convenient, economically efficient, and ecologically benign way of protecting interface communities from fire. Clearing vegetation from within 20 to 40 meters of structures is one of the most effective ways of preventing their ignition. Treating small, isolated patches in a large landscape, on the other hand, is unlikely to affect fire behavior because fires often burn quickly over large areas of fuels.

Because of a number of risks and problems associated with mechanical treatments, they should generally be seen as a step toward the eventual reintroduction of fire. For example, mechanical treatments tend to be prohibitively expensive. The small size of billions of trees in western forests makes them worthless from an economic standpoint, and removing them costs hundreds of dollars per acre; a study of fuel reduction projects in Colorado forests found that projects requiring the removal of fuels could cost in excess of $1,000 per acre. Approximately ten million acres of federal land have been designated as being in Condition Class 3, which indicates that their proximity to communities and watersheds and high stem densities make them the highest-priority

68. U.S. DEP'T OF AGRIC., SCIENCE BASIS, supra note 58, at 29.
lands for treatment. At the national level in the United States, Fire Regime Condition Class data suggest that the USDA Forest Service alone should remove small trees from more than 50 million acres (classified as Condition Class 3 by land management agencies) immediately, and then start work on another 80 million acres (Condition Class 2). Lands managed by the National Park Service, Bureau of Land Management, state agencies, and private citizens face similar problems. Finally, because of rapid regrowth, agencies must eventually plan to implement a program of "maintenance" in many western forests that uses mainly low-intensity prescribed fires.

At the same time, the effectiveness of mechanical treatments is poorly documented. Most relevant research relies on computer-based modeling to show that mechanical removal of fuels would reduce fire severity and/or extent. Modeling neatly avoids many of the practical problems with experimental design associated with the study of unpredictable, large-scale fires. However, a model's results are only as good as the data and assumptions used to build it. In some cases, this problem results in clearly circular reasoning. The assumption that fuel reduction activities will moderate fire behavior is built into the model, so an outcome favoring thinning activities is unavoidable. For example, tree density is often included in models as a major part of the definition of fire risk, despite a lack of clear quantitative evidence. Because thinning reduces density by definition, models tend to suggest that all kinds of thinning will reduce fire risk. Similarly, nearly all models over-generalize the parameters (a necessary evil in modeling ecosystems) by applying a specific model to an extremely broad ecosystem type such as "forests," "forests of western North America," or "boreal forests"; even where a specific study area is used, there is no evidence that one type of fuel or fire regime necessarily predominates across what are usually politically defined landscapes. Modelers also have to choose (or ignore
altogether) specific climate and weather variables from the wide variability that can exist even within a specific forest during a given season or fire event. With the number of potential variables that is manageable within any particular computer-based fire model, it is very difficult to model fire behavior with reasonable accuracy.

Furthermore, thinning should not be expected to prevent crown fires completely, and certain weather conditions can cause extreme fires to breach treated areas. For example, a post-fire analysis of the 2002 Hayman Fire suggested that where high winds, very low fuel moisture, and weather patterns combined, the fire completely overwhelmed most attempts at fuel modifications. In certain kinds of forests, including spruce-fir and mixed conifer forests in the western United States, fire spread may be constrained primarily by fuel moisture, not by fuel continuity. In ecosystems where fire is driven primarily by weather and climate, manipulation of fuels through mechanical treatments may not significantly affect fire behavior.

Many mechanical treatments also have negative side effects on ecosystems. These effects include the introduction of nonnative species, construction of roads, soil compaction, sedimentation, removal of the organic surface layer of soils, damage to non-target trees, decreases in habitat quality for some wildlife species, and an overall reduction in biodiversity and complexity. In many cases, methods are available to ameliorate these problems, and these methods should be addressed specifically in treatment planning.

In some cases, mechanical treatments can actually increase fire frequency or intensity. This apparent paradox is produced by several

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75. U.S. DEP’T OF AGRIC., SCIENCE BASIS, supra note 58, at 23.
77. Matthew G. Rollins et al., Landscape-scale Controls over 20th Century Fire Occurrence in Two Large Rocky Mountain (USA) Wilderness Areas, 17 LANDSCAPE ECOLOGY 539, 554 (2002).
noteworthy effects of thinning. First, mechanical treatments tend to
increase, not decrease, woody debris and flammable ground cover when
slash is not removed after thinning. This may increase fire frequency and
intensity, because although the understory decreases ladder fuels, there
is a buildup of surface fuels.80 Thinning forests, especially closed-canopy
types, can also exacerbate the drying of fuels, windthrow, and wind
breakage due to increased exposure to sun and wind.81 Finally, vegetation reestablishes rapidly in treated forests. In fact, thinning is a
standard silvicultural method for triggering regeneration; because many
species resprout vigorously, a single treatment may actually increase
understory stem density very quickly.82

In conclusion, mechanical treatments can be very useful within
certain prescriptions but, like any management tool, they carry certain
risks. These treatments are most likely to be effective and efficient in the
wildland-urban interface (where costs are relatively low and other
management techniques often are problematic) or when used to reduce
specific kinds of hazardous fuels before reintroducing fire.

Fire Treatments

Controlled fire treatments, including both prescribed fires and
lightning-ignited "wildland fire use" fires,83 are another potential means
of reducing or changing the structure of available fuels. Pyne notes,
"Earlier, fire was considered controlled only if it burned within the
perimeter of firelines or fuelbreaks; now fire is considered controlled if it
burns within the conditions established by a prescription."84 Fires are
especially practical in remote locations or in rough terrain where other
management activities are impractical or even impossible. The use of fire
can also be combined with mechanical treatments to burn slash piles

80. Amy E.M. Waltz et al., Diversity in Ponderosa Pine Forest Structure Following
81. Peter Z. Ful6 et al., Comparing Ecological Restoration Alternatives: Grand Canyon,
Arizona, 170 FOREST ECOLOGY & MGMT. 19, 37 (2002); U.S. DEP’T OF AGRIC., SCIENCE BASIS,
supra note 58, at 25; Thomas E. Kolb et al., Six-Year Changes in Mortality and Crown Condition
of Old-Growth Ponderosa Pines in Ecological Restoration Treatments at the G.A. Pearson Natural
Area, in PONDEROSA PINE ECOSYSTEMS RESTORATION AND CONSERVATION: STEPS TOWARD
82. RALPH D. NYLAND, SILVICULTURE: CONCEPTS AND APPLICATIONS 394-96 (2d ed.
2002).
83. Wildland fire use, also known as "let burn" fire, is a naturally ignited fire that is
not immediately suppressed but rather is managed within pre-established guidelines.
84. STEPHEN J. PYNE, FIRE IN AMERICA: A CULTURAL HISTORY OF WILDLAND AND RURAL
FIRE 17 (1997) [hereinafter PYNE, FIRE IN AMERICA].
after thinning or to maintain an open, grassy understory that has been produced by previous treatments.

Fire is often attractive to managers and members of the public because it was historically very common in most North American ecosystems. Species that evolved with periodic fire have developed an impressive variety of adaptations to it.\textsuperscript{85} The use of naturally ignited fire is usually relatively inexpensive, and it can cover large areas efficiently, especially when the fire is lightning-ignited but burning within prescribed parameters. Recent research suggests that fire plays a very special role in many ecosystems, which fire “surrogates” such as mechanical treatments cannot always replace.

Many North American species that evolved with fire are in some sense fire-dependent: some part of their life cycle is dependent on fire. For example, cones of some forms of lodgepole pine (\textit{Pinus contorta}) require a high degree of heat to release seeds, which occurs at the right temperature during a fire.\textsuperscript{86} Likewise, many common tree species are shade intolerant and depend on fire to open up the canopy at regular intervals.\textsuperscript{87} Low-intensity fires can also enrich forest soils by recycling the nutrients in dead fuels and organic materials on the forest floor, thereby increasing soil pH, stimulating nitrification, and increasing the availability of many minerals.\textsuperscript{88}

Manipulating fire frequency and intensity can be a good method for reaching a variety of management goals. Where fires are frequent, they are known to promote thinning of some species, maintenance of a grassy substratum, and the exclusion of less fire-tolerant species.\textsuperscript{89} For example, ponderosa pine (\textit{Pinus ponderosa} Dougl. ex Laws.) is generally considered to be adapted to fairly frequent, low-intensity fires and is not particularly susceptible to fire mortality once mature.\textsuperscript{90} The wetter forests, such as mixed conifer and spruce-fir dominated forests, tend to have very long intervals and more intense fires and are characterized by

\begin{itemize}
\item \textsuperscript{86} \textit{James A. Young & Cheryl G. Young, Seeds of Woody Plants in North America} 250 (1992). \textit{See also} H. Weaver, \textit{Effects of Fire on Temperate Forests: Western United States}, in \textit{Fire and Ecosystems}, \textit{supra} note 85, at 279, 297 (citing John Muir’s 1901 description of lodgepole pines releasing seeds after a fire).
\item \textsuperscript{87} Common shade-intolerant species include, for example, Douglas fir, lodgepole pine, and aspen. \textit{Wright & Bailey}, \textit{supra} note 56, at 248.
\item \textsuperscript{88} \textit{Nyland}, \textit{supra} note 82, at 106–16; Weaver, \textit{supra} note 86, at 293.
\item \textsuperscript{89} \textit{Nyland}, \textit{supra} note 82, at 109.
\item \textsuperscript{90} \textit{Wright & Bailey}, \textit{supra} note 56, at 209.
\end{itemize}
both surface and crown fires.\textsuperscript{91} In any forest ecosystem, burning favors more fire-tolerant, shade-intolerant species (such as ponderosa pine) over more shade-tolerant, fire-intolerant species (such as Douglas-fir, \textit{Pseudotsuga menziesii} var. \textit{glauca} (Breissn.) Franco).

The effective use of fire as a management tool is dependent on detailed knowledge of the fire ecology of a particular system. Tree-ring records and historical accounts can provide rough estimates of past fire frequency and intensity. However, to use fire to meet specific management goals and to maintain biodiversity, managers must have a great deal of information on the effects of fire on individual species and sites. Fire use requires land and fire managers with superb skills in ecology, watershed function, adaptive long-term management, smoke management, and public relations.

As with any management tool, there are several drawbacks to the use of fire. The effects of fire are not necessarily more permanent than those of mechanical treatments. Many species (for example, New Mexico locust and quaking aspen) resprout vigorously after fire.\textsuperscript{92} Thus, the use of fire to meet management goals requires a long-term strategy. Somewhat paradoxically, very narrow prescriptions must be met in terms of weather, fuel moisture, and other factors if managers are to control prescribed fires. Several years may pass while managers wait for an appropriate time to burn a particular area. As a result, it is often difficult to burn an area frequently enough to actually change fire behavior. In a recent General Accounting Office (GAO) report, weather accounted for 40 percent of the delays on fuels projects at sites visited by GAO researchers.\textsuperscript{93} When managers are forced to work within very specific time constraints for planning and budgetary reasons, projects can be easily thwarted by even normal variability. For example, National Park Service field units typically spend only 50 to 60 percent of the money budgeted for prescribed burns each year, largely due to unsuitable weather conditions, and money that is not spent is withdrawn and reallocated.\textsuperscript{94}

\textsuperscript{91} See id. at 240; Tania Schoennagel et al., \textit{The Interaction of Fire, Fuels, and Climate Across Rocky Mountain Forests}, 54 \textit{BIOSCIENCE} 661, 663 (2004).


\textsuperscript{94} NAT'L ACAD. OF PUB. ADMIN., \textit{STUDY OF THE IMPLEMENTATION OF THE FEDERAL WILDLAND FIRE POLICY: PHASE 1 REPORT: PERSPECTIVES ON CERRO GRANDE AND
Public perception of fire varies greatly and can be especially negative when controlled burns escape and threaten communities. In general, it is more difficult to use fire in heavily developed areas, where residents are nervous about the risk of escape and where smoke management is a concern. Attitudes toward wildland fire use are generally more negative than those of prescribed fires.

Smoke from wildland fires, whether prescribed or otherwise, can be a serious health concern, especially for older residents (a problem that is exacerbated in and around retirement communities in the Southwest). Ambient levels of particulate matter often exceed EPA standards (see Clean Air Act discussion below), and exposure to smoke has often been associated with increased incidences of conjunctivitis, sinusitis, chronic obstructive pulmonary disease, bronchitis, asthma, and chest pain.

The perception that frequent, low-intensity fires are good for forest health has led to massive overgeneralizations in the application of fire. A very real threat to biodiversity can result when fire is used without regard to specific ecosystem and site characteristics. Although nearly all western forest species evolved with fire and thus have adaptations for dealing with it, it is not always obvious to managers what kind of fire regime they are best adapted to. For example, in many mixed-conifer forests, fire normally occurs very infrequently and only during extreme drought conditions. These very intense crown fires cause massive mortality, which is necessary for the regeneration of shade-intolerant species and for the maintenance of a biologically diverse ecosystem. An attempt to "restore" frequent, low-intensity burns into an area that evolved with infrequent burns may adversely affect many species, just as very intense burns threaten species that are adapted to low intensity fires. Likewise, species whose numbers are already greatly diminished (most notably threatened and endangered species) are more threatened by fire, even if the species as a whole is well adapted to avoid or resist fire. In such a case, a very minor negative impact, such as the loss of just a few individuals, could jeopardize the survival of that population or species.

97. Weaver, supra note 86, at 292–93; Schoennagel et al., supra note 91, at 670–71.
Fire Suppression

Fire suppression has long been the primary tool of fire managers.98 As noted above, the implication that aggressive fire suppression has caused a buildup of hazardous fuels has led managers to reconsider the pervasive use of these tactics. Nonetheless, the majority of fire management funding (as well as the bulk of public attention) still goes to fire suppression.99 Suppression tactics, including very expensive aerial suppression techniques, are still used not only in the wildland urban interface but also in remote areas where little threat to human life and property exists.

Much of the continuing emphasis on fire suppression is due to the idea that putting out small fires is the only way to prevent them from becoming large fires and eventually threatening human communities. However, the greatest benefit of suppression tactics is that when used in the wildland urban interface where homeowners who construct "defensible spaces" around their homes and construct roofs from less flammable materials, firefighters can protect communities from all but the most extreme fires.100

The most obvious problem with fire suppression as a management technique is that it continues the buildup of fuels that is so frequently cited as having reached a "crisis" level and will eventually be subject to fire again, and that next fire may prove to be even more intense. Another drawback of suppression techniques is that they are rarely effective on large or intense fires without the cooperation of the weather.101 Many techniques only succeed when a change in weather patterns brings increased humidity, lower wind speeds, and/or rain or when a fire literally runs out of fuel. A publication by the Western Fire Ecology Center quotes a U.S. Forest Service Fire Program Leader as saying, "Often we use resources because of the public and political pressure to do something, even though it has no effect on the fire and is an economic waste."102 Indeed, suppressing fires is exceedingly

98. See generally Pyne, FIRE IN AMERICA, supra note 84 (history of fire suppression policy in the United States).
100. Cohen, supra note 67, at 20, 21.
expensive. In recent years, federal land management agencies have regularly spent more than $1 billion annually on fire suppression, and suppression costs for individual large fires can run well into the millions.\textsuperscript{103} As noted in the Fiscal Year 2003 budget, "In some western areas, the government pays more in suppressing fires than the fair market value of the structures threatened by those fires. It would literally be cheaper to let the fires burn and pay 100 percent of the rebuilding cost."\textsuperscript{104} This statement is particularly striking in light of the threat to firefighters' lives and safety that is involved in these obviously uneconomic endeavors. Indeed, the number of acres burned by wildfires has varied considerably from year to year but has shown no substantial linear increase since 1960 (Figure 2).\textsuperscript{105} However, the number of firefighter fatalities has increased each decade since the 1940s (Figure 3).\textsuperscript{106} The aggressive suppression of fires should also be tempered by a thorough understanding of the negative environmental impacts of firefighting activities.\textsuperscript{107}

\footnotesize

\textsuperscript{103} Nat'I Interagency Fire Ctr., supra note 23 (for total annual costs, follow "Wildland Fire Suppression Costs" hyperlink) (last visited Jan. 14, 2007).


\textsuperscript{105} Nat'I Interagency Fire Ctr., supra note 23 (for data used in Figure 2, follow "Wildland Fires and Acres (1960-2005)" hyperlink).

\textsuperscript{106} NAT'L INTERAGENCY FIRE CTR., WILDLAND FIRE ACCIDENTS BY YEAR (n.d.), http://www.nifc.gov/reports/year.pdf (including fatalities from 1940 to 2004, as shown in Figure 3).

\textsuperscript{107} See generally Dana M. Backer et al., Impacts of Fire-Suppression Activities on Natural Communities, 18 CONSERVATION BIOLOGY 937 (2004).
The most notable conclusion of this brief review is that these three kinds of fire management practices each have an appropriate time and place. Mechanical treatments are generally most effective in the areas where controlled burning is impractical, especially in the narrow margins of the wildland-urban interface. The use of fire as a management tool is most practical outside the interface, and where specific management goals and a detailed knowledge of fire ecology can be used to develop effective prescriptions. Fire suppression, in turn, is generally only economically viable when densely populated or highly
valued areas are directly threatened—and perhaps not even then. As will be demonstrated in the next section, policies can strongly favor a single form of management, sometimes making it difficult for fire managers to choose a combination of fire management practices that is well suited to a particular site.

V. FIRE AND FEDERAL ENVIRONMENTAL POLICY

Schneider and Ingram define policy design as a “purposeful and normative enterprise through which the elements of policy are arranged to serve particular values, purposes, and interests.”108 In the United States, a network of federal, state, and local policies has been developed to regulate the actions of public and private land and natural resource managers and their impacts on the environment. When applied to real-world management activities, the system of incentives (whether coercive or enabling, direct or indirect) laid out by these policies is often confusing, complex, and even contradictory. This should not be surprising; after all, environmental policies have evolved over several decades through a variety of administrations and management paradigms and through the debate and negotiation of countless decision makers. They are implemented in a constantly changing environment. This complexity, however, need not always have a paralyzing effect on managers because most policies leave the responsible bureaucratic agencies a great deal of flexibility in implementation.

One of the major ways policies influence the behavior of groups and individuals is through the creation of incentives and sanctions. However, due to the unpredictable processes of policy development and implementation, the incentives created are not always appropriate to the initial goals. A society or group’s needs and priorities may also shift, so that policy incentives can become normatively inappropriate (in other words, policy no longer supports society’s goals). In the case of wildland fire, different policies create incentives or disincentives for different fire management activities. They can encourage or discourage the use of the three management strategies described above, each of which has its own risks and benefits. They can also provide incentives for managers to follow the guidelines set out by federal fire policies discussed in part III, to involve the public and other agencies in their decision making, and to work from a strong scientific basis. Conversely, of course, they can also create disincentives for the same activities.

108. SCHNEIDER & INGRAM, supra note 9, at 3.
The application of these policies in the context of wildland fire management is no less complex. Regulatory environmental policies create incentives and disincentives for different fire-management activities, making them more or less attractive to managers. These incentives may become problematic, for example, when they contradict one another, when they favor management activities that are economically or ecologically inappropriate, or when they subvert democratic processes.

The sections that follow examine four major federal policies that often affect fire-management decisions: the National Environmental Policy Act, the Endangered Species Act, the Wilderness Act, and the Clean Air Act. The goals and implementation of each policy are briefly summarized, followed by a description of the incentives and disincentives that these policies create for managers to use or reject the three fire management activities described in part IV, namely mechanical treatments, controlled fire activities, and fire suppression.

The National Environmental Policy Act

The underlying intent of the National Environmental Policy Act (NEPA) is to require federal agencies to incorporate environmental considerations into project development and decision-making processes. More importantly, NEPA requires federal agencies to put this decision-making process into writing and makes it open to public and judicial review at several levels. One of the stated goals of NEPA is “to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man.” Thus, NEPA is essentially a legislative attempt to ensure that public health and environmental quality are considered in all federal agency actions. Its application is not limited to formal project planning but covers a variety of federal activities from small-scale public resource allocations to major land use planning to federal legislation.

NEPA barely comprises ten pages, largely because the details of its implementation are set out separately in the Code of Federal Regulations and in other regulations set forth by individual agencies. The statute itself consists of three main parts. The first outlines the intent of the act by setting goals for the environmental health of the nation and establishing the role of the federal government in assuring “for all Americans safe, healthful, productive, and esthetically and culturally

pleasing surroundings." The second main part forms the core of the act, stating in part that every federal agency must examine the environmental impacts of its decisions and must include these environmental considerations in the decision-making process. Furthermore, it must do so in a formal, systematic, and interdisciplinary manner. NEPA establishes the President's Council on Environmental Quality (CEQ). The CEQ was established to provide the federal agencies with guidance in implementing NEPA and developed a set of guidelines for that process that are widely used by agencies and courts and play a substantial role in the interpretation and implementation of NEPA.

Most planned fire-management activities are subject to NEPA analysis, although several major exceptions are described below. Federal agencies must determine whether a proposed activity will have a significant environmental impact, usually through an environmental analysis (EA), and, if so, must develop an environmental impact statement (EIS) describing the potential impacts and the impacts of a range of viable alternatives to the project while incorporating significant public comments and participation. The responsible agency must then respond to any public comments.

The Supreme Court has ruled that NEPA is a strictly procedural statute. In other words, although it forces agencies to formally consider the environmental impacts of their actions, it does not in any way dictate the final decision on the action. An agency could legally take the most environmentally destructive course of action of all its alternatives, provided that it appropriately considered the impacts and alternatives and set forth its reasoning as required by NEPA regulations. The procedural nature of NEPA is critical to its compatibility with fire-management activities. With fire management, as with many natural resource management situations, there is often no management decision that is clearly more environmentally preferable than all other alternatives. NEPA allows federal agencies significant flexibility in balancing fire management priorities while still ensuring that these priorities are considered in a formal and public manner. Therefore, from its actual text, NEPA appears not to favor any specific fire management activity.

112. Id. § 4332.
113. Id. § 4342.
In implementation, however, certain activities are often treated differently by NEPA. First, agency directors have appropriately made it clear that public and firefighter safety takes first priority in any fire management activities. The NEPA regulations developed by the CEQ allow agencies to make special arrangements when emergency circumstances prevent full NEPA documentation from being completed before an action is taken. As a result, fire suppression activities are not subject to environmental analysis under NEPA. While the reasoning behind this exception is clear and understandable, it could create an incentive for fire managers to rely on fire suppression, which, when unplanned, avoids the NEPA process and its associated paperwork, administrative oversight, and public review procedures entirely. This incentive would obviously contradict the federal fire policy goal of reintroducing fire.

The Fire Management Plans (FMPs) mandated by Federal Fire Policy are subject to NEPA analysis. FMPs must outline all strategic fire management practices, including plans for fire suppression. These documents are subject to NEPA both because they form part of the broader Land Management Plans (which are subject to NEPA) and because they do not constitute an emergency response to any imminent danger. Thus, the Federal Fire Policy, when properly implemented, removes the incentive to rely more heavily on unplanned fire suppression practices.

In 2003, the USDA Forest Service and the Department of the Interior announced a regulation change that named certain fire management activities as "categorical exclusions": categories of actions that do not normally significantly affect the human environment and therefore do not require development of an EA or EIS except under special circumstances. As a result of this rule change, many of the smaller hazardous fuel reduction and post-fire rehabilitation projects are effectively exempted from NEPA. As a result, an incentive exists for fire managers to use those activities preferentially. This incentive applies to mechanical and controlled fire activities that:

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117. Id.
118. This was a non-legislative change to the regulations that outline NEPA implementation in the federal agencies.
- Are conducted for the primary purpose of hazardous fuels reduction and will not involve the sales of vegetation except when removed with the intention of reducing hazardous fuels;
- Are not conducted in wilderness areas;
- Do not use herbicides or pesticides;
- Do not involve the construction of new permanent roads;
- Do not exceed 1,000 acres for mechanical treatments and 4,500 acres for fire treatments; and
- Are conducted in the wildland-urban interface or in other areas classified as historically having relatively frequent, low- to moderate-intensity fires (Fire Regime Groups I, II, or III) and as having a moderate to high departure from historical fire regimes (Fire Regime Condition Classes 2 or 3).120

It is important to note that the regulation change applies to any hazardous-fuels reduction projects that meet these broad requirements. For example, mechanical treatments are not limited to the wildland-urban interface, nor is the harvest of large trees limited in any way. As a result of this change, the regulations implementing NEPA provide an inappropriate incentive for several kinds of activities that are unlikely to be effective in changing fire behavior, such as small-scale thinning projects outside the wildland-urban interface.

**Healthy Forests Restoration Act**

Congress made a second set of changes to NEPA’s procedural requirements with the Healthy Forests Restoration Act of 2003 (HFRA).121 Under normal circumstances, an environmental impact statement (EIS) consists of a clear comparison of the proposed action with a range of alternative actions, including a “no action” option. The range of environmental consequences for each potential action is also included. With the requirement of a “no action” alternative, NEPA acknowledges that, as is common in fire management, a failure to act can also have significant consequences. Hazardous-fuels reduction projects covered by the HFRA (generally those in specific areas classified by

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agencies as high risk but not in wilderness or wilderness study areas) are subject to less stringent requirements and generally must present and analyze only the proposed agency action, the "no action" alternative, and one additional alternative. Projects that are very near at-risk communities in the wildland-urban interface are generally not required to develop either the "no action" or additional alternative.

The changes in implementation described above provide clear incentives for certain kinds of management. The rule change involving categorical exclusions favors hazardous fuels projects that are in the wildland-urban interface and in high-risk areas and that are relatively small both in scope and in their potential for negative environmental impacts. The HFRA favors projects that are in the wildland-urban interface but also provides incentives for projects outside the interface. Interestingly, the treatment of areas with threatened or endangered species is also included (see ESA section below). Individual projects are not limited in size, although a total maximum of 20,000,000 acres may be treated, nor are they limited to specific activities.

However, there is a caveat to the idea of incentives as discussed here. Thus far it has been assumed (both in policy making and in this analysis) that NEPA provides incentives for management only by making specific activities exempt. This takes for granted that managers will be motivated by an aversion to "jumping through the hoops" of NEPA and will prefer any activity that is excluded from NEPA analysis. The recent focus by many agency leaders on the "red tape" aspects of NEPA compliance supports this idea. However, it is important to remember that NEPA was created for a reason. Where due process can avoid environmental damage, bad publicity, and litigation, "jumping through the hoops" can be an advantage to management agencies; indeed, agencies often claim that a desire to avoid litigation or bad publicity causes land managers to produce analyses that are more thorough than NEPA requires. The primary intent of NEPA was to promote transparency where agency actions may threaten the environment. In such situations, transparency benefits agencies as well as citizens, and NEPA can provide incentives for management that is

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122. The HFRA definitions of these areas are admittedly quite broad. The wildland-urban interface is defined as the area within one-half or one-and-one-half miles of designated "at-risk communities," depending on topography, geographic characteristics, and Fire Regime Condition Class. 16 U.S.C. § 6511(16). These communities, in turn, are listed in the Federal Register under the National Fire Plan. The list includes 11,376 communities that are in the vicinity of federal lands that are at high risk from wildfire. Urban Wildland Interface Communities Within the Vicinity of Federal Lands That Are at High Risk from Wildfire, 66 Fed. Reg. 43,384, 43,384 (Aug. 17, 2001).

based on scientific knowledge but remains open to public input and scrutiny.

NEPA provides substantial incentives for interagency cooperation and cooperation between agencies and the public, a priority that is stressed in all of the fire policy documents. As part of the NEPA process, agencies are required to "[e]ncourage and facilitate public involvement in decisions which affect the quality of the human environment" and to "[m]ake diligent efforts to involve the public in preparing and implementing their NEPA procedures."124 In addition to publicizing hearings, decision notices, and the like, the responsible agency must make a draft EIS available for public comment before the final EIS is prepared. The agency must obtain comments from any other federal agency with special expertise or legal jurisdiction over the process and must request the comments of the general public (and in particular any people or groups that might be interested or affected), any private applicant involved in the proposed action, all relevant state and local agencies, any tribes that may be affected, and any agency that had previously requested to receive statements on similar actions.125 Inter-agency cooperation is strongly encouraged, and agencies are permitted to designate joint lead agencies if state or local agencies are closely involved in the proposed project, provided at least one federal agency is included.126 Special provisions are also made to allow joint processes in order to avoid overlaps in documentation between federal and state or local procedure.127

Unfortunately, these incentives for cooperation and coordination have been undermined by the same policy and regulation changes described above. By exempting some fire management activities from the NEPA process, categorical exclusions effectively remove them from interagency analysis as well as from the public eye. The HFRA goes even further by limiting the administrative and judicial review processes for the projects it covers. These restrictions are intended to reduce citizen involvement in public lands management under the rationale that frivolous appeals and litigation are hampering effective management. Ironically, the measures are often referred to in Healthy Forests documents as strengthening public participation. As Franklin and Agee point out, the issues addressed by HFRA are "procedural matters and do not address substantive issues such as where, how, and why fuel projects are to be conducted. The assumption appears to be that if we free
resource managers from procedural constraints, they will make the appropriate decisions about where, how, and why. Such an assumption ignores the many conflicting political, economic, and social pressures that agency personnel must balance in their management decisions.

The mistaken idea that NEPA processes inevitably slow down fire management activities and keep managers from conducting hazardous-fuels reduction projects has become pervasive. The above discussion has pointed out that when federal fire policy is properly implemented, any administrative or bureaucratic delays are likely to be minimized since all fire-management activities should be covered by a fire management plan. Similarly, the citizen appeals that are specifically permitted under NEPA (except as changed by the HFRA) are often blamed for slowing implementation and interfering with fire management efforts; however, in limiting the use of the less costly and less antagonistic administrative appeal process, HFRA actually risks increasing the potential for litigation.

As with any policy, it is likely that the ground-level implementation of NEPA is significantly different than what is suggested by the policy document itself. Agency officials often argue that the current fuels situation is such a crisis that agencies simply do not have time to meet the procedural requirements of the laws without further exacerbating the problem, or that agency planning is hampered by a fear of appeals and litigation. However, initial evidence suggests that these perceptions are inaccurate. The CEQ regulations concerning NEPA implementation clearly address issues of timeliness, and the CEQ allows agencies to set time limits for each part of the NEPA process based on the potential for harm, the magnitude of the action, the degree of controversy, and other criteria. A recent report from the non-partisan General Accounting Office (GAO) suggests that litigation has played only a minor role in delaying hazardous fuels projects. Of 762 fuels-related decisions in fiscal years 2001 and 2002, only 180 were appealed (affecting 900,000 of a total 4.7 million acres) and only 23 were litigated (affecting 100,000 acres). The same GAO report also found that 79 percent of appeals were handled within the mandated 90-day period. A separate report found that at sites visited by GAO researchers, 30 percent of the delays on fuels

128. Franklin & Agee, supra note 18, at 60.
129. See, e.g., Norton & Veneman, supra note 4, at 1.
projects were caused by the reallocation of funds for fire suppression; weather accounted for an additional 40 percent of delays.\textsuperscript{132}

The Endangered Species Act

The stated purposes of the Endangered Species Act are:

to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions [on international trade in endangered species].\textsuperscript{133}

Certainly the best-known impact of ESA is the establishment of broad prohibitions against any take of animal species listed as endangered or threatened.\textsuperscript{134} In addition, federal agencies are required to (a) actively promote the conservation of listed species and (b) avoid any actions that would have negative effects on listed species and their critical habitat.\textsuperscript{135} The application of the Endangered Species Act to fire management on federal lands is somewhat complex. In many cases, scientific understanding of a listed species' relationship with fire is limited or even nonexistent. While it is often assumed that wildland fire poses a threat to endangered species, many species actually need fire to maintain their populations or habitat, and many more tolerate fire well.\textsuperscript{136} Many animal species are able to simply avoid fire, and a recent summary of U.S. Fish and Wildlife data showed that just four of the 186 listed, proposed, and candidate plant species that are found on Forest Service lands are actually harmed by fire.\textsuperscript{137} However, there is no doubt that not only wildfires but also prescribed fires and fuel treatments can have confusing, complex, and sometimes adverse effects on endangered species' habitats. It can also be difficult to weigh long- and short-term

\begin{footnotes}
\item[132] U.S. GEN. ACCOUNTING OFF., supra note 93, at 4.
\item[133] 16 U.S.C. § 1531(b) (2000).
\item[134] Id. § 1538(a).
\item[135] Id. § 1536(a).
\item[136] McPherson & Weltzin, supra note 55, at 6.
\end{footnotes}
impacts of different fire management decisions in the implementation of the ESA.

As with NEPA, the agencies responsible for implementing the ESA (the U.S. Fish and Wildlife Service and the National Marine Fisheries Service) have clearly stated that firefighter and public safety is the first priority in any fire management decision.\textsuperscript{138} Federal regulations related to the ESA state that, in an emergency situation, consultation may be informal and may take place either during or after the necessary response measures.\textsuperscript{139} This alternative is applicable for fire suppression tactics in general. The wildfire itself is considered an act of God and not an agency action; thus, consideration of endangered species never takes priority over human life. This exception again provides some incentive for agencies to prefer fire suppression activities to mechanical and controlled fire treatments. Indeed, this incentive (or, seen conversely, the disincentive to use preventative treatments) can be quite strong, as the ESA generally prohibits a planned project that threatens a listed species.

The most common "disincentives" of this kind have centered on mechanical treatments (including post-fire "salvage" logging), although fire treatments are also affected. The conflict comes in Section 7 of the act, which mandates that

\[ \text{[e]ach Federal Agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency...is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary...to be critical, unless such agency has been granted an exemption for such action by the Committee...}. \textsuperscript{140} \]

The standard for agency actions in terms of listed species is that jeopardy to the listed species, whether intentional or incidental, is not likely to occur; with very few exceptions, an agency action must not threaten the continued existence of a listed species or destroy or degrade its designated critical habitat.\textsuperscript{141}

Under the ESA, consultation with the responsible secretaries (often referred to as a Section 7 consultation) is normally required for all federal projects that may negatively affect listed species. The Section 7

\textsuperscript{138.} Memorandum from Gale Norton to Agency, supra note 117.
\textsuperscript{139.} 50 C.F.R. § 402.05 (2005).
review process is relatively straightforward and is outlined within the act; few external regulations dictate the process. The consultation generally results in the secretary either finding that there is no likelihood of jeopardy associated with the proposed action or suggesting alternative actions to the agency's proposal that would not be likely to result in jeopardy. When an agency frequently consults with a secretary on the same kinds of projects, this consultation procedure may be replaced by a joint counterpart agreement.

As part of President George W. Bush's Healthy Forests Initiative, joint counterpart regulations have been developed for the activities covered by the National Fire Plan (generally mechanical fuel reduction and prescribed fire projects). These regulations effectively establish an alternative process for consultation for any project authorized, funded, or carried out to implement the NFP. Under this alternative process, the agency proposing the project is allowed to determine whether the species' survival is jeopardized without any formal or informal consultation with the secretaries or agencies normally responsible for implementing the ESA. Instead, training and information is to be provided by these implementation agencies (the U.S. Fish and Wildlife Service or National Marine Fisheries Service) as needed. The goal of the agreement is to reduce the delays that may be involved in the traditional consultation process. Obviously, this change also removes a substantial incentive for interagency cooperation.

The ESA is often seen as unnecessarily hindering mechanical and fire treatments because the act does not explicitly recognize that avoiding these management activities for fear of harming species and their critical habitat could theoretically lead to even higher mortality of an endangered species by creating more severe fire conditions in the future. When it is interpreted in this way, the ESA conflicts not only with the goals of fire policy but also with its own goals and those of other environmental policies.

However, it should be emphasized that this is a question of implementation only; the Secretary of the Interior is given substantial leeway in interpreting the "no jeopardy" clause and may easily choose a broader, more long-term view of potential species impacts. Perhaps more importantly, the purpose of the act with respect to federal agencies is to ensure that management actions, no matter how well intentioned they may be, do not directly threaten the continued existence of listed species. When confronted with a decision such as whether to conduct a

fuel thinning project in critical habitat or risk the eventual destruction of such habitat to a severe fire, the formal consultation with the U.S. Fish and Wildlife Service is intended to help an agency form a reasonable, science-based opinion on the management practices in question and avoid conflicts with Section 7 requirements. Nonetheless, agency personnel frequently cite the ESA and the Section 7 consultation process as barriers to fire management.

As noted above, it is also difficult to anticipate the effect a prescribed burn or wildland fire use ("let burn") fire will have on any given species. While the ESA requires decisions to be science-based, it does not force agencies to wait for exhaustive studies or complete information on a question (which would again provide an incentive to avoid planned management practices in favor of emergency fire suppression). Rather, agencies are to use the "best scientific and commercial data available" in fulfilling the requirements of section 7. An agency must develop a biological assessment, generally within 180 days of the initiation of the consultation and before beginning the activity, describing any listed species that might be affected. The time constraint, in combination with the fact that monitoring can be and often is recommended as part of the consultation, functions to encourage the continuing improvement of management practices, and this flexibility encourages the use of planned fuels treatments. Nonetheless, many managers continue to see the ESA as a barrier to fire and fuels management activities, and the actual implementation process should be explored in more depth on the ground.

The Wilderness Act

The intent of the Wilderness Act is to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas within the United States and its possessions, leaving no lands designated for preservation and protection in their natural condition...[and] to secure for the American people of present and future generations the benefits of an enduring resource of wilderness.
To meet this goal, the Wilderness Act lays the foundation for a National Wilderness Preservation System comprised of federal lands “where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain.” Over the life of the Act (more than 40 years), its general function has remained the same: to set aside large areas of federally owned land and prevent them from being used in ways that would disturb their “pristine” condition. In general (and with several notable exceptions, described below), designated wilderness areas are protected from commercial enterprises, construction of roads, any kind of mechanical transport (including motor vehicles, motorized equipment, and motorboats), and construction of any structure or installation. These prohibitions apply equally to resource managers and resource users.

Section 4(d) of the Wilderness Act permits certain prohibited activities under special circumstances. One of these provisions can allow an otherwise restricted activity as part of certain kinds of forest stewardship: “such measures may be taken as may be necessary in the control of fire, insects, and diseases, subject to such conditions as the Secretary deems desirable.” Other agency-specific regulations and guidance may apply, but all managing agencies use the “minimum requirement” concept. This requirement stipulates that wilderness managers can authorize an activity allowed under the special provisions described above only if it is needed to meet the minimum requirements for the administration of the area as wilderness and if the methods used are considered the “minimum tools” for that necessary project. For example, mechanical thinning projects in wilderness areas often use hand rather than motorized tools, and fire suppression efforts may depend more heavily on hand-built lines and backfires than on aerial suppression. Under circumstances outlined in the individual wilderness management plans, prescribed fire, fire suppression, and use of natural-ignition fires are all acceptable management practices. Certain

rehabilitation or restoration measures may also be prescribed by area-specific plans.

Although the wildland-urban interface is rapidly moving closer to the wilderness, wilderness areas are designated in part due to their distance from heavily populated areas. As Gorte notes, "Ultimately, 'wilderness areas' are whatever Congress designates as wilderness, regardless of developments or activities which some would argue conflict with definition of wilderness." As a result, wilderness policy appropriately favors low-impact techniques (outlined in the USDA Forest Service's minimum-impact suppression tactics (MIST) guidelines), while not ruling out any specific fire management methods. The Wilderness Act allows local-level land and resource managers substantial flexibility in dealing with fire, even while clearly promoting wilderness priorities. The federal requirement that fire management plans (FMPs) be developed in conjunction with wilderness management plans in wilderness areas also promotes a thoughtful approach to suppressing fires in the wilderness. For example, the wilderness areas associated with the Gila National Forest in New Mexico now make extensive use of fire as a wilderness management tool, conducting more than 175,000 acres in large prescribed fire and wildland fire use projects in 2003. However, the Leopold Institute, a USDA-administered research group, reports that as of 2001 only about 20 percent of wilderness areas had FMPs allowing wildland fire use.

In summary, wilderness goals and fire management present a delicate balance with regard to management of those designated wilderness areas. Agencies must apply the minimum-requirement concept and manage for wilderness values, but concerns that a fire burning in a wilderness area might eventually spread to other public or private lands also exist. Ultimately, however, this balance represents a broader challenge to wildland fire managers, who must consider the very different situations in and outside the wildland-urban interface in creating and executing fire management plans. Some may find managing fire within wilderness boundaries restrictive, while others, as in the Gila National Forest, see wilderness areas as an opportunity to restore large-scale fire processes.

152. Backer et al., supra note 107, at 938.
154. Carol Miller, Wildland Fire Use: A Wilderness Perspective on Fire Management, in FUEL TREATMENTS, supra note 64, at 279, 381.
The Clean Air Act

The underlying purpose of the Clean Air Act is to establish minimum national standards for air quality. Like the Clean Water Act, the Clean Air Act is a federal-level environmental policy that is primarily implemented through programs at the state level. The Environmental Protection Agency (EPA) sets National Ambient Air Quality Standards (NAAQS). There are two types of these standards: primary standards, which are based on the level of air quality needed to protect human health, and secondary standards, which take into account other, less direct, aspects of public well-being such as the air quality needed for healthy vegetation and wildlife or to prevent damage to buildings and food supplies. These standards have been set for six very common pollutants: carbon monoxide (CO), nitrogen dioxide (NO$_2$), ground-level ozone (O$_3$), lead (Pb), particulate matter of ten micrometers or less (PM$_{10}$) and 2.5 micrometers or less diameter (PM$_{2.5}$), and sulfur dioxide (SO$_2$).

Under the Clean Air Act, states are required to submit a State Implementation Plan (SIP) describing how they will reach national air quality standards. States must then implement those plans in a timely manner; otherwise they may face sanctions, including the withholding of some federal highway funds. In addition to state-level programs, the Clean Air Act has prompted regional efforts at improving implementation, such as the Western Regional Air Partnership (WRAP), described below.

Wildland fires, both prescribed and otherwise, often create or contribute to air quality problems. Especially during the summer months, wildland fires can be a significant source of airborne fine particulate matter (PM$_{2.5}$) emissions and other pollutants, including nitrogen oxides, volatile organic compounds, and ammonia. Because these emissions can result in elevated levels of ambient PM$_{2.5}$ and impaired visibility, fire managers and decision makers must take Clean Air Act standards into account when planning prescribed or fire use.

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155. The Clean Water Act is not discussed here because any fire-management activities would be classified as non-point sources and would be virtually unregulated by that policy. States are simply required to develop EPA-approved plans to deal with non-point source pollution. PHILIP WEINBERG, ENVIRONMENTAL LAW: CASES AND MATERIALS 262 (3d ed. 2001).
fires. The state agencies responsible for implementation can regulate prescribed burning on federal lands; however, in practice, most federal agencies simply call these state agencies for approval of a planned fire based on weather conditions or other factors.  

One of the most important parts of the Act for fire management purposes lays out tighter standards for air quality within larger national parks and wilderness areas, referred to as Class I Federal areas. All states are required to demonstrate progress toward a National Visibility Goal for these areas. Class I areas are also affected by the EPA-issued Regional Haze Rule, which requires a state-level smoke management program.

Regional haze is visibility impairment produced by fine particles from a variety of sources that absorb or scatter light across a broad geographic area. While regional haze can also cause significant human health and environmental effects that must be addressed, the impairment of visibility is seen as being a particular problem for the national parks and wilderness areas of the United States, and the Clean Air Act sets a goal of remedying any existing visibility problems and preventing any such future problems in Class I areas.

Implementation of the regional haze goal has been delayed due to a lack of scientific knowledge on how pollution sources and regional haze are linked. In 1999, EPA published the Regional Haze Rule, which requires states to set specific goals for strategies for improving visibility in Class I areas. This planning is to take place through state implementation plans (SIPs) on regional haze. The regional haze rule specifically encourages states to work together in regional partnerships, such as the Western Regional Air Partnership (WRAP), a voluntary group formed in 1997 with the goal of coordinating regional air quality issues in the western United States, especially regional haze. Its members include the governors of 13 western states, including Arizona and New Mexico, as well as federal agencies and tribes.

Wildland fires are a major source of regional haze; however, the regional haze rule applies only to anthropogenic sources of air pollution such as utilities, pulp mills, or smelters. Thus, the EPA policy covers both prescribed fires and wildland fire use but not unplanned wildland

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162. Id.
163. Id. at 35,737.
fires (whether ignited by humans or naturally ignited).\textsuperscript{164} Although regional haze SIPs have been released for mandatory Class I areas of the Colorado Plateau, the area covered does not include many other fire-prone areas of the West outside the Colorado Plateau that are not covered by individual state plans. New or expanded SIPs must be developed by 2008 to include all Class I areas.

The EPA has recognized the complex relationships among regional haze, wildland fire, and forest ecosystems and has suggested that land managers should work with the EPA to reduce the impacts of fire emissions where fire use may be otherwise beneficial.\textsuperscript{165} For example, the existing Arizona Regional Haze SIP defines annual emission goals for management of fires, outlines a series of state regulations for enhanced smoke management planning, and encourages the use of non-burning alternatives in land management.\textsuperscript{166}

WRAP’s involvement with fire management has focused on the idea that increased fuel loads lead to more intense, widespread, and uncontrollable fires and thus more particulate emissions. As a result, although WRAP recommendations have generally supported the use of prescribed fire to mitigate wildfire threat, they have particularly emphasized the use of mechanical treatments. For example, one WRAP report recommends the removal of federal, state, local, and tribal “administrative barriers to the use of alternatives to burning.”\textsuperscript{167} The Clean Air Act’s focus on improving air quality in large national forests and wilderness areas may well serve to encourage the use of mechanical treatments in those usually isolated areas. This stands in clear contradiction to federal fire policy goals of reintroducing fire as a valuable management tool and ecosystem process. It also conflicts with scientific evidence that suggests mechanical treatments should be used primarily in the wildland-urban interface.

At the same time, WRAP and most western state governments have pursued a focus on smoke management and emissions tracking to facilitate some prescribed burning when this activity will not create major air quality problems. State and tribal smoke management programs (SMPs) are developed to manage smoke from controlled fires.


\textsuperscript{165} See, e.g., id. at 1.


\textsuperscript{167} Grand Canyon Visibility Transport Comm'n, supra note 158, at 50.
They are generally developed in cooperation with wildland owners and managers. The EPA describes the purposes of SMPs:

- To mitigate the nuisance and public safety hazards caused by smoke in populated areas;
- To prevent problems with air quality and the violation of national Clean Air Act standards because of controlled fire; and
- To address visibility impacts in Class I Federal areas.\(^{168}\)

Although states are not required to develop smoke management programs, the EPA has established a strong incentive. An interim directive from the EPA on air quality and fires states that the EPA will not designate an area as in “nonattainment” when the use of controlled fires “cause[s] or significantly contribute[s] to” violations of the particulate matter standards if the state or tribe concerned has an approved smoke management program in place.\(^{169}\) Instead, the EPA will require a review and update of that program and will only consider more serious sanctions after several violations have occurred. The development of smoke management programs promises to encourage the use of controlled fire as a management tool.

VI. CONCLUSIONS

Conflicts and contradictions in fire policy and management exist on at least three levels. First, different federal-level fire policies have contradictory goals; from a broad perspective, some policies promote fuels management and the reintroduction of fire, but others emphasize and increase funding for fire suppression at the expense of more effective management activities. Second, some policies create incentives for fire management activities that are inappropriate from an ecological or economic perspective. For example, recent regulation changes under the Healthy Forests Initiative create incentives for small-scale mechanical thinning projects outside of the wildland-urban interface; these projects are both ecologically and economically costly and are unlikely to influence the behavior of large fires. Finally, environmental policies sometimes create conflicting incentives. For example, the Wilderness Act

\(^{168}\) U.S. ENVTL. PROT. AGENCY, supra note 164, at 17.

\(^{169}\) Any area in the nation that fails to meet national air quality standards for any of the six NAAQS air pollutants is a non-attainment area. The Environmental Protection Agency provides a national map of non-attainment areas and estimates that 60 percent of the U.S. population lives in these areas. Id. at 8.
creates incentives for large-scale wildland fire use, but the Endangered Species Act and Clean Air Act can discourage such activities.

On the whole, however, this analysis finds that the conflicts in fire policy and management practices are few and relatively minor. Where conflicts do exist, they are most commonly the result of inherent complexity in fire-prone ecosystems that require some flexibility in policy implementation. In the absence of reliable data to either support or deny the claims that conflicting policies, excessive litigation, or burdensome procedures are thwarting federal attempts to bring a fuel/fire crisis under control, sweeping policy changes would be ill advised at this time.

As was discussed briefly in the introduction, recent public dialogue about environmental policy and fire management has tended to support the idea that existing environmental policies often conflict with the effective use of fire management strategies (including mechanical thinning, fire use, and suppression). President George W. Bush and the heads of several federal land management and environmental agencies have repeatedly expressed pessimistic views on the applicability of environmental policies to fire management. Given that these officials and agencies are charged not only with the responsible management of public lands but also with the implementation and enforcement of the very policies they find “burdensome,” these comments should be seen as very real and serious criticism of federal environmental policy.

Similarly, despite a growing scientific and public consensus that favors the reintroduction and extensive use of fire as a management tool, the shift from fire suppression to fire use has been slow. If policy is not inhibiting this shift, what is? In this article, I have explored the possibility that the incentives of fire-relevant policies inherently contradict one another and the principles of science-based management. This analysis has shown that, while some contradictions do exist, they do not appear to be unreasonably prohibitive to fire management activities. In light of these questions, I propose three alternative analytical conclusions, which are beyond the scope of this article and will require much closer examination in future research.

One possible alternative is that some aspect of the implementation of environmental policies may constrain or contradict good fire management practices; the conflict may be not in the letter of the law but in its implementation on the ground. One outstanding theme of the policy debate has been that of administrative delays in the implementation process. For example, some managers have argued that the NEPA documentation process in particular is unreasonably lengthy and time-consuming. Others argue that the citizen appeals and litigation permitted under these laws are slowing implementation and interfering
with fire management efforts. As with any policy, it may be that the ground-level implementation of NEPA and ESA is significantly different than what might be suggested by the policy document itself. Similarly, it may be that the current fuels situation is such a crisis that agencies simply do not have time to meet the procedural requirements of the laws without further exacerbating the problem.

However, some initial evidence suggests that these conclusions may be inaccurate. The CEQ regulations concerning NEPA implementation clearly address issues of timeliness, and the CEQ allows agencies to set time limits for each part of the NEPA process based on the potential for harm, the magnitude of the action, the degree of controversy, and other criteria.\textsuperscript{170} A recent report from the non-partisan General Accounting Office suggests that litigation has played only a minor role in delaying hazardous fuels projects; of 762 fuels-related decisions in fiscal years 2001 and 2002, only 180 were appealed (affecting 900,000 of a total 4.7 million acres) and only 23 were litigated (affecting 100,000 acres).\textsuperscript{171} The same GAO report also found that 79 percent of appeals were handled within the mandated 90-day period. Nonetheless, these data address only a small portion of the implementation process. Following the work of Aaron Wildavsky, future research is needed concerning the on-the-ground realities of the implementation of environmental policy in the fire management context.\textsuperscript{172}

A second alternative is that, as was previously suggested, the formal incentives of policies are overshadowed by relatively obscure budgetary incentives. Because fire suppression is funded through a variety of channels, including emergency suppression funds funneled from other agency activities, it is difficult to compare the increases in funding for fire suppression to those for other, more effective fire management activities. Nonetheless, this should prove an interesting and productive topic for future researchers.

A final alternative is that the policy dialogue described here is primarily or wholly a political construction. L. Earl Peterson, a Florida state forester, began his welcome address to the 1995 Environmental Regulation and Prescribed Fire Conference with what may be a telling story:

\textsuperscript{170} 40 CFR § 1501.8 (2005).
\textsuperscript{171} U.S. GEN. ACCOUNTING OFF., supra note 101, at 27.
\textsuperscript{172} See generally AARON WILDAVSKY, SPEAKING TRUTH TO POWER: THE ART AND CRAFT OF POLICY ANALYSIS (1979); AARON WILDAVSKY & JEFFREY PRESSMAN, IMPLEMENTATION: HOW GREAT EXPECTATIONS IN WASHINGTON ARE DASHED IN OAKLAND; OR, WHY IT'S AMAZING THAT FEDERAL PROGRAMS WORK AT ALL, THIS BEING A SAGA OF THE ECONOMIC DEVELOPMENT ADMINISTRATION AS TOLD BY TWO SYMPATHETIC OBSERVERS WHO SEEK TO BUILD MORALS ON A FOUNDATION OF RUINED HOPES (1973).
During a skit on the Smothers Brother Show, Tommy Smothers fell into a large vat of chocolate, and began to yell "FIRE." When asked by his brother Dick why he yelled fire, he responded, "well, do you think anyone would have come if I had yelled 'CHOCOLATE'?"

Recent criticism by some citizen groups has effectively accused government agencies and the president of yelling "fire" instead of "chocolate." The Sierra Club describes the Healthy Forests Initiative as "[u]sing the hype of the 2002 fire season" and "giv[ing] free reign to the timber industry across National Forests under the guise of 'fuel reduction.'" Similarly, the Center for Biological Diversity argues that the Healthy Forests Restoration Act is "the Bush Administration's push to increase logging and decrease public participation in decisions that affect our national forests." Indeed, popular dialogue has made wildland fire an increasingly sensitive and emotional subject, which in turn makes it a good catchphrase for mobilizing support for new policies and regulations. In the absence of reliable data to either support or deny these claims, sweeping changes to administrative law should be regarded with a great deal of skepticism.

Schneider and Ingram provide what may prove to be a useful framework for evaluating the possible political construction of this policy debate. They describe a situation in which public policy design has become increasingly hyper politicized; they argue that through the political and social construction of oppositional target groups, "policies deceive, confuse, and in other ways discourage active citizenship, minimize the possibility of self-corrections, and perpetuate or exacerbate the very tendencies that produced dysfunctional public policies in the first place." Because the debate described here is based on the assumption that past fire policy has been dysfunctional, and because it is rapidly evolving into new policy designs (for example, the Healthy Forests Restoration Act), a unique opportunity exists to examine whether the emerging federal fire policy is an example of hyper politicization. There are some hints that this might be the case, especially in the new...
restrictions on citizen suits and reductions in transparency that have developed from the fire debate.

If fire policy is a hyperpoliticized issue, academic analysis of its implications has generally been depoliticized. However, a worthwhile analysis of these policies should incorporate an explicit discussion of the political and economic interests involved. If, as Schneider and Ingram’s framework suggests, the emerging wildland fire policies build different incentives for different target groups, promote self-interested conflict among constructed target groups, and show signs of subverting democratic values, any further policy analysis should make explicit the policy incentives for different stakeholders in fire management.

Exploring these critical research questions and issues in depth will require substantial on-site work with federal land and resource managers and fire planners and managers, but the issues addressed are critical ones. Finding the exact points of contention between fire management and environmental policy may allow policy makers to solve those specific problems rather than undermining otherwise effective legislation.