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**WILDFIRE SUPPRESSION:
STRATEGIES FOR
CONTAINING COSTS**

BACKGROUND AND RESEARCH

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The views expressed in this report are those of the Panel. They do not necessarily reflect the views of the Academy as an institution.

PREFACE

The Panel Report, *Wildfire Suppression: Strategies for Containing Costs* (September 2002), presents the Panel's findings and conclusions as well as the full set of recommendations for containing the rising costs of wildfires. In the course of developing and adopting its recommendations, the Panel considered a much wider array of background and research information than could be included in the Panel Report itself.

This *Background and Research Report* makes available the extensive body of information upon which the Panel Report was based. It contains 8 Chapters and 11 Appendices that provide a wealth of facts and insights about how wildfires are fought, what drives their costs, and what is being done to help contain them. The Academy study team has organized and simplified this complex mass of information, so that it can inform policy deliberations and support progress toward increasingly efficient and effective implementation of federal and intergovernmental wildland fire goals and objectives.

Appendix B lists the more than 300 persons who supplied vital information needed to support this study, plus more than 150 additional people in the six large-fire case studies. The Panel expresses its heartfelt thanks to all of the individuals who participated in the study. Each made an important contribution to the Panel's work

CONTENTS

PREFACE	iii
CONTENTS	v
BOXES, CHARTS, FIGURES AND TABLES	ix
ACRONYMS	xi
CHAPTER 1: ORIGIN AND APPROACH OF THE STUDY	1
Why Are Costs Rising?.....	2
What Can Be Done to Contain Costs?	3
The Panel’s Approach to The Study.....	4
CHAPTER 2: POLICY CONTEXT FOR WILDFIRE SUPPRESSION	5
Evolution of the Fire Policy.....	5
Agency Implementation of the Policy	9
Developing a Joint Fire Management Plan Template	11
Revising Training to Reflect Federal Wildland Fire Management Policy	12
Implementation Accomplishments	12
Academy Field Work	14
Performance Measures for Implementing the Federal Wildland Fire Management Policy	15
Next Steps in the Policy’s Evolution	18
CHAPTER 3. HOW LARGE WILDFIRES ARE FOUGHT AND FINANCED	19
Incident Command System.....	19
Initial and Extended Attack.....	22
Initial Attack	23
Extended Attack	24
The Need for a Wildland Fire Situation Analysis.....	25
Evolution of The Type I Incident Management Team.....	27
Incident Management Team Phase	28
Transition to an Incident Management Team	28
Operational Management	29
Other Management Organizations	31
Factors Affecting Strategic Decisionmaking	32
The Need for Successive Incident Management Teams	34

Obtaining and Allocating Resources to Large Wildland Fires	35
Decision Support Tools and Information Technology.....	38
Mop-Up, Emergency Stabilization, and Rehabilitation.....	41
Mop-Up.....	41
Emergency Stabilization and Rehabilitation.....	42
Financing Large Wildland Fire Suppression	42
Cooperators' Share of Suppression Costs	44

CHAPTER 4. THE SIX CASE STUDIES OF 2001 LARGE FIRES47

Green Knoll Fire—Forest Service	52
Arthur Fire—National Park Service	54
Sheep Fire—Bureau Of Land Management	56
Virginia Lake Complex—Bureau Of Indian Affairs	58
Moose Fire—Forest Service	60
Star Fire—Forest Service.....	62
The 2002 Fire Season – The Hayman Fire	64
Principal Cost Themes	65

CHAPTER 5: INCIDENT MANAGEMENT CHALLENGES69

Planning Is Critical for Influencing Fire Suppression Strategies and Costs	72
Planning and Fire Suppression Strategies	72
Case Study Fire Management Plans	73
Different Approaches to Fire Management Affect Fire Strategies and Costs	75
Incentives Needed for Cost Effective Behaviors	76
Factors That Can Work Against Cost Containment Efforts	76
Current Incentives to Contain Costs	77
Cost Sharing.....	78
Preparedness.....	79
Incident Management Operations	82
The Wildland Fire Situation Analysis.....	82
Supply/Dispatch System Performance.....	85
Resource Availability.....	87
Team Transitions	89
Incident Management Business Operations	90
Resource Issues.....	92
Perspectives on Costs Versus Benefits	93

CHAPTER 6: HAZARDOUS FUELS CHALLENGES95

Fire Regimes and Condition Classes	97
Fuel Treatment Methods	104

Reintroduction of Fire	104
Mechanical Treatments	105
Chemical Treatments	107
Biomass Utilization (Recycling)	107
Electric Co-generation	108
Does Fuel Management Make a Difference?	109
Stream Fire, Plumas National Forest, California July 28 - August 3, 2001	110
Fire in Lake Meredith National Recreation Area, Texas, June 18, 2000	110
The Caylor Fire, Tuolumne County, California, July 14, 1999	110
The Winton Fire, California, September 9 - September 12, 1999	110
Strategy for Fuel Treatments	111
Challenges	116
A Complex Statutory, Regulatory, and Administrative Framework	116
Controversies over Timber Harvesting	118
Inadequacy of Federal Funding Alone	119
Fuel Treatments as a Long-Term Investment	121
The Need to Prioritize	121
Large-Scale Fuel Treatment Programs	123
CHAPTER 7: COMMUNITY INTERFACE CHALLENGES	127
The Big and Growing Interface Problem	127
Wildland Demographics	127
Perceptions of Risk	128
The Many Faces of Community Interface	128
Not a Responsibility for the Federal Government Alone	130
Education and Voluntary Action Is Not Enough	130
Community Innovations	131
Three General Approaches	131
Innovative Communities	135
Bend, Oregon	135
Boulder, Colorado	138
Flagstaff, Arizona	143
Jackson Hole, Wyoming	145
Prescott, Arizona	147
San Diego, California	150
Malibu, California	152
Firewise Communities/USA	153
The Flood Plain Analogy	155
Previous Academy Findings and Recommendations	155
Need For a More Systematic and Effective Approach	156

**CHAPTER 8: SCIENCE, TECHNOLOGY AND INFORMATION
MANAGEMENT OPPORTUNITIES159**

Introduction.....159

Development of Fire Research and Technology Efforts.....160

 National Fire Plan and Congressional Expectations162

 NFP Research and Development Funding162

 Fire Fighting Systems and Predictive Services R&D163

 Current Fire Research Programs and Organizations.....163

 Integrating User Needs with Science and Technology165

The Role of Science and Technology in Managing Wildland Fires166

 Early Detection and Response167

 Monitoring Fire Size, Location and Progression.....169

 Information for Managing the Fire170

 Business Management.....173

Meeting Science and Technology Challenges175

 Technology Transfer Challenges176

 Consolidating Planning and Budgeting177

 Needed Information Management Framework.....177

 Data and Measurement for Assessing Performance179

APPENDICES

Appendix A. Panel and Staff..... A-1

Appendix B. Individuals Interviewed or ContactedB-1

Appendix C. Fire-Related Expenditures C-1

Appendix D. Summary of Wildfire-Related Issues and Recommendations D-1

Appendix E. Views of State Forestry Officials on Fire-Suppression Cost
Containment E-1

Appendix F. 2001 Large-Fire Case Study ReportsF-1

Appendix G. Accounting for Wildland Fire Costs in Wildland Fire Situation
Analysis (WFSA): Prospects and Problems G-1

Appendix H. Wildfire Fire Exposure Study for Ten Sites in the Western U.S. H-1

Appendix I. Community Interface Activities.....I-1

Appendix J. Definitions of Wildland Fire Cost FactorsJ-1

BOXES, CHARTS, FIGURES AND TABLES

Box 2-1. Guiding Principles: 2001 Federal Fire Policy.....	7
Box 2-2. Agency Manuals and Handbooks Providing Directions for Implementing the Fire Policy.....	10
Box 2-3. Interagency Fire Management Plan Template	12
Table 2-1. Status of Agency Fire Management Plans, as of September 30, 2001	13
Table 2-2. Policy Implementation at Six Fires	15
Box 2-4. Some Fire-Related Performance Measures Used in Federal Agency GPRA Plans	16
Table 2-3. The 10 Year Comprehensive Strategy Implementation Plan, May 2002	17
Figure 2-1. National Policy Timeline	18
Box 3-1. Incident Command System Functions	20
Box 3-2. Eight Incident Complexity Analysis Factors and Sample Evaluation Statements	21
Table 3-1. Fire Complexity and IMT Relationships	22
Table 3-2. Advantages and Disadvantages of Primary Fire Control Strategies	24
Box 3-3. Major Sections of the Wildland Fire Situation Analysis	26
Box 3-4. Examples of Fire Management Complexities that Evolved Since the 1970s	28
Table 3-3. Natural Resources to be Protected and Related Restrictions	34
Table 3-4. Unable-to-Fill Orders for the 2000 and 2001 Fire Seasons	38
Table 3-5. Selected Decision-Support Systems	39
Table 3-6. National Fire Plan Allocations—Fiscal Years 2001 and 2002	44
Table 4-1. Wildland Fire Suppression Cost Study: Six Large-Fire Cases	48
Figure 4-1: Location of Six Case-Study Fires	49
Box 4-1. Factors Influencing Costs of Case-Study Fires	50
Figure 4-2: Cost Factors	51
Figure 4-5: Sheep Incident, Nevada	57
Table 5-1. Challenges to Incident Management Operations Derived from the Case Studies	71
Table 5-3. Fire Management Plans’ Key Provisions Affecting Strategies	74
Figure 6-1. Changes in Forest Structure and Density	96
Table 6-1. Characteristics of Natural Fire Regime Groups	98
Figure 6-2. Fire Condition Classes	100
Figure 6-3. Large Fire Locations in 2002 Fire Season by Fire Condition Classes 2 & 3	101
Table 6-2. Estimated Acres of Historical Fire Regimes by Condition Classes – All Federal Resource Agencies (in millions of acres)	102
Figure 6-4. Natural Vegetation Groups	103
Figure 6-5. Positive Impact of Thinning Treatments on Fire Behavior	109
Table 6-3. Hazardous Fuels Reduction, Acres Treated in FY 2001	112
Table 6-4. Summary Description of Four Alternative Programs of Fuels Treatments to Reduce Wildfire Risk to Communities (RTC) and Risk to Ecosystems (RTE) over 15 and 30 Year Periods	112
Figure 6-6. Projected Risk to Communities and Risk to Ecosystems within 15 Years and 30 Years Schedule of Four Alternatives in the Joint Cohesive Strategy ..	114

Table 6-5. Relative Impact of the Proposed Joint Cohesive Strategy’s Options on Future Suppression Costs after 15 years	115
Figure 6-7. Hazardous Fuel Reduction Projects on the Western Half of the Santa Fe National Forest, New Mexico.	123
Figure 7-1. Many Faces of the “Community Interface”	129
Table 7-1. General Characteristics of Community Interface Innovation Programs	135
Box 7-1. Key Components for Successful Project Impact Communities	157
Table 8-1. Wildland Fire Research: A Selective Chronology	161
Table 8-2. NFP Research and Technology Funding	162

ACRONYMS

AA	Agency Administrator
AC	Area Command
BAER	Burned Area Emergency Rehabilitation
BehavePlus	Decision Support System that Can Predict Fire Behavior
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BuRec	Bureau of Reclamation
CEQ	Council on Environmental Quality
CWN	Call-When-Needed
DFPZs	Defensible Fuel Profile Zones
DOD	Department of Defense
DOI	Department of the Interior
EA	Environmental Assessment
EPA	Environmental Protection Agency
ERI	Ecological Restoration Institute
ESA	Endangered Species Act
ESR	Emergency Stabilization and Rehabilitation
FARSITE	A fire area simulation model
FEMA	Federal Emergency Management Agency
FMO	Fire Management Officer
FMP	Fire Management Plan
FMU	Fire Management Unit
FUMT	Fire Use Management Team
FWS	Fish and Wildlife Service
FY	Fiscal Year
GACC	Geographic Area Coordinating Center
GAO	General Accounting Office
GeoMAC	Geospatial Multi-agency Coordination System
GIS	Geographic Information System
GPRA	Government Performance and Results Act
GPS	Global Positioning System
GTG	Geospatial Task Group
HAZUS	Hazards United States (a nationwide loss estimation model)
HFQLG Act	Herger-Feinstein Quincy Library Group Forest Recovery Act
IA	Initial Attack
IAP	Incident Action Plan
IBA	Incident Business Advisor
IC	Incident Commander
ICARS	Incident Cost Accounting and Reporting System (part of I-SUITE)
ICP	Incident Command Post
ICS	Incident Command System
IFCI	International Fire Code Institute
IFEMG	Interagency Fire Emergency Management Group

IFRCC	Interagency Fire Research Coordination Council
IMET	Incident Meteorologist
IMT	Incident Management Team
IRSS	Incident Resource Status System (part of I-SUITE)
I-SUITE	An integrated set of three incident management software applications
IT/IM	Information Technology/Information Management
ITS	Incident Time System (part of I-SUITE)
JFSP	Joint Fire Science Program
LMP	Land Management Plan
MEL	Most Efficient Level
MIST	Minimum Impact Suppression Techniques
MOU	Memorandum of Understanding
NASA	National Aeronautics and Space Administration
NASF	National Association of State Foresters
NEPA	National Environmental Policy Act
NFES	National Fire Equipment System
NFMAS	National Fire Management Analysis System
NFP	National Fire Plan
NFPA	National Fire Protection Association
NICC	National Interagency Coordination Center
NIFC	National Interagency Fire Center
NOAA	National Oceanic and Atmospheric Administration
NP	National Park
NPS	National Park Service
NWCG	National Wildfire Coordinating Group
NRWG	Natural Resources Working Group
NWS	National Weather Service
QLG	Quincy Library Group
RAMS	Risk Assessment and Mitigation Strategies
RAWS	Remote Automated Weather Stations
RD&A	Research, Development and Applications
RFD	Rural Fire District
ROSS	Resource Ordering and Status System
SRAs	State Responsibility Areas
T&E	Threatened & Endangered Species
UC	Unified Command
USGS	U.S. Geological Survey
UTF	Unable-to-Fill
UWIC	Urban-Wildland Interface Code
VFD	Volunteer Fire Department
VHFHSZs	Very High Fire Hazard Severity Zones
WFSAs	Wildland Fire Situation Analysis
WUI	Wildland-Urban Interface

CHAPTER 1 ORIGIN AND APPROACH OF THE STUDY

The American taxpayer, watching television or reading the newspaper, receives a daily dose of wildland fires consuming thousands of acres of vegetation, dwellings and other structures—and millions of dollars. Occasionally, the stories mention evacuations and firefighters lost. Perhaps the trees will come back healthier and more natural, and the houses will be rebuilt. But the money and lives lost will not be restored. Recent trends and current forecasts indicate that the federal government will be called upon to provide even more funds to fight fires in succeeding years.

Wildland fire historically has been described as an inevitable natural force and, therefore, not necessarily evil. Fire helps develop ecosystems; many plants, in fact, depend on its presence. Native Americans actively used fire to foster their goals for the land and the plants and animals that lived on it. They used “prescribed” fires before the land management agencies came along and developed the definition.

Today, planned fires are not unusual; they are used to achieve ecosystem objectives much as the early Native Americans did, and also to reduce the risk of devastatingly severe firestorms. Where possible, land managers try more and more to use naturally-caused fires, such as by lightning, for these purposes. The taxpayer, however, does not know or care how or why a fire started. The taxpayer stares at the television set and sees tax dollars going up in flames.

Congress and the Office of Management and Budget, confronted with conflicting demands for federal funds, increased appropriations for the wildland fire program significantly in recent years. The main federal land management agencies—the Forest Service in the Department of Agriculture; and the Bureau of Land Management (BLM), National Park Service (NPS), Bureau of Indian Affairs (BIA), and Fish and Wildlife Service (FWS) in the Department of the Interior—have proposed an ambitious long-range plan for restoring the nation’s wildlands to a more natural condition less prone to severe wildfires. The prognosis is for many years of rapidly rising fire suppression costs. The concern is that these expected costs will be too high to be sustained in the federal budget as Congress and other political leaders face “short-term” budget shortfalls and seek solutions and options that will bring benefits more quickly.

The rising suppression costs caused Congress to ask the Forest Service and Interior to jointly fund a “thorough, independent review of wildfire suppression costs and strategies.” The agencies turned to the Academy and asked that its study provide analysis of the agencies’ suppression policies for adequacy and consistency, research on the factors that drive wildland fire suppression costs, the cost implications of Federal Wildland Fire Policy provisions, recent cost experience, and alternative firefighting methods and technologies. Congress and the agencies required the study to be based on case studies of six large fires from the 2001 fire season to assess whether policies were substantially followed and whether firefighting costs could have been reduced.

Data from the Forest Service¹ show that the annual cost of wildland fire-related expenditures during the 1970's averaged slightly over \$420 million per year. During the 1980's, the average was about \$460 million. During the 1990's it increased to almost \$700 million annually. In Fiscal Year 2000, Forest Service expenditures exceeded \$1.4 billion. And these increasing costs are in inflation adjusted 2000 dollars.²

Is this a taste of what may come? Many in the wildland firefighting community predict that 2000 may eventually turn out to be one of the less expensive years of the decade.

The Academy's long-term analysis indicates that these climbing expenditures are a cause of concern taxpayers, budget examiners, and appropriators alike. Fighting wildland fires consumes a lot of money. There are two obvious questions: "Why?" and "What can be done about it?"

This report addresses both questions.

WHY ARE COSTS RISING?

During the course of the study, Academy field teams identified 30 primary factors that affect fire costs. Some are more significant than others. Experts in the fire management field emphasize three primary factors, (1) fuels build-up, (2) the interface with human activity (commonly referred to as the wildland-urban interface, or WUI),³ (3) and drought and weather conditions. The Panel agrees with this conclusion, but also believes it is important to consider how management improvements can contribute to cost savings as well as how equitably the costs of firefighting are distributed between those who benefit from firefighting efforts and those who pay.

It is generally agreed that fuels build-up in many cases is the result of decades of wildland management that inadequately maintained the appropriate balance of old and new trees, undergrowth and other flammable materials. All-out fire suppression for decades contributed to allowing fuels to increase and the "natural balance" to tilt. However, fire is not the only tool for keeping fuels in check. Mechanical thinning is another. Chemical treatment is also an option. One by-product of timber harvesting may also be fuels reduction. Chapter 6 describes the challenges and the potential solutions to the hazards caused by the build up of fuels in the forests and wildlands.

The human interface represents a more recent factor. The rush of Americans to build homes among the trees and "return to nature," along with limited measures to fireproof their houses (such as installing metal roofs rather than cedar shake, and creating space between their house and the trees rather than having houses literally wrap around trees) created an environment where

¹ Precisely comparable data from the Department of the Interior four land management agencies are not readily available, but generally follow the same trends.

² See Appendix C for additional details.

³ Wildland-urban interface generally is identified as that location where a forest intersects with residences, watersheds, power line right-of-ways, satellite towers, and other similar structures or locations that affect people and their livelihoods. It may be only a few structures; it is not necessarily an "urban" area in the usual sense.

firefighting costs escalated to protect those structures. Chapter 7 addresses the interface challenges of mingling people with trees.

The two factors above are controllable to varying degrees. That is, given the will and the resources, fuels build-up and the community interface can be better managed to help control costs. The third factor, weather (including drought) is beyond human control; we can only predict and prepare. Most people agree that the current conditions are such—several years of severe drought throughout the United States—that we will experience more and larger fires. Some predict the era of million-acre fires is not far away. The case study write-ups (see Appendix F) of the six large fires reviewed by the Academy demonstrate the dominant effects of weather and how wildfires, once started, can escape and spread rapidly. They bring new meaning to that old phrase that “it’s not nice to fool with Mother Nature.”

Chapter 2 shows how federal fire policy has evolved over recent years. Factors such as changing wildland conditions, severe fire seasons, and the increased understanding of fire’s relationship to the ecosystem prompted the federal land management agencies to alter their management operations and develop common approaches. The 1995 interagency Federal Wildland Fire Management Policy affirmed the role fire plays and the need to plan in advance how fire might be used to support land management goals. It took a long step toward institutionalizing a much improved interagency approach to how fire is viewed in the ecosystem and how the agencies can jointly plan, develop, and implement their individual and cross-boundary fire management programs.

Everyone once agreed that “the only cheap fire was the one that never started.” There is still some truth in that statement. However, as the land management agencies discovered that better use of fire could improve the ecosystem, the saying changed slightly: “The fire that enhances the environment as nature intended is cheaper than no fire at all.” The issue then shifted toward better determining how large wildfires are fought and paid for. Chapter 3 looks at the current practices for managing a fire—from initial attack (when the fire first starts) to long-term restoration after the fire is extinguished.

Chapter 4 summarizes the six large-fire case studies and 30 factors that affected their costs. These factors are defined in Appendix J. This chapter serves as a bridge between the general system for how wildland fires are fought and the challenges of fighting them illuminated by the cases.

Chapter 5, Incident Management Challenges, analyzes the six case studies, outlines the primary cost-related issues raised by them, and summarizes what can be learned from these fires about where cost savings might be possible.

WHAT CAN BE DONE TO CONTAIN COSTS?

There is no “magic bullet” for reducing the costs of wildland fire management. It took decades for federal wildlands to reach their current level of fire hazards. It will require a long-term coordinated and committed effort on the part of all the parties—federal, state, tribal, local, and

private—to make material inroads on the issues. The things that will move the land management agencies ahead in meeting this challenge will involve a coordinated strategy, better defined performance goals and accountability measures, improved management systems that ensure consistent policy implementation, and demonstrated results. These accomplishments will be neither cheap nor quick.

The bulk of this study centers on what can be done to contain wildfire costs. In addition to Chapters 2-7, described above, Chapter 8 concentrates on the potential for science and technology to provide help. Appendix D summarizes the many previous recommendations that others have made over the past seven years to help contain wildfire suppression costs, underscoring the point this is not a new issue. Appendix E provides details of an updated National Association of State Foresters survey that explores state views on wildfire cost-containment issues. Appendix G describes how the Wildland Fire Situation Analysis process, which is used to select cost-effective strategies for fighting large wildfires, works and how it could be improved. Appendix H reports on how the Hazards United States (HAZUS) loss-estimation model could be used to begin providing data on community values that may be at-risk of wildfire damage. And Appendix I contains three papers describing how communities are working to manage the interface between people and wildlands.

THE PANEL'S APPROACH TO THE STUDY

The background and research chapters and appendices provided a foundation for the Panel's findings and recommendations included in the previously published Panel Report, *Wildland Suppression: Strategies for Containing Costs*. In the course of preparing this report, interviews were conducted with more than 160 people in 13 states and the District of Columbia who represent the federal land management agencies and their wildland fire programs, plus other federal agencies; the legislative branch of the federal government; state, local, and tribal governments; and the private sector organizations. In addition, many government reports, policies, manuals, other documents, and relevant literature were reviewed. Many helpful comments on various drafts of the report were received from Interior and Forest Service reviewers. The Panel held four meetings to consider these materials, develop findings and conclusions, and approve related recommendations.

Appendix A provides brief biographical sketches of the Academy Panel members who directed this study and the study staff. Appendix B lists the persons interviewed or contacted for this study.

CHAPTER 2

POLICY CONTEXT FOR WILDFIRE SUPPRESSION

This chapter focuses on the provisions of the Federal Wildland Fire Management Policy that relate to wildland fire suppression and associated costs. It also outlines the steps taken by the land management agencies to comply with the Policy, and their efforts to develop performance measures to track implementation.

EVOLUTION OF THE FIRE POLICY

Federal wildland fire management policy is contained in two documents: the December 1995 Federal Wildland Fire Management Policy & Program Review, and the January 2001 Review and Update of the 1995 Federal Wildland Fire Management Policy. Prior to 1995, fire management policy emphasized quick response in order to suppress all wildfires as rapidly as possible, with the goal of controlling the majority of wildland fires by 10:00 a.m. the morning following the start.

During the 1960s and early 1970s, the effects of decades of fire suppression coupled with past land-use practices increased fire hazards by disrupting natural fire cycles. Recognizing this problem, by 1982 the land management agencies eliminated the “out by 10 a.m.” strategy, replacing it with a process that allowed fires to play a more natural ecological role under appropriate conditions.

The genesis of the 1995 Wildland Fire Management Policy was the 1994 fire season during which 34 firefighters died, including 14 in the South Canyon Fire. That severe fire season raised concern that the potential for catastrophic wildfires was increasing beyond the nation’s capability to respond. At the request of the secretaries of Agriculture and the Interior, the federal land management agencies re-examined their programs “to ensure that uniform Federal policies and cohesive interagency and intergovernmental fire management programs exist.”

An interagency Steering Group directed the review process. The group’s membership included representatives from DOI, USDA, the U.S. Fire Administration, the National Weather Service (NWS), the Federal Emergency Management Agency (FEMA), and the Environmental Protection Agency (EPA). A core staff from Interior and Agriculture supported the Steering Group. During the review process, the team gathered input from internal and external subject-matter experts. External input was sought via the *Federal Register*. The final report, *Federal Wildland Fire Management Policy & Program Review*, published December 18, 1995, became the first interagency policy for federal wildland fire management.

The 1995 Policy affirmed the valuable role that fire plays in managing ecosystem health and reducing the risk of catastrophic fires. It also institutionalized common rules for all five land management agencies to follow when assessing whether to allow a fire to burn for resource benefit purposes. This policy shift called for dramatic changes in how the agencies viewed the role of fire in ecosystems.

The 1995 Policy included 9 guiding principles, 13 policy statements, and 83 action items. The action items were categorized into four major policy areas:

- Role of Fire in Resource Management
- Use of Wildland Fire
- Preparedness and Suppression
- Coordinated Program Management

The Policy recognized the need for more scientific information about current ecosystem conditions and the consequences of various management strategies to ensure reintroducing fire safely and beneficially. The Policy also required all units with burnable vegetation to develop fire management plans (FMPs) using these data. Without an FMP in place, the Policy precluded managers from using fire-use management options; they could take only suppression action. In addition, the Policy called for integrating fire into land and resource management plans on a “landscape” scale that crosses agency boundaries. It called for conducting fire management planning, preparedness, suppression, fire use, monitoring, and research on an interagency basis with the involvement of all appropriate partners. This placed a heavy emphasis on interagency communication and collaboration.

Within this overall context, the Policy addressed large-fire suppression costs as follows:

A growing concern shared by Members of Congress, agency administrators, and the public is the cost of fighting large wildfires. Some critics believe expenditures are excessive and that the crisis nature of wildfire has led to imprudent use of personnel, equipment and supplies. Others believe that firefighting practices are not as effective as some natural forces in bringing wildfires under control and that fire suppression efforts should take better advantage of weather, terrain, fuel, and other natural conditions. **In the future, there will be less tolerance for excessive expenditures on large-fire suppression** (emphasis added). The costs and benefits of fire suppression activities must be analyzed. Analyses done so far have not resulted in improved practices or reinforced confidence in current suppression strategies.¹

In the area of Program Management, the Policy established a goal developing a system to analyze the relative efficiency of specific activities of the fire management agencies, and directed Federal agencies to:

...jointly develop a standard methodology for measuring and reporting fire management efficiency that includes commodity, non-commodity, and social values. This methodology should specifically address, among other considerations, the costs and benefits of large-fire suppression.

This item was later dropped as a specific action item, however.

¹ *Federal Wildland Fire Management, Policy and Program Review*, December 18, 1995, p. 29.

Following the Cerro Grande Fire in May 2000—which destroyed 235 structures in and around Los Alamos, New Mexico, and consumed over 47,000 acres—the secretaries of Agriculture and the Interior requested that the federal wildland fire community review the 1995 policy and its implementation.² They appointed an interagency work group that included several individuals from the 1995 team. The number of signatory agencies for the 2001 Fire Policy expanded from two (Agriculture and the Interior) in 1995 to include, in addition, the Departments of Commerce, Defense and Energy, the U.S. Geological Survey (USGS), the Bureau of Reclamation (BuRec), and the National Association of State Foresters (NASF). The new work group found that the 1995 policy was basically sound, but that some aspects were unclear, incomplete, unrealistic, or no longer appropriate. Although, this led to several modifications and additions, the revised policy retained the same general format of interlocked principles, policies, and action items.

The “guiding principles” were changed only to recognize the growing importance of international mutual aid and international exchanges of technology, training, skills, and knowledge. The current guiding principles are summarized in Box 2-1.

Box 2-1. Guiding Principles: 2001 Federal Fire Policy

- Firefighter and public safety is the first priority in every fire management activity.
- The role of wildland fire as an essential ecological process and natural change agent will be incorporated into the planning process.
- FMPs, programs, and activities support land and resource management plans and their implementation.
- Sound risk management is a foundation for all fire management activities.
- Fire management programs and activities are economically viable, based upon values to be protected, costs, and land and resource management objectives.
- FMPs and activities are based upon the best available science.
- FMPs and activities incorporate public health and environmental quality considerations.
- Federal, state, tribal, local, interagency, and international coordination and cooperation are essential.
- Standardization of policies and procedures among federal agencies is an ongoing objective.

Source: 2001 Federal Wildland Fire Management Policy, pp. 21-22.

The 2001 policy statements flowing from the general principles addressed the following five areas:

- the role of fire in ensuring ecosystem sustainability
- the need for restoration and rehabilitation of fire-damaged lands and ecosystems
- the role of science in developing and implementing fire management programs

² June 27, 2000 memorandum.

- the importance of communication and education internally and externally
- the critical need for regular, ongoing evaluation of policies and procedures

Within these areas, the 2001 update lists 17 policies, two of which mention wildland suppression costs. First, Policy 6, Protection Priorities, links the costs of protection to the values being protected, and to human health and safety as follows:

The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be based on the values to be protected, human health and safety, and the costs of protection. Once people have been committed to an incident, these human resources become the highest value to be protected.

Then, Policy 11, Suppression, directs that fires be suppressed at minimum cost, considering firefighter and public safety, benefits, and values to be protected, consistent with resource objectives.

However, the revised Implementation Actions flowing from these policies do not address either protection or suppression costs. In fact, in Implementation Action 2, Response to Wildland Fire, agencies are instructed to evaluate risks to firefighter and public health and safety, weather, fuel conditions threats, and values to be protected, without any reference to costs, or a goal of minimizing costs.

Nevertheless, the land management agencies have established requirements for post-fire reviews that include suppression costs as a factor. For example, the Forest Service advises Regional Foresters to formally review selected large fires, and includes the following criteria: (1) incident costs were projected to exceed \$5 million; (2) a Type 1 Incident Management Team was assigned; (3) control objectives and predicted times on control exceeded 5 days, and (4) there were significant natural resource concerns. NPS requires that fires be reviewed to determine the cost-effectiveness of a fire operation, and BLM requires a state level review of fires costing \$250,000 or more, and a national level review of fires costing \$500,000 or more. FWS utilizes both regional and national level reviews, which include cost effectiveness; criteria for these reviews include significant national adverse media or political interest, and substantial loss of national fire asset equipment or property (without any dollar threshold). BIA regional reviews are conducted when issues related to health and safety are raised or as requested by the Director of Trust Responsibilities. The Academy study team did not determine either the frequency or the adequacy of such reviews.

Two provisions of the 1995 Policy and the 2001 update impact wildland fire suppression the most. First is the requirement for each burnable area to have an FMP to help identify the level of risk associated with each burnable acre, including areas bordering the wildland-urban interface, and to outline the land unit objectives to be supported by fire use. The plans describe where and when a fire can be allowed to burn safely as a natural event to regenerate ecosystems and/or reduce fuel loadings.

Second, on the issue of property protection, the Policy clearly defines operational roles for Federal agencies as partners in the wildland-urban interface including wildland firefighting, hazardous fuels reduction, cooperative prevention and education, and technical assistance. It specifically addresses structural fire protection, a high-cost area of growing concern because of the rapid growth of communities in and near fire-prone wildlands, and establishes the roles and responsibilities of the land management agencies *vis a vis* tribal, state and local governments. Under formal fire protection agreements, federal agencies may assist with exterior structural protection before a fire reaches the structures. Structural fire suppression, which includes exterior and interior actions on burning buildings, is generally considered to be the responsibility of tribal, state or local fire departments.

AGENCY IMPLEMENTATION OF THE POLICY

Standard procedures to guide immediate implementation of the 1995 Policy were issued in August 1998. The guide “Wildland and Prescribed Fire Management Policy, Implementation Procedures Reference Guide,” was prepared by representatives of NPS and Agriculture, and endorsed by the five land management agencies. It covered all elements of the Policy, and introduced procedures for using “prescribed natural fire.” This new practice—essentially using a natural fire for resource benefit purposes—was separated from the prescribed fire element of the fire management program, and was classed as an appropriate management response to wildfires. This change allowed the objectives previously accomplished through prescribed fire to be achieved, instead, through appropriate management of naturally ignited fires. The Guide further stressed, however, that without an approved FMP, the only acceptable response to a wildland fire is suppression.

Using standards in the 1995 Policy, the mutually agreed upon 1998 reference guide, and the 2001 policy update, the five land management agencies continue to issue their own implementing procedures. The various agency documents, summarized in Box 2-2, generally use the same approach in describing the essential elements of the Policy. In particular, they establish procedures for developing Fire Management Units (FMUs) within the land unit showing where the various fire strategies may be appropriate.

Box 2-2. Agency Manuals and Handbooks Providing Directions for Implementing the Fire Policy

USDA FOREST SERVICE

Forest Service Manual (FSM) 5100 provides direction for fire managers and clarifies agency policy for integrating fire use into land and resource management plans and practices. Revisions to FSM 5100 were completed in June 1999 to comply with the 1995 Policy, and an interagency group has drafted changes required by the 2001 Policy Update to make FSM 5100 compatible with state and other federal agency partners. These national guidelines are supplemented by regional office guidelines.

DEPARTMENT OF INTERIOR

Departmental Manual Part 620, Wildland Fire Management, April 10, 1998, established the Interior Fire Coordination Committee, and the requirement that every area with burnable vegetation must have an approved Fire Management Plan. It further requires that wildland fire be used as a natural process and as a management tool. These department-wide requirements are supplemented by issuances from Interior's individual land management agencies.

National Park Service

Director's Order # 18 (DO-18), effective 1998, outlines NPS Wildland Fire Management policy and endorses the principles, policies, and recommendations of the 1995 Policy, calling for the integration of fire management with all other aspects of park management and requiring that fire management programs be designed to meet resource management objectives.

Reference Manual 18 (RM-18), revised in 2001, contains specific direction for fire management programs. Chapter 4, Fire Management Plans, and Chapter 10 Fuels Management, include revisions to incorporate both the 1995 Policy and the 2001 Review and Update.

Bureau of Land Management

Standards for Fire and Aviation Operations 2002 (BLM Handbook 9213-1, the "Red Book") provides BLM policy and guidance to perform fire and aviation management operations. It references the 2001 Federal Wildland Fire Management Policy. Started as a BLM-only document, the 2002 edition now applies to BLM, the Forest Service, and the Fish and Wildlife Service.

Instruction Memorandum No. OF&A 2000-20, Subject Prescribed Fire "Interim Direction", July 12, 2000, contains guidance on the content of Fire Management Plans as well as the linkage of these plans to Resource Management Plans. It includes instructions for the identification of polygons within a land unit and identification of the appropriate fire management strategy for each polygon.

Instruction Memorandum No. 2002-34, Land Use Planning and Fire Management Planning, dated December 7, 2001, provides additional information and guidance regarding the 1995 Policy and the treatment of wildland fire management in land use, fire management, and other implementation-level plans and projects.

U.S. Fish and Wildlife Service

Fire Management Handbook, dated June 12, 2001, incorporates 1995 Policy requirements that each refuge or complex have a fire management plan, that fire use be addressed in the Comprehensive Conservation Plan, Habitat Management Plan, and that these plans comply with the NEPA process.

Bureau of Indian Affairs

BIA Instructional Memorandum "Fire Management Plan, June, 1998, provides requirements for how the Fire Management Plan documents the Wildland Fire Management Program as described in the approved land use plans. It also describes management response strategies based on values to be protected for fires requiring suppression and fire having resource benefits.

FMUs are a key element in a Fire Management Plan, and BLM's guidance on delineating the possible fire management strategies for each unit (called polygons by BLM) is fairly typical:

Category A: Where wildland fire is not desired at all.

Category B: Where unplanned wildland fire is likely to cause negative effects, but those effects may be mitigated or avoided through fuels management, prescribed fire or other strategies.

Category C: Where fire is desired to manage ecosystems, but there are constraints because of the existing vegetation condition due to fire exclusion.

Category D: Where fire is desired, and there are no constraints associated with resource condition, or social, economic, or political considerations.

The most current actions reflecting the desired interagency approach are (1) the January 2002 adoption of performance goals and measures, (2) the May 2002 10-Year Comprehensive Strategy, and (3) the May 2002 Draft Interagency Fire Management Plan Template.

Developing a Joint Fire Management Plan Template

The Interior department and the Forest Service chartered an interdepartmental work group in 2002 to (1) review fire management planning procedures used by federal agencies, and (2) develop a single, landscape-scale FMP template for use by all five agencies. This group had the advantage of starting with the results of a two-year joint Forest Service/NPS project to do the same thing for those two agencies. The Forest Service/NPS project resulted in uniform guidance on FMP's for use by those two agencies. The five agency template is to provide a seamless, cross-boundary approach to wildland fire management using standard:

- format and terminology
- guidance for consistent application of principles
- integration with land use planning efforts
- review process
- schedule for completing all new FMPs by the end of FY 2004

Both departments were reviewing the proposed template in June 2002. Its major features are summarized in Box 2-3.

Box 2-3. Interagency Fire Management Plan Template

May 10, 2002 Draft

Fire Management Plans identify and integrate all wildland fire management and related activities within the context of approved land management plans.	
I.	INTRODUCTION
II.	RELATIONSHIP TO LAND MANAGEMENT PLANNING/FIRE POLICY
III.	WILDLAND FIRE MANAGEMENT STRATEGIES
	A. General Management Considerations
	B. Wildland Fire Management Goals
	C. Wildland Fire Management Options
	D. Description of Wildland Fire Management Strategies by Fire Management Zone
IV.	WILDLAND FIRE MANAGEMENT PROGRAM COMPONENTS
	A. Wildland Fire Suppression
	B. Wildland Fire Use
	C. Prescribed Fire
	D. Non-Fire Fuel Applications
	E. Emergency Rehabilitation and Restoration
V.	ORGANIZATION AND BUDGET
VI.	MONITORING AND EVALUATION
	Glossary
	Appendix

Revising Training to Reflect Federal Wildland Fire Management Policy

The Advance Fire Use Applications course, S-580, given by the National Advanced Resource Technology Center, was revised to include a unit entitled “Fire Use Management Team Organization and Management.” This course describes how to use the interagency Fire Use Management Teams, which were developed to help implement the Policy provisions allowing accomplishment of beneficial objectives by managing natural wildfires in addition to using prescribed fire. The Advanced Incident Management course (S-520) has also been revised to reflect provisions of the Policy.

Implementation Accomplishments

While the agencies have moved expeditiously in issuing new policies in support of the Policy, implementation of the key fire management plan requirement lagged. Table 2-1 provides an overview of each agency’s actions on these plans.

Table 2-1. Status of Agency Fire Management Plans, as of September 30, 2001

Agency	Units needing plan	Units with a plan	% Units with a plan	Units not compliant with 1995 policy	Per cent of plans not compliant
BIA	157	78	50	79	50
BLM	60	60	100	0	0
FWS	648	419	65	252	38
FS	242	219	90	137	57
NPS	277	147	53	227	82
TOTAL	1,384	923	67	695	50

Source: GAO- 02-158 Wildland Fire Management, March 2002

The table shows that, as of Sept. 30, 2001, 50 percent of all federal units did not have fire management plans consistent with the Policy requirement. In accordance with the Policy, therefore, all fires on about half of these agencies’ units may have to be suppressed immediately, regardless of the circumstances. This elimination of the “fire use” option may increase suppression costs while decreasing benefits.

However, as the GAO reports, compliant fire management plans cover 82 percent of the almost 655 million acres of burnable federal land. This means that only a small percentage of federal wildlands are not covered by an FMP that satisfies the Fire Policy. While BLM has all its units and burnable acres in compliance, the other agencies have moved more slowly.

In the March 22, 2002 joint Interior/Agriculture response to GAO, the agencies made the following points:

- There is more work to be done to complete Fire Management Plans. Using a joint FMP template, which incorporates both the 1995 Policy and the 2001 Review, both departments will be 100 percent compliant by 2004, having completed the remaining FMPs.
- It is not correct to assume that updated FMPs will automatically result in implementing a “let burn” decision. Such a decision can be made only when the land use plan provides for it, and in many cases the land use plans have not been updated to reflect the 1995 Policy or the 2001 update.
- Due to the prolonged drought for the last three years, and the heavy build up of fuels in forests and rangelands, it may be unrealistic to expect large savings through “fire use” techniques, since full suppression may be the only viable option now in many cases.

Academy Field Work

In conducting the six large-fire case studies, the Academy team reviewed how the Policy was being implemented. Table 2-2 summarizes what the Academy found at each of the land unit sites by arraying key elements of the Policy against the findings on each of the six fires in a question and answer format. For example, Question 1 “Was there a fire management plan on site?” shows that in each of the six cases, the answer is “Yes.” With one exception (Star), these plans were all less than 5 years old.

However, the case-study land units were much less successful in implementing two other aspects of the policy. Only Moose and Green Knoll had attempted to establish landscape-scale FMPs or LMPs. Only the Moose fire had an FMP that allowed for fire use, and only Yellowstone National Park (site of the Arthur fire) had a history of fire-use fires. The absence of landscape-scale efforts at the remaining four sites reflects the difficulty encountered in developing joint FMPs involving federal agencies having differing land management goals. The use of the joint FMP template described above should help to overcome this difficulty.

It is interesting to note that Question 6(a) dealing with “fire use” did not yield any “Yes” answers (with the exception of the Moose fire, which had both suppression and “fire use” techniques). This reinforces the point made in the agencies’ response to GAO that even when land units have current FMPs properly tied to the land management plans, full suppression may well be the only practical option when large-scale wildland fires occur because of community interfaces, drought, or fuels build-up.

Table 2-2. Policy Implementation at Six Fires

Wildland Fire Policy Requirement	Arthur	Sheep	Virginia Lake	Moose	Star	Green Knoll
1. Was there a fire management plan on site?	Y	Y	Y	Y	Y	Y
2. Was the plan tied to land and resource management plans?	Y	Y	Y	Y	Y	Y
3. Did the plan show fire management units within the land unit, and show different fire options for the different units?	Y	Y	Y	Y	Y	Y
4. Was there any evidence of landscape scale efforts in either the fire management plan and/or the land and resource management plans?	N	N	N	Y	N	Y
5. Were actions on the particular fire being studied consistent with the fire management plan?	Y	Y	Y	Y	Y	Y
6 a. Was there any effort to use the fire being studied as a “fire use” type fire?	N	N	N	N&Y ³	N	N
6 b. Was there a history of the land unit allowing previous wildland fires to be used as a “fire use” type fire?	Y	N	N	N	N	N
7. What conclusions (i.e., (a) adequate or (b) inadequate) regarding planning, staffing, training, and equipment were reached on the land unit’s preparedness efforts prior to the fire?	A	A	A	A	A	A
8. Were the fires suppressed at minimum cost ⁴ ?						
9. Were fire prevention programs established at the land unit?	Y	Y	Y	Y	Y	Y
10. Were the actions of the land unit and IMT consistent with the given operational role for Federal agencies in WUI type fires?	Y	Y	Y	Y	N/A	Y

PERFORMANCE MEASURES FOR IMPLEMENTING THE FEDERAL WILDLAND FIRE MANAGEMENT POLICY

The land management agencies have used a variety of performance measures related to fire management in their Government Performance and Results Act (GPRA) plans. These measures have focused on initial attack success rates, urban-interface areas with completed fuels treatments, prevention and education programs, and firefighting production capability. Box 2-4 provides a more complete list of these measures.

³ Full suppression while the fire was on Flathead NF but fire use when it entered Glacier NP.

⁴ The Academy study team was not able to answer this in the short time allowed.

Box 2-4. Some Fire-Related Performance Measures Used in Federal Agency GPRA Plans

INTERIOR

- Percent of wildland fires contained by initial attack
- Percent of rural fire districts receiving assistance for improved safety, training, and equipment standards
- Percent of communities' at-risk priority projects to restore natural ecological process through fire use implemented
- Number of fire facilities upgraded
- Total acreage with natural ecological process restored through increased use of fire

FOREST SERVICE

- Percent of wildland-urban interface areas with completed fuel treatments.
- Percent of all acres with fuel levels meeting condition class 1
- Percent of affected communities with prevention and education programs in place, and where fire-wise treatments are being applied on the ground
- Firefighting production capability rating for initial attack of wildfires is maximized
- Percent of needed support resources available for deployment in support of large wildfire incidents
- Percent of affected communities with increased firefighting capability and readiness
- Proportion of acres in short-interval, fire-adapted ecosystems (fire regimes I & II) in condition classes 2 & 3 compared to condition class 1

These performance measures illustrate two points: first, Interior and the Forest Service have not been using the same measures, and second, none of the agencies has a performance indicator for the percent of burnable acres covered in their FMPs.

In May 2002, the secretaries of Agriculture and the Interior, the Western Governors' Association, the National Association of State Foresters, the National Association of Counties, the Intertribal Timber Council, and several non-governmental organizations reached agreement on a common set of performance measures (see Table 2-3). These goals and measures respond to many of the Policy issues—such as measuring the percentage of burnable acres covered in fire management plans, the restoration of fire-adapted ecosystems, and the reduction of hazardous fuels both in and outside the wildland-urban interface. These measures were part of the 10-Year Comprehensive Strategy, which is an effort to work collaboratively in managing wildland fire, reducing hazardous fuels, restoring habitats, and rehabilitating public land. Implementation of the joint performance measures will commence by January 2003, by which time, the departments of the Interior and Agriculture (and the state, tribal, and local officials) are to have established the baselines within their respective jurisdictions from which future performance will be measured.

Table 2-3. The 10 Year Comprehensive Strategy Implementation Plan, May 2002

Goals and Performance Measures
<p>Goal One--Improve Fire Prevention and Suppression: <i>Losses of life are eliminated, and firefighter injuries and damage to communities and the environment from severe, unplanned and unwanted wildland fire are reduced.</i></p> <ol style="list-style-type: none"> 1. Amount of time lost from firefighter injury in proportion to number of days worked across all agencies. 2. Number of acres burned by unplanned and unwanted wildland fire. 3. Percent of unplanned and unwanted wildland fires controlled during initial attack. 4. Number of homes and significant structures lost as a result of wildland fire. 5. Average gross costs per acre for suppression and emergency stabilization and rehabilitation by size class and fire regime for fires (i) contained within initial attack, (ii) escaping initial attack, (iii) within wildland-urban interface areas, (iv) outside wildland-urban interface areas, (v) in areas with compliant fire management plans, and (vi) in areas without compliant fire management plans. 6. Percent of burnable acres covered in federal fire management plans in compliance with Federal Wildland Fire Policy. 7. Percent of burnable acres covered by state fire management plans in compliance with state policy.
<p>Goal Two—Reduce Hazardous Fuels <i>Hazardous fuels are treated, using appropriate tools, to reduce the risk of unplanned and unwanted wildland fire to communities and to the environment.</i></p> <ol style="list-style-type: none"> 1. Number of acres treated that are (1) in the Wildland-Urban Interface or (2) in condition classes 2 or 3 in fire regimes 1, 2, or 3 outside the wildland-urban interface, and are identified as high priority through collaboration consistent with the Implementation Plan, in total, and as a percent of all acres treated. 2. Number of acres treated per million dollars gross investment in Measures a. (1) and a. (2) respectively. 3. Percent of prescribed fires conducted consistent with all Federal, State, Tribal and local smoke management requirements.
<p>Goal Three--Restore Fire-adapted Ecosystems <i>Fire-adapted ecosystems are restored, rehabilitated and maintained, using appropriate tools, in a manner that will provide sustainable environmental, social, and economic benefits.</i></p> <ol style="list-style-type: none"> 1. Number of acres in fire regimes 1, 2, or 3 moved to a better condition class, that were identified as high priority through collaboration consistent with the Implementation Plan, in total, and as a percent of total acres treated. 2. Percent of acres degraded by wildland fire with post-fire rehabilitation treatments underway, completed, and monitored. 3. Number of acres moved to a better condition class per million dollars of gross investment.
<p>Goal Four—Promote Community Assistance <i>Communities at risk have increased capacity to prevent losses from wildland fire and the potential to seek economic opportunities resulting from treatments and services.</i></p> <ol style="list-style-type: none"> 1. Percent of states with a prioritized list of at-risk wildland-urban interface communities. 2. Percent of communities at risk with completed and current fire management plans or risk assessments. 3. Percent of communities at risk with fire prevention programs in place and being implemented. 4. Percent of communities at risk that initiate volunteer and community funded efforts to reduce hazardous fuels resulting in removal of the community from the at-risk list. 5. Percent of acres treated to reduce hazardous fuels by mechanical means with by-products utilized.

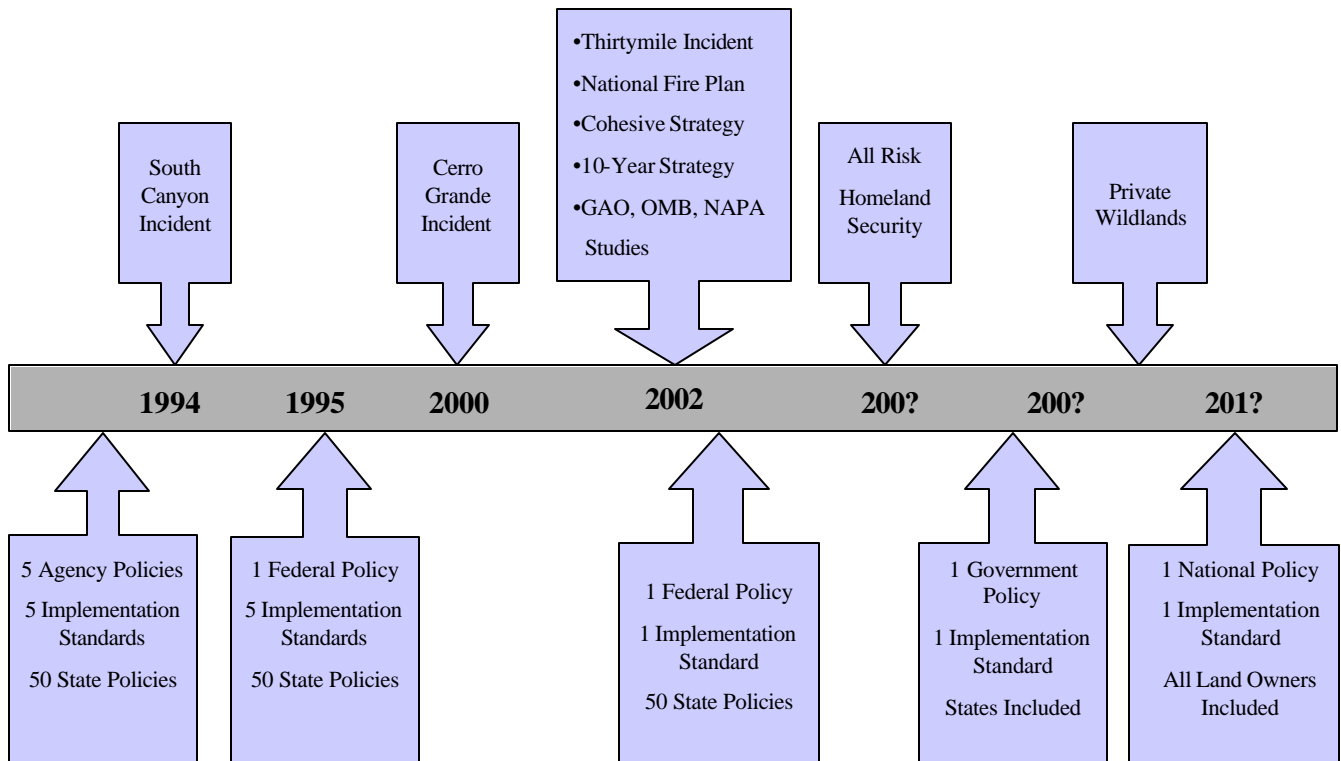
NEXT STEPS IN THE POLICY'S EVOLUTION

The federal Fire Policy provides consistent direction, but relies on each of the federal land management agencies to implement it independently. It neither prescribes uniform implementation standards nor applies to state and private land managers.

Recognizing these limitations, the NWCG chartered a Task Group to develop an implementation plan for the Fire Policy. The Group includes representatives from the land management agencies and the National Association of State Foresters. Complementing the 10-Year Comprehensive Strategy, the long-term goal of the project is to deliver a national (not just federal) fire management policy that will be adopted consistently by federal agencies and the states. The project will further refine the wildland fire policy to offer differentiated guidance for wilderness, general wildlands, and wildland-urban interface. But it is only the next step; ahead lies the ultimate need to develop a single national policy to include all landowners under the same implementation standards.

A timeline tracing the developments from 1994 to 2002 and beyond might appear as follows:⁵

Figure 2-1. National Policy Timeline



⁵ Federal Wildland Fire Management Policy, Evolutionary Context and Current State, a working paper for NWCG's Task Group on Implementing the Federal Wildland Fire Policy, p. 4.