University of Montana

ScholarWorks at University of Montana

Graduate Student Theses, Dissertations, & Professional Papers

Graduate School

2010

FUELS MANAGEMENT POLICY AND PRACTICE IN THE U.S. FOREST SERVICE

Erik K. Hakanson
The University of Montana

Follow this and additional works at: https://scholarworks.umt.edu/etd

Let us know how access to this document benefits you.

Recommended Citation

Hakanson, Erik K., "FUELS MANAGEMENT POLICY AND PRACTICE IN THE U.S. FOREST SERVICE" (2010). *Graduate Student Theses, Dissertations, & Professional Papers*. 473.
https://scholarworks.umt.edu/etd/473

FUELS MANAGEMENT POLICY AND PRACTICE IN THE U.S. FOREST SERVICE

By

ERIK KAJ HAKANSON

M.S. University of Montana, Missoula MT, 1997
B.A. Lewis and Clark College, Portland OR, 1991

Dissertation

presented in partial fulfillment of the requirements
for the degree of

Degree Doctorate of Philosophy
in Forestry

The University of Montana
Missoula, MT

July 2006

Approved by:

Perry Brown, Associate Provost for Graduate Education
Graduate School

Dr. James Burchfield, Chair
College of Forestry and Conservation, Department of Society and Conservation

Dr. Ronald Wakimoto
College of Forestry and Conservation, Department of Ecosystem and
Conservation Sciences

Dr. William Borrie
College of Forestry and Conservation, Department of Society and Conservation

Dr. Cameron Lawrence
School of Business Administration, Department of Management Information Systems

Dr. Irene Appelbaum
College of Arts and Sciences, Department of Anthropology

Hakanson, Erik, PhD., August, 2010   Forestry

Fuels Management Policy and Practice in the U.S Forest Service

Committee Chair: James Burchfield

   This dissertation investigates the history and development of wildland fire and fuels management policy in the U.S. Forest Service (USFS) and the implementation of this policy in fuels management project planning at the national forest and ranger district levels. The policy guiding fuels management is broad and ambiguous but may be summarized as: 1) reducing the risks posed by wildland fire and 2) restoring or maintaining ecosystem health and sustainability.
   Wildland fire management policy is interagency in scope, including input from state governments and is dispersed among a multitude of policy and strategy documents, such as the 1995/2001 Federal Wildland Fire Policy, successive fire policy implementation guidelines as well as the various documents collectively known as the National Fire Plan. To these policy documents have been added the legislation and regulatory enactments of the Healthy Forest Initiative. The relationship between these policy and strategy documents and these legislative and regulatory enactments is not well defined nor are concepts such as risk, restoration and ecosystem health or sustainability. There is no clear guidance for determining environmental conditions or management actions that contribute to risk or sustainability or for adjudicating conflicts between them.
   This research examined three national forests in the Forest Service Northern Region; the Bitterroot, Helena and Kootenai, to understand how fuels management project proposals are developed and to identify the key factors that affect this development. The results suggest that fuels management project proposals are developed within a loosely defined process called NFMA analysis. It is an iterative process of negotiation with specialists from other resource management programs in which a project's objectives and treatments are refined and defined. This research suggests that the key factors that affect the development of project proposals are fuels management acreage targets and the budget associated with this target and the costs associated with data collection and analysis estimated by managers to be necessary for regulatory and policy compliance and to mitigate the threat of litigation. Some recommendations are offered in the context of current efforts to develop a cohesive wildfire management strategy and new forest planning regulations.

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

Tables and Figures

List of Figures:

List of Tables:

CHAPTER ONE

INTRODUCTION & RESEARCH QUESTIONS

1.1   Introduction

This dissertation is about fuels management policy and practice in the US Forest Service. Land managers and scientists have long recognized that fire plays a vital role in many ecological processes of fire-adapted ecosystems, including the reduction of fuels, and that past land management policies and practices, including fire suppression, timber management, and grazing have disrupted these processes (Arno and Allison-Bunnell, 2002). Ever since the early 1970s, when the Forest Service changed the name of the Division of Fire Control to the Division of Fire Management, fire researchers and fire management leadership have expounded on the need to develop policies that integrate fire and fuels management more fully into overall land management planning and implementation at a scale commensurate with the phenomenon of wildfire. While numerous conferences have been held, research conducted and articles written, progress has been slow, some say non-existent (Franklin and Agee 2003; Stephens and Ruth, 2005).

Fuels management remained primarily a support function to other resource management activities in the Forest Service until the late 1990s. The unprecedented fires of 2000 added a new level of urgency to the issue of fire and fuels management resulting in its expanded role in public lands management. Fuels management funding increased dramatically and it moved from a support function to an active participant in proposing

and developing projects. But this new role for fuels management is not guided by coherent policy and direction but has instead inserted fuels managers into the existing conflict ridden project planning and decisionmaking process of the Forest Service.

Many federal strategies, interagency plans, legislation and administrative initiatives have been developed in response to the growing concerns over wildfire and the role of fuels management in mitigating these concerns. The National Fire Plan, begun while the fires of 2000 were still smoldering, and the interagency Federal Wildland Fire Management Policy of 1995, updated in 2001, both recommend and provided the general outlines of a coordinated and integrated approach to landscape-scale fuels management in order to reduce the risk posed by fire to social and economic values while at the same time restoring forest ecosystem health and the ecological role of fire. The legislative and administrative enactments of President Bush's Healthy Forest Initiative of 2003 followed the development of these policies and plans, and rhetorically at least, builds on the notion of an integrated landscape-scale approach to fire risk and restoring forest health. These enactments, however, took these concepts in a different direction.

The Government Accountability Office (GAO),[1] as well as many large fire cost reviews and internal agency reports, have repeatedly criticized the federal land management agencies, particularly the Forest Service, for the disparate and uncoordinated nature of their fuels management programs, its lack of integration with other agency programs and objectives, the lack of criteria and procedures for prioritizing areas most at risk and the widespread use of fuels manager's subjective professional judgment in the selection and development of fuels management project. While

---

[1] GAO (1999a, 2002, 2003ab, 2004a, 2005ab, 2008, 2009).

coordinated landscape-scale fuels management is widely agreed to be necessary, nowhere in these many policy documents or legislation are "coordination" or "landscape-scale" clearly defined and remain ambiguous. Nor are the concepts of fire risk or the ecological role of fire clearly defined but rather than ambiguity there are a variety of competing conceptions and methods of analysis and classification. It is widely accepted, at lest rhetorically, both within and outside the agency that the current uncoordinated, project-by-project approach to fuels management planning and implementation with little attention to broader ecological interactions and cumulative effects is entirely inadequate to the scope of the fuels and ecosystem health problem. As Chet Joy, Senior Evaluator, Natural Resource Management Issues for the GAO described it in testimony before Congress "…the Forest Service is facing some difficult reconciliation chores. Our point is, that can't be done on the basis of ad hoc. There has to be a very cohesive strategy that clearly recognizes those priorities and makes it absolutely transparent to everyone what the thinking is that is going into it" (Joy, 1999, 54).

There is no consensus, however, and in fact considerable disagreement within the agency, from the Washington Office to the ranger districts where projects are actually planned and carried out, as to precisely what constitutes hazardous fuels, fire risk and forest ecosystem health, what landscape-scale management means operationally. This lack of consensus makes discussing and analyzing the relationships between hazardous fuel, fire risk and forest ecosystem health even more problematic. Consequently there is little agreement over precisely which management policies and practices should be changed, how they should be changed and how these changed practices can be coordinated together across the ecological and organizational landscape. A general

problem is recognized, in other words, but the solutions articulated are as vague as the problem itself. The federal Quadrennial Fire and Fuels Review Report (NWCG, 2005, p. 1) states that "The federal wildland fire agencies must continue to modernize processes and infrastructure, reassess structure and organization at both the national and field levels…"[2] Nazzaro (2005, p. 6) of the GAO is slightly more explicit in testimony before Congress stating that "…the agencies will have to overcome the challenges presented by the current lack of a consistent approach to assessing the risks of wildland fires to ecosystem resources as well as the lack of an integrated, strategic, and unified approach to managing and using information…in wildland fire decision making."

According to the GAO (1999a, 2005ab) the root cause of this lack of coordinated planning on a landscape-scale is the agency's lack of leadership and its failure to develop and implement a cohesive strategy to guide fuels management. Federal agencies, however, are faced with implementing incongruent and often contradictory public lands policies, Congressional funding priorities overlain with non-binding and vague fire and fuels strategies (such as the Federal Wildland Fire Policy and the National Fire Plan). Moreover, each administration has pushed different land management agendas emphasizing different land management policies and practices. During the Clinton administration, when the Federal Wildland Fire Policy and the National Fire Plan was initiated, the Forest Service emphasized broad-scale assessments and ecosystem management influenced heavily by concepts from landscape ecology. The Bush

---

[2] This report, submitted to the National Fire and Aviation Executive Board (NFAEB), "contains the Panel's final analyses and strategy recommendations, but does not purport to represent any official policy or program decision by NFAEB and the federal wildland fire agencies…The Quadrennial Fire and Fuel Review (QFFR) represents, for the first time, a unified fire management strategic vision for the five federal natural resource management agencies under the Departments of Interior and Agriculture." (p i and 1)

administration, by contrast, focused more narrowly on forest health influenced by more traditional utilitarian interpretations of forest health and management. The *Interagency Strategy for the Implementation of Federal Wildland Fire Management Policy* captures the conundrum faced by fire and fuels management policy and practice in the context of competing visions of land management when it states that:

> Fundamentally…wildland fire policy improvements are attempting to marginalize a much deeper, much more systemic, and more problematic public lands policy dilemma. Until larger, overarching land/resource policy issues are reconciled, wildland fire policy evolution can only inch forward on the heels of undesirable outcomes in firefighting and fire use (USFS, DOI, 2003, p. 13).

Both the GAO's assertion that the complex problem of coordinated landscape-scale fuels management can in fact be meaningfully guided by a cohesive strategy and effective leadership and interagency fire management leadership's allusion to the dependence of progress in fire management policy on the reconciliation of "larger, overarching land/resource policy issues" both exhibit a bias towards an instrumental rationalist perspectives of organized and coordinated action. It is a perspective that holds that the actual activity of fuels management project planning and implementation more or less automatically follows from policies and strategies and that the current ad-hoc and uncoordinated approach to fuels management follows from current lack of a coherent policy and strategy. This perspective ignores what the actual practice of fuels management can tell us about what is driving ad-hoc fuels management practice. Mosse (2004, p. 640) notes that "…enormous energy [is] devoted to generating the right policy models, however, there is surprisingly little attention paid to the relationship between these models and the practices and events that they are expected to generate or legitimize

in particular contexts." This observation holds equally well for the emphasis by the GAO on the need for a cohesive strategy and increased agency leadership as well as the view in the *Interagency Strategy for the Implementation of Federal Wildland Fire Management Policy* (USFS, DOI, 2003) that the larger policy dilemma must be reconciled before real progress can be made in the fire arena. Mosse continues:

> At best, the relationship between policy and practice is understood in terms of an unintended 'gap' between theory and practice, to be reduced by better policy more effectively implemented... What if the practices…are in fact concealed rather than produced by policy? (Mosse, 2004, p. 640)

In the case of fire and fuels management, where there is no coherent policy or strategy, what if the practice of fuels management, though it results in ad-hoc project planning and implementation, nonetheless follows some logic and exhibits some order rather than simply being the more or less random result of a lack of clear direction? A great deal of ethnographic research on work and the workplace suggests that coordinated and organized activity arises from the actual practice of work in context. Crabtree (2000, p. 6) notes that "there is a 'necessary' character to formal rules but it is not a prescriptive necessity (let alone a causal one)..." This research also suggests that the actual working practices of an organization's staff, what Suchman (1987) calls situated action, results in relatively stable and reoccurring patterns that Garfinkle and Sacks (1969) call assemblages of practice. These stable and observable patterns in organized activity, according to this research, arise and are reproduced by organization members using established procedures and organizational structures to help interpret broad and often contradictory policy goals and objectives and meet the requirements of administrative direction in each specific situation. Latour (1996) notes, however, that such established

organizational structures and procedures may themselves constitute "system goals" such that the interpretation of broad policy and direction often serves to protect and reproduce organizational hierarchies and bureaucratic interests tied to this administrative order even while they are rationalized through the language of formal policy goals and objectives.

Bureaucracies, especially the Forest Service with its long history of administrative discretion, are more than instruments of policy. They generate their own interests and goals. Mortimer (2002) even goes so far as to describe the agency as having been delegated law-making authority by Congress through its avoidance or refusal to address longstanding policy conflicts and continually passing ambiguous legislation.[3] At the same time, however, this delegation does not entail that the agency has clarified what Congress has not. Rather, Mortimer (2002, p. 910) notes, the agency replicates this ambiguity resulting in "administrative schizophrenia" such that the agency may not even recognize let alone articulate a coherent mission or policy to achieve it." Thus the system goals of which Latour (1996) speaks become both more important as guides for action, resulting in the stable behavior and reoccurring assemblages of practice of Garfinkle and Sacks (1969), while at the same time become even more obscured by the rationalizations offered for them using the ambiguous language of formal policy goals and objectives.

1.2   Research Questions

Fire and fuels management policy in particular and land management policy in general are clearly important, as illustrated by the longstanding conflicts and contests to define them. Despite being less than clear and coherent, managers must attempt to

---

[3] Mortimer (2002) also describes a vicious cycle at work where continued conflict provides the impetus for further delegation of authority in successive ambiguous legislation that in turn produces yet more conflict.

interpret and follow them. It is in this sense that policy, following Crabtree (2000), has a necessary but not a prescriptive character. But to understand the practice of fuels management and why it continues to be ad-hoc as the GAO asserts we must look beyond the ad-hoc character of policy and investigate the practice of fuels management project planning itself as well. This research seeks to answer the following three questions:

1. What is fuels management policy and how did it arrive at its current state?

2. How are fuels management projects identified, prioritized and developed into project proposals? Or, more simply, how are fuels management projects planned?

3. What are the key factors that affect fuels management project planning?

The overall goal of this research is to document the actual practice of project planning and the structure and patterns of behavior that illustrate the salient or operative goals of the institution enshrined in the agency's procedures. These three questions are the means by which this goal will be approached. These questions are explored in two parts, the first broad based focusing on fire and fuels policy and its history. The second examines the practice of fuels management project development via a more fine-grained empirical approach. Following chapter two describing the methods and theoretical approached used in this research, chapter three will focus on question one and describe the history and development of fuels management policy in the Forest Service. Chapters four and five will focus on question two and three. Chapter Four describes the organizational structure and process of fuels management project planning and the key factors that affect project planning while chapter five describes the how projects are identified, prioritized and developed into project proposals. The discussion, chapter six

revisits fuels management policy in light of the practice of fuels management and

discusses recommendations followed by a conclusion in chapter seven.

CHAPTER TWO

METHODS

2.1   Overview

The theoretical approach and analytical methods used for this research for both

the policy and practice chapters are derived from Actor-Network Theory (ANT) as

described by Latour, Callon, Law, Ciborra and others.[4] ANT is derived from ethnography

in general and ethnomethodology in particular and focuses on the practice or activity

engaged in by actors (Lynch, 1993). A principle concern of ethnography is understanding

events or actions in context because it is context that provides the tools with which

participants to action interpret the meaning of direction and expectations passed down

from above. ANT barrows from ethnomethodolgy the focus on the various means by

which participants to action interpret situations and directions for action (such as policies

or rules) and simultaneously use situations to interpret directions and directions to

interpret situations and negotiate courses of action. Because there are multiple actors

participating in action, attention must be paid to the diversity of interpretations brought to

the negotiation over courses of action by these various participants. This leads to the

advice, even insistence, for ethnographic studies to employ what is commonly referred to

as *thick description* following Geertz (1973). Studies employing ANT, whether focused

on broad and historical situations, such as policy development, or narrow and specific

situations such as the practice of fuels management project development, seek to provide

---

[4] Principle sources include: Callon (1986, 1991); Callon et al. (1986); Callon and Law (1995, 1997); Knorr-Cetina and Cicourel (1981); Latour and Woolgar (1986); Latour (1987, 2005); Law (1992); Law and Hassard (1999) and Ciborra (2000, 2002).

such thick description so that the ingredients of actor's interpretations and negotiations are front and center highlighting the basis of the analyst's interpretations and explanations. ANT, in other words privileges thick description over sparse interpretation and explanation on the part of the analyst (Latour 1997). It is an effort to acknowledge rather than elide the contingency of interpretation and explanation.

Effort was made in writing this dissertation to provide such thick description in both the policy and practice chapters since the question of interpretation is so important. Extended passages from interviews as well as policy documents, legislation and federal agency directives and reports as well as published material by various actors involved in the public discourse over land management are used throughout. As described in the introduction, the policy guiding fuels management is anything but straightforward and in the practice of fuels management there is such a wide variety fuels reduction treatment activities and environmental and administrative conditions taken into account by managers that many combinations are interpreted by some to be legitimate fuels management while others are not. It is a context dependent judgment. While the concepts and methodological approach employed for analyzing the documentary and interview data are derived from ANT, these concepts and their terminology are not employed in the resulting thick descriptions of policy and practice. The material is complex enough such that a narrative style was adopted rather than attempt to employ terms from ANT that have specific theoretical meaning. The following briefly describes 1) three forests studied in this research; 2) the data collection effort undertaken for this research; and 3) the theoretical approach of Actor Network Theory.

2.2   Site Description

The three study sites for this research are the Bitterroot, Kootenai and Helena National Forests, all within the Northern Region (Region 1) of the U. S. Forest Service. These three forests were selected because they represent diversity in organizational structures and project planning capacity. It was suggested by managers during early investigations setting up this research that the full spectrum of project planning - from the early stages of an initial idea for a project, its selection for funding and finally the development of a formal proposed action that undergoes the analysis required by the National Environmental Policy Act (NEPA) – is heavily influenced by the organizational structure and division of responsibilities within the Forest Service.

Project development and planning in the Forest Service is characterized by a dynamic relationship between forest leadership in the forest supervisor's office or SO, and the forest district offices (ranger stations) headed by district rangers. Project planning requires the participation of a variety of specialists from the different resources management programs such as fuels management, vegetation management and watershed and wildlife management. These specialists are organized into what is called an interdisciplinary team or ID team. The SO controls the forest's budget, establishes annual priorities and allocates funding and the time resource specialists on the ID teams may devote to the many project planning and implementation activities occurring on a forest in any given year. The analysis and planning of individual projects is carried out at the district level by the ID team under the direction of the district ranger on whose district a project takes place. These three forests were selected in an effort to account for the

organizational differences in order distinguish the idiosyncratic from the more general aspects of this dynamic as they affect fuels management project development and planning.

The Bitterroot National Forest encompasses 1.6 million acres in west-central Montana on the border with Idaho. The forest is divided into four ranger districts; Stevensville, Darby, West Fork and Sula. The Forest Supervisors office is located in Hamilton, Montana. The Kootenai National Forest encompasses 2.2 million acres located in the north-west corner of Montana with a small portion (50,384 acres) in Idaho. The forest is divided into five ranger districts: Rexford, Fortine, Three Rivers, Libby and Cabinet with the Supervisors office in Libby, Montana. The Helena National Forest lies in west-central Montana encompassing just under one million acres and is divided into three ranger districts: Lincoln, Helena and Townsend with the Forest Supervisors office in Helena, Montana. These three forests were selected because they appeared to offer a broad range of forest organizational forms. The Kootenai National Forest is comparatively "well off" with each of its seven districts able to field what is described as a full complement of specialists from each resource management program (e.g. Vegetation management, Watershed and Wildlife management and fire and fuels management) to form an interdisciplinary team (ID team). The Bitterroot, by contrast, is not quite as "well off" with the majority of the members of the ID teams organized into zones encompassing two districts each. The Helena National Forest represents the other end of the spectrum with what is described as an "ID team and a half" for the whole forest.

2.3   Data Collection Overview

There were two types of data collected for this research – 1) response to interviews and notes taken during participant observation in various activities and 2) documents. Both of these two types of data were analyzed and the results presented in chapters three, four and five. However, chapter three, on fire and fuels management policy, relies predominantly on current and historical documents relating to fire and land management policy. Chapter four relies on a mix of interview response and documents relating the organization of national forests, direction in the Forest Service Handbook as well as court cases that affect the process of project planning. Chapter five is based primarily on interview responses along with completed project decision documents described as illustrative of the topics discussed by interview participants. The individuals selected for interviews and the documents selected for analysis were identified using a version the snowball method where interview subjects suggest other individuals to interview and documents to analyze. Documents reference other documents and these were, in most cases, located and included in the data set.

To ensure a degree of systematization to the snowball method when employed over three study sites (national forests), every effort was made to interview personnel in comparable positions and areas of responsibility across the three forests rather than simply following the suggestions of the interviewees. That is, when district Assistant Fire Management Officer (AFMO) suggested, for example, interviewing the assistant planner, this was done where possible on all three forests. This was not always possible with every follow-up suggestion due to a variety of reasons, including scheduling conflicts,

differences in organizational structures of the three forests and the personnel employed or simply position vacancies. Similarly for documents, covering topics or processes below the regional office level, every effort was made to ensure commensurable representation across the three forests. This primarily pertained to project planning decision documents and supporting assessment results.

2.3.1 Interviews and Participant Observation & Documents

Participants were interviewed using a set of open ended questions (Appendix A: Interview Schedule). The Interview schedule, consisting of eight very broad questions, was developed following eight interviews conducted for different but related projects focusing on the conduct of the FRCC Guidebook (USDA et al., 2004) assessment procedures. These initial interviews revealed a great willingness to describe and critique project planning in detail, including various internal conflicts that affect this process. They also revealed a very dynamic process of how project development and planning progresses from the general to the specific, from an initial idea for a project to a well defined proposed action, a formal document that incurs substantial regulatory requirements. The dynamic process revealed in these initial interviews suggested several consistent and common themes relating to this temporal sequence of project planning and the factors that affect it as well as many idiosyncrasies. Descriptions of what constitutes assessment or planning, for example, and their relationship to project objectives and how objectives are themselves determined are multi-faceted and not clear-cut. Thus, what constitutes the factors that affect this process of fuels management project planning, were also multifaceted and inter-related.

Interviews

Following from the theoretical framework employed in this research, described below, the definition or nature of the phenomena of inquiry, their bounding and identities as distinct phenomena (such as project planning, resource assessment, the establishment of project objectives etc.) should be as free from preconceptions and a priori categories or definitions as possible. Yet research must begin somewhere. It was decided not to ask obvious questions directly focused on research question #3 (what factors affect project planning?) in favor of letting this emerge from the responses to questions focused specifically on research question #2 (how are fuels management projects identified, prioritized and developed into project proposals?).

Shortly into the interview process, once at least two subjects from each forest had been interviewed and initial analysis of the transcripts was conducted, several themes became immediately apparent, themes common to all forests. For example, the answers to the first question on the interview schedule, noted above ("what factors affect project planning"), almost invariably lead to a discussion of the "NFMA analysis." NFMA analysis is a term from the USDA Forest Service's *NEPA/NFMA Forest Plan Implementation Training Course (1900-01)* which all personnel who participate in project planning take early in their careers. In brief, the term refers to all the aspects of project development and planning that leads to a formal proposed action. NFMA analysis in fact became the central focus of chapter four on the practice of fuels management project planning. Several additional questions were added to the Interview Schedule to specifically probe these themes and the initial subjects interviewed prior to the addition of these probe questions were interviewed again.

In conducting the interviews the long answers to the first question on the interview Schedule (Describe the development, planning and analysis of a fuels management project) invariably touched on and partially answered many of the other questions. In such cases follow up questions (called *probing*) were asked to obtain more detail on these questions as they came up. Thus, the order of questioning followed the flow of responses rather than order of the Interview Schedule. In almost every case the topics of all the questions were hit upon with the first three questions without prompting. The added probe questions were used to flush out the topic of NFMA analysis. Project planning documents, discussed below, were collected at the time of interviews. These documents, however, were for completed projects but they provided general information to guide subsequent follow up interviews.

Interviews and site visits were conducted in a variety of settings usually dictated by the availability of managers. The majority were conducted with one or two managers at ranger stations or forest headquarters. Five interviews, however, were conducted as part of a visit to project sites in various stages of development. At least one such site visit was conducted on each forest. These ranged from forty five minutes to two hours. Forty individuals were interviewed using the Interview Schedule. Twenty three were recorded and transcribed. Extensive written notes were taken for the remaining seventeen interviews where respondents preferred not to be recorded.

In conducting interviews, every effort was made to get a comparable breadth and depth of individuals in various positions at the three forests studied for this research. One of the reasons for employing the snowball approach to identifying interview subjects was

to learn the organizational structure of the three forests and the dynamics of fuels management project planning. The resulting interviews were distributed across the Regional Office, the three Forest Supervisor's offices and two districts on each forest (see figure 1 Distribution of Interviews). These included the Assistant Fire Management Officer (AFMO) responsible for fuels management at each Forest Supervisor's office and district offices (ranger stations) as well as at least one fuels specialist from each district. Most of the upper level Fire Management staff interviewed had worked on their forest since before the fires of 2000 and the increased funding that accompanied the National Fire Plan. A few, however, were hired as a result of the increased spending for fuels management following the 2000 fires or had transferred from other forests. Similarly for non-fire management staff interviewed, the majority had worked on their forest since before the 2000 fires. Thus the range of experience on the job ranged from three to eighteen years.
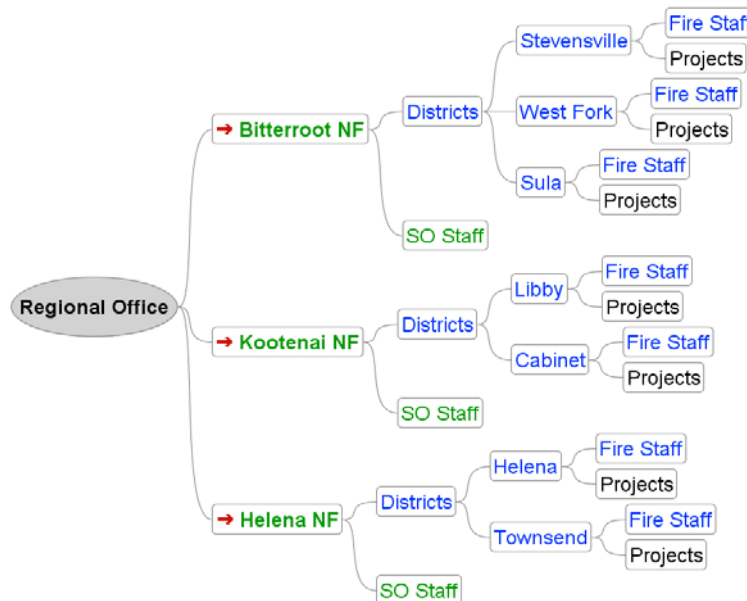
Figure 1 Distribution of Interviews

At the time this research was conducted each of the forest in this study had a forest fire ecologist and these individuals were interviewed as well as one other resource management specialist from each forest (silviculture and watershed). Additionally, the forest planners from each of the three forests, as well as assistant planners for two of the forests were interviewed. Discussions were held with district rangers from two of the forests but formal recorded interviews using the interview schedule could not be conducted (arrangements for interviews were made but scheduling conflicts arose in each case). The interview schedule was employed for all formal interviews except those five from the Regional Office. Follow up interviews were conducted with each forest and district level AFMO, fire ecologist and three of the planners as well as several fuels specialists. The majority of formal interviews were recorded and transcribed. Extensive written notes were taken for the few interviews not recorded and at these site visits, meetings and training courses.

Participant Observation

In addition to interviewing managers several forms of participant observation were engaged in. Interviews using the Interview Schedule were not conducted but extensive notes were taken and included with interview data for analysis. These included:

- Four site visits accompanying fuels management to project sites in the early stages of project development

- Three meetings in district offices (covered a wide range of topics including specific projects).

- Participation in four prescribed burning operations.

Three formal training courses were attended at which notes were taken on course content as well as informal interviews with several participants employing questions from the Interview Schedule as appropriate:

- FACTS accomplishment reporting database entry and business rules course for fuels managers (3 day course, four individuals interviewed)

- NEPA/NFMA Forest Plan Implementation Training Course -1900-01 (5 day course)

- FRCC Guidebook training course (5 day course).

Documents

The documentation reviewed for this research was of several types. Policy and historical documents that are the subject of chapter three are too numerous to describe in detail here, please refer to the bibliography. They include, for example, the various official agency policy documents such as the 1995 Federal Wildland Fire Policy (USDA and USDOI, 1995), the 2001 update to this policy (USDA and USDOI, 2001) as well as the many implementation guides that have accompanied these policies; the documents that make up the National Fire Plan; and various reviews of agency practice such as those of the Government Accountability Office (GAO); large fire cost reviews, as well as transcripts of Congressional testimony and peer reviewed journal articles. The documents analyzed for this research were also identified using a version of the snowball approach, such as following up on interview participant referenced or suggested documents or "back-tracking" additional documents referenced within policy documents themselves.

The forest plans and Fire Management Plans (2004 – 2007) for each forest as well as the fuels management Program Direction for fiscal years 2006 and 2007 were also reviewed. Numerous memos and guidelines were also reviewed, such as recommendations from the Regional Office to forest planners and resource management specialists on a variety of topics. Examples include "lessons learned from appeals reviews" on the writing of decision memos (DMs) for projects categorically excluded from NEPA; regional guidelines on conducting FRCC Guidebook assessments and cross-walking between different ecological classification systems (e.g. VRU & FRCC) for analyzing and representing current forest conditions; and regional directions for reporting fuel treatment accomplishments in the Forest Service's national database (FACTS). Numerous chapters in the Forest Service Manual and Handbook covering topics referred to during interviews were also analyzed, such as the guidance on NEPA compliance in 1909.15 Zero Code through 1909.15.40 to compare how managers interpreted and employed such guidance in the specific context described in the interviews.

NEPA documentation for 26 projects between 2001 through 2007 that included fuels management as one of their objectives were analyzed to compare the formal outcomes of project planning, their description of project objectives and purpose and need statements with managers description of the project planning process and how the category of NEPA authority used is determined. Ten of these were small projects conducted under CE authority, nine were EAs and seven EISs). Seven additional project documents completed in the late 1990s were also reviewed. The project files of one CE and one EIS on each of the three forests were also reviewed and notes were taken but

copies were not made. Most of these NEPA documents were selected on the recommendation of interview participants.

2.4   Theoretical Approach

Actor Network Theory (ANT) fits within a larger paradigm of social research that focuses on relationships rather than categories, individuals, groups or their attributes as the unit of analysis. ANT is useful or for generating detailed descriptions of dynamic phenomena whose patterns and processes are closely inter-connected and not clearly delineated (such as the nature and relationship between assessment and planning). It is particularly useful in settings where key concepts are ill-defined and contested (such as fire risk, forest health the nature and attributes of ecosystems) and upon which the application of pre-defined conceptions of organizational structure or the nature of the object of management activity may obscure rather than reveal how actors contend with the lack of definitions. ANT encourages the researcher to discover the identities and relationships of the actors involved and how they temporarily stabilize the meaning and definition of otherwise contested concepts from the self-reporting and self-representation of the participants involved.

ANT is sometimes referred to as the sociology of translation (Latour, 2005) and it is the heuristic concepts revolving around the concept of translation that proved the most useful and will be reviewed here. Translation is basically the same thing as negotiation but the term translation is used to convey the fact that the meaning or nature of the object of negotiation is changed or translated, in the act of negotiation. Like translating a story from one language to another, its meaning is altered as it is inserted into a different

context where the readers may share little few of the experiences or understand the culture within which the original text was produced.[5]

There are many other concepts associated with ANT but these concepts of negotiation and translation are the most relevant here for describing the analysis of the development of federal fire policy and Forest Service fuels management project planning and will be described below. The primary purpose and utility of these concepts is to provide the researcher with what Garfinkle and Sacks (1969) call "ethnomethodological indifference." Ethnomethodological indifference is the ethnographic principle that participants to action should be allowed to provide their own categories and ascribe their own meaning to words, things and phenomena. This is referred to as the principle of symmetry where the nature of actors in a network, their attributes and competencies, are not established a priori but rather approached as much as possible in an evenhanded way since the attribution of characteristics and competencies to actors by other actors is a large part of what needs to be discovered and a priori attribution by the analyst would restrict such discover. It derives from the perspective that the identities of actors are not stable but context dependent or, in ANT terms, dependent on the network of associations among actors in a given situation. In order to discover how negotiation proceeds and transformation comes about it is necessary to discover how the participants of action employ their own categories and inscribe their own definitions in the process of negotiation, e.g. what constitutes hazardous fuels and a legitimate fuels reduction treatment. The concepts of translation (as combination of the act of negotiation that leads

---

[5] Latour and others also uses the term transformation to describe the process of negotiation. Translations always result in transformation of the object of negotiation and the concept of translation helps to keep in mind the linkage between what the object of negotiation was at the start of the process and what becomes as negotiation transpires.

to transformation) are intended to provide the researcher with this ethnomethodological indifference.

Callon (1986) describes four characteristic points of achievement within processes of negotiation he calls moments of translation. These are problematization, interessement, enrollment and mobilization. Problematization is the formulation of a rough framing of a situation and representation of a problem calling for a response. It is an act of making a case for a course of action that more or less correspond with the perspectives, interests and objectives of those actors framing the problem in that way. Callon (1998) later employs Goffman's (1971) concept of framing to explain translation and negotiation and points out that much of the content and significance of a frame may be implicit and self evident to the protagonists initially involved if they share strong connections of some kinds such that agreement or consensus on the nature of the frame may not be explicit and only loosely specified. This entails that the proposed course of action may also be only loosely specified, the details also being implicitly understood. Making the frame and course of action more explicit and increasing their specificity and level of detail becomes necessary as actors that are necessary for the course of action to move forward are brought into the negotiation process but do not perceive or frame the problem in quite the same way.

Interessement, roughly translated as "to make interested," is the forming of alliances by aligning the various perspectives, interests and objectives of other actors with the proposed courses of action. To the extent that these new actor's perspectives, interests and objectives are different such alignment will result in altering (translating)

the course of action into something different. Enrolment is the moment when buy-in is achieved, it "describes the group of multilateral negotiations, trials of strength, and tricks that accompany interessement and enable it to succeed" (Callon, 1986, p. 206). Finally, mobilization is the process whereby those actors made interested in and aligned with a problem framed in a particular way and enrolled through negotiation over interests and objectives into a supporting or adopting a particular course of action work together as allies in subsequent negotiations with additional actors to continue to move an effort forward.

An important distinction is made in ANT between actors that behave as intermediaries and those that behave as mediators. Actors that behave as intermediaries do not transform the object of negotiation (such as the nature of a project, its objectives, size and the specific treatments employed etc.) in the process of being enrolled. Mediators, on the other hand, require changes in order to gain their support for moving forward with a proposed action thereby transforming the object of negotiation.

There are three important points to make clear in this conception of negotiation. One is that these moments of translation are heuristic devices. While these moments are more or less sequential, aspects of each are occurring simultaneously during each moment. When new actors become engaged they are confronted with the results of the entire suite of negotiations thus far and the moments are likely repeated. If the new actors are not more or less instantly mobilized to support the course of action, because they frame the situation differently, negotiations begin again over the framing or re-framing of the problem, revising the courses of action and so on.

The second point is that the course of action that is eventually pursued after mobilizing all the necessary actors may bare little resemblance to the courses of action initially proposed. The course of action may change to such an extent that its content and significance only resemblance to the initial proposal is a name, and perhaps a loosely defined objective. The actors who initially framed the problem and proposed the course of action may even become un-enrolled in the process, either voluntarily or involuntarily or, more commonly, remain mobilized to support the chosen course of action despite disagreeing with it, as when a superior simply directs a subordinate to carry on despite their misgivings.

Third, though perhaps it is obvious, negotiation over proposed courses of action may fail and a project may never get off the ground and move beyond a mere topic of discussion. They may fail early on or late in the planning process. However, even in the case where projects move forward, judgment of success or failure and even the identity or the nature of a project (e.g. its objectives and associated treatments) depends on the perspective of those passing judgment. Point two above is essential to bear in mind here.

For example, a district fuels specialist described proposing a prescribed burning project and had mobilized other members of the fuels crew and his supervisor, the district Assistant Fire management Officer (AFMO) into supporting the project idea. Through these negotiations among the 'fuels shop' the project was refined, its objectives were established - hazardous fuels reduction to reduce the risk and impacts of wildfire. The project was named and the basic details were roughed out such as boundaries and size, the location of the different treatment units within the overall boundary and estimates of

the type and location of mechanical pre-treatments necessary to accomplish the burn safely. Specialists from the Wildlife program were enrolled and acted as intermediaries in the negotiations because the proposed project met their program goals of increasing wildlife foraging habitat in the area and, consequently, were successfully mobilized to support it.

However, in the ensuing negotiations to enroll the other actors required for the project to move forward, principally vegetation management (the 'veg shop') and the district ranger, the size of the area designated for prescribed burning was reduced by over half and the size of area identified for mechanical treatments was more than doubled. Thus the 'veg shop' and the district ranger acted as mediators in the negotiation process, transforming the project proposal (the object of negotiation) significantly. The project went forward with the same name and objectives.

In the judgment of the district ranger and the 'veg. shop' the project was a success – fuels were reduced, receipts from the timber sale helped off-set the costs of the project and many of the concerned public was satisfied, but by no means all of them. From the perspective of the 'fuels shop' however, it was less than successful. There was, of course the issue of egos and the sense that the project was "taken over by the Veg. shop." There is also the issue of the reduction in acres treated and local units are held to account for meeting annual acreage targets. According to one fuels manager, the tradeoff of timber receipts to off set project costs was not enough to outweigh the added cost of increased NEPA analysis and mitigation efforts required to reduce the impacts of increased timber harvesting and the anticipated litigation harvesting entails, especially for the reduced

acreage of fuels treatment. The main reason, however, that the 'fuels shop' judged the

project less than successful (and even considered to no longer qualify as fuels

management in anything but name only) was because they felt the impacts on fire risk

was marginal. In the course of the changes made to the project, the treatment unit

boundaries were radically altered - boundaries which had been initially chosen based on

topographic features and their effect on estimates of fire spread and the ability to both

safely conduct the prescribed burning and to allow greater tactical options in the event of

a wildfire. The stated objectives of the project were retained - reduce the risk and impacts

of wildfire - but, in their view, compromised.

Methods from Grounded Theory (Strauss and Corbin, 1998) were used for data

management and analysis. Like ANT, Grounded Theory emphasizes generation of

explanations and understanding from the explanations and understanding of the actors

involved and reproducing the phenomena of interest. Grounded Theory is an analytical

method to qualitative data in which the material, (usually textual though other material

such as images can be analyzed this way as well) is segregated into broad topics or

themes and sub themes in a process called coding. The themes where identified following

ANTs emphasis on relationships and the process of negotiations (e.g. the four moments

of translation described above) for establishing the identity objects of management such

as the objectives of a project. For example, though the nature of project objectives and

project planning are poorly defined and interrelated in a dynamic and fluid process,

managers descriptions of the NFMA analysis process mentioned above revealed a distinct

sequence in the process of project development and planning where ideas for projects and

their objectives start out as very general and are refined and more clearly defined in a

sequence marked by specific institutional prescribed events such as the development of the annual program of work developed by the forest leadership team. This sequence was distinguished by the increasing number of actors brought into the negotiation process until the broad outlines of the project have been provisionally accepted and funding for further development has been allocated. After this decision to allocate resources the number of actors involved more or less stabilizes. Manager's description of the process of negotiation during this sequence of NFMA analysis as a project moves from a rather vague idea of an opportunity for management to a formal proposed action revolved around negotiating over the myriad of interrelated issues that must be addressed in order for a project to succeed. These were grouped into themes and coded according to this described sequence and what considerations were described as most salient by managers during different phases.

These considerations were eventually distilled into what are called in this dissertation the two "key factors" affecting project planning: Targets & Budgets and Compliance with Law, Regulation and Agency Policy, the Threat of Litigation and the Cost of Analysis. These factors were identified as "key" because they were topics of negotiation throughout NFMA analysis. These key factors, however, and their interrelationship to one another, were described by managers in different ways. At times they were described in a manner that distinguished them as separate and countervailing factors while at other times they were combined into a more general influencing factor in project development. This is the principle reason they are described as two sets of interrelated factors – to maintain the variety of meanings and conveyed in manager's accounts. They simply do not have stable, distinct meanings and influence across

different projects and throughout the sequence of negotiations characterized by NFMA analysis, according to mangers accounts. Rather, from an ANT perspective, these factors derive their meaning and impact upon negotiations depending on their association with other aspects of the negotiation process, i.e. the context or network of relations.

As described above, actors in the negotiation process may behave as intermediaries or mediators depending on whether changes to proposal are required to enroll their support. Also as described above, problem framing (which in this research means the proposed project, its objectives and treatments) becomes more explicitly defined as actors who do not share the same problem frame due to disparate interests and objectives enter into the negotiation process. The heuristic concepts of moments of translation and the distinction between intermediaries and mediators were employed during the coding process to distinguish the various definitions of and the role played by these factors in the negotiation process as it proceeded through the sequence of NFMA analysis. The coding and analysis process was carried out and managed using the QSR NVivo qualitative data management and analysis software as well as FreeMind and CmapTools cognitive mapping software. NVivo allows the tagging of passages within a text with a theme or code so similarly coded passages may be compared and contrasted. The surrounding text can be interrogated when questions arise over membership in a theme or their relationship with other themes. FreeMind and CmapTools are two examples of mind mapping or concept mapping tools, tools for graphically representing the relationships, similarity or differences between concepts (or themes and codes).

CHAPTER THREE

FUELS MANAGEMENT POLICY IN THE
U.S. FOREST SERVICE

3.1   Introduction

This chapter describes fuels management policy. It briefly describes the historical

background leading up to current policy and sets the stage for the chapters four and five

on the organizational structure and practice of fuels management project planning. The

policy governing fuels management is complex and not well defined because fuels

management is a component of the larger enterprise of fire management and fire

management is itself embedded in the even more diffuse enterprise of land management.

While fuels management is the provenance of individual agencies, such as the Forest

Service, wildfire incident management is an interagency endeavor, owing to its historical

development as an emergency response requiring mobilization of resources across

jurisdictions. The administrative apparatus of fire management thus has developed a

degree of autonomy from each individual agency yet not quite separate from them either.

Fire policy is written by this semiautonomous administrative apparatus yet must be

approved by the leadership of each agency as well. Each agency, however, follows its

own policy inscribed in their own directive system (such as the Forest Service Manual

and Handbook) but this is supposed to reflect the agreed upon interagency policy.

Moreover this directive system also reflects each agency's different legislative mandates

and organizational culture. The three areas of fire, fuels and broader land management

policy are intertwined and overlapping in myriad ways. Understanding fire policy thus requires starting with a brief account of the early days of fire management and policy.

3.2   From Fire Control to Fire Management

Public policy and attitudes towards wildfire have varied tremendously over time. Federal policy and practice has largely treated fire as an unmitigated evil to be excluded from the landscape while many private landowners and timber companies in the west advocated "light burning" to control undergrowth and promote seedling establishment. Shaped by the "Big Blowup" of 1910 in the northern Rockies, where 78 fire fighters were killed and five million acres burned, the Forest Service promoted a policy of total fire exclusion. In a 1920 article titled *"Paiute Forestry" or the Fallacy of Light Burning*, written shortly before he became Chief of the Forest Service, William Greeley denigrated the practice of prescribed burning as native folklore, lacking any scientific basis and stated that "[t]h protection of our western forests from fire is one of the finest accomplishments in forestry yet witnessed in the United States" (Greeley, 1920 and 2000, p. 21).[6]

All Fires Out By 10 AM

In 1935 the Forest Service adopted the policy of "all fires out by 10 AM" the morning after detection. The Forest Service became the dominant agency defining and implementing the Federal response to fire. Federal fire research, dominated by the Forest Service, focused predominantly on techniques of fire prediction and suppression. Increasing interest and fear of fire as a weapon aroused by the firestorms of World War II

---

[6] This article originally appeared in the March, 1920 issue of *The Timberman*. It was reprinted in fall, 2000 issue of *Fire Management Today*.

were intensified with 1949 detonation Soviet Union's first atomic bomb and the Mann Gulch fire in which 13 firefighters, most of them elite smokejumpers, lost their lives. Forest Service fire research intensified focusing primarily on the physics of fire and the development of mathematical equations to help predict fire danger and fire behavior in support of the total fire control mission of the federal agencies (Pyne 1982).

Early Opposition to Total Fire Control

An alternative undercurrent to the official federal policy of total fire control remained however. Aldo Leopold argued in 1924 that fire was an important natural process necessary for the propagation of many plant and tree species. In 1943 Harold Weaver, a forester for Bureau of Indian Affairs, presaging the dilemma that would confront fire management 30 years later, wrote in the *Journal of Forestry* about the negative effects of fire exclusion on ponderosa pine (*Pinus ponderosa*) and the potential for severe consequences due to fuels buildup.[7] While Federal research, dominated by the Forest Service, focused on increasing the efficiency and effectiveness of fire control, research into the positive side of fire had to find alternative venues. The annual fire ecology conferences initiated in 1962 by the privately funded Tall Timbers Research Station in Tallahassee, Florida became the primary arena for research into the ecological role of fire and its beneficial effects (Rothman 2005).[8]

In the mid 1960s National Park Service (NPS) began to break away from the total fire control orientation of federal fire management. The Leopold Report on wildlife in the

---

[7] Weaver, H. (1943). Fire as an ecological and silvicultural factor in the ponderosa pine region of the Pacific Slope. Journal of Forestry 41(1): 7-14.
[8] Weaver was invited to present at the second Tall Timbers conference in 1963 but was denied permission to attend (Carle, 2002).

National Parks, released in 1963, recommended that the Park Service "recognize the enormous complexity of ecological communities and the diversity of management procedures required to preserve them" (Leopold et al, 1963, no page number). Many, both within and outside the NPS, such as Harold Biswell, advocated for a greater role for the findings of scientific research in public land management, especially fire ecology, in formulating management responses to fire beyond simple protection (Stephens and Sugihara, 2006, Kilgore, 2007).

The passage of the Wilderness Act in 1964 (P.L. 88-577), with its requirement to preserve the "wilderness character" of natural environments, strengthened the case of those calling for a new approach to fire. In 1968 the Park Service changed its fire management policies to allow lightning (e.g. "naturally") caused fires to burn following, a determination of minimal risk to human life and park facilities and beneficial effects to the ecosystem and became known as "let-burn" (Kilgore, 2007).

Fire by Prescription

The Wilderness Act and the example of the Park Service gave support for the cause of those in the Forest Service advocating for the reintroducing fire on the landscape and a more nuanced approach to the policy of total fire control. Management-ignited prescribed fire was approved for limited areas of the front country and exceptions to the 10 a.m. policy were made in 1971 for prescribed natural fires on small portions of a handful of the new wilderness areas, the first being the White Cap Fire Management Area in the Selway-Bitterroot Wilderness on the Bitterroot National Forest (Mutch, 1974). In 1973, the Forest Service's "Division of Fire Control" was renamed the "Division of Fire

Management" to symbolize what Forest Service Chief John R. McGuire (1973, p. 1) described as "a significant change in our attitude and approach to managing fire." Pyne (1982) called this new approach to fire management *fire by prescription.*

Defining Fire Management

With suppression no longer the automatic response and fire formally recognized as potentially beneficial, a phenomenon to be managed rather than controlled, the question became how to conceive of the role fire management was to play in land management more generally. What were to be the objectives of fire management and the basis of fire prescriptions? The Forest Service manages multiple natural resources such as timber, water, species habitat and recreation under the Multiple Use Sustained Yield Act (MUSY 1960) but it is not itself a natural resource as classically understood or legislatively defined. Yet fire affects all of these resources and the management of these resources in turn affects fire. How were these interactions to be conceived and specified in order to devise prescriptions? This question consumed the attention of researchers and fire managers at all levels of the Forest Service during the 1970s. Retired Northern Region Assistant Regional Forester, Fire Management William (Bud) Moore, noting the Forest Service's historic 1973 publication of the public information booklet *The Natural Role of Fire*, described fire management as:

> …fire protection, the scientific use of fire, and hazard reduction
> activities… organized to support the objectives sought in managing each
> unique tract of land…As in the past, fires with destructive potential will be
> controlled…Fires will be prescribed for beneficial purposes. Lightning
> and other incidental fires will be allowed to burn under surveillance where
> land use plans and fire prescriptions indicate that fire has beneficial
> influence on the ecosystems (Moore, 1974, p. 12).

Jack Barrows (1974, p. 3), who planned the development of the Fire Lab in Missoula, noted that fire is an "eternal agent of ecological change that may coincide or conflict with the interests of man", described the new mission of fire management as the use of new knowledge and technologies for distinguishing "wanted from unwanted fires". Barney (1975, p. 498) defined fire management as "the integrating of fire-related biological, ecological, physical, and technological information into land management to meet desired objectives."[9]

Fire Knowledge and Considerations

In 1972 Richard Rothermel (hired by Barrows) had released the most enduring results of the research effort into the physics of fire with the publication of his surface fire spread equations and stylized models of fuel complexes that allowed the prediction of important aspects of fire spread and behavior.[10] Work began in earnest to develop simple applications for field use of Rothermel's equations. There was, it seems, increasing faith and optimism during this period in the efficacy of various research initiatives to develop analytical techniques that would help in the determination of "wanted and unwanted fire" based on analysis of fire behavior and fire history.

Research in fire history and ecology also expanded greatly. Heinselman (1973) was one of the first researchers to articulate the concept of the *natural fire regime* as a way of describing the fire history and ecological role of fire for particular ecosystems.[11]

---

[9] The article, in the Journal of Forestry was titled "Fire Management: a definition"

[10] "Dick and his team set the stage for the things we're doing today" according to Mark Finney, a researcher at the Missoula Fire Sciences Lab and developer of the Farsite and FSPro fire modeling applications. Fire Science Digest, Issue 2, March, 2008. http://www.firescience.gov/Digest/FSdigest2.pdf (Last accessed September, 2009).

[11] Based on fire history research in the Boundary Waters Canoe Area of Minnesota and presented at a 1972 symposium jointly held by the Ecological Society of America and the American Institute of Biological

His initial formulation was rather crude but including the three components from which the concept has since evolved: Fire frequency, severity and size. It is apparent that these fire researchers and managers conceived of the "fire knowledge" that should guide the establishment of fire management objectives and prescriptions as some combination of fire history analysis - to determine fire's ecological role - and fire behavior analysis - to determine the safe and ecologically appropriate use of prescribed natural fire, prescribed fire and/or mechanical fuels treatment to alter and steer fire appropriately.

In 1974, the Forest Service held a symposium titled Fire and Land Management in conjunction with the Tall Timbers Fire Ecology conference in Missoula, Montana. During a policy panel held in conjunction with this symposium, the Forest Service announced the establishment of the "Fire in Multiple-Use Management Research, Development, and Applications Program" (Lotan, 1979). This new program was charged with developing procedures and techniques to define the role of fire in ecosystems and integrating these findings within fire and land management planning and implementation. (Lotan, 1979, p. 9), head of the RD&A program, defined fire management as the incorporation of "*fire considerations*" such as "knowledge of preburn conditions, the particular kind and amount of fire involved, and the response of the ecosystem over time" into the management planning and decision making process. The introduction to Arno and Sneck's (1977) RD&A sponsored report that is still in use today titled *A method for Determining Fire History in Coniferous Forests of the Mountain West* begins:

> Throughout much of western North America, forest managers are making
> a transition from a narrow policy of fire control to a broader approach

Sciences. Many others also used the term fire regime but did not specify the elements that would distinguish one regime from another.

called fire management…This change reflects their increasing interest in using fire in fuel management, wildlife habitat improvement, silvicultural improvement, and natural area management. Thus, managers want to evaluate the influence of fire on forest ecosystems. But, to fully understand the role that fire has played, one should learn about the fire history. The following questions should be investigated: what were the (1) average, minimum, and maximum intervals between fires in various forest habitats? (2) sizes and intensities of fires? (3) effects of past fire on forest vegetation, particularly stand composition and age-class structure? (4) effects of modern fire suppression? (Arno and Sneck, 1977, p. 1).

For Heinselman, Arno and many other researchers and practitioners, knowledge of fire behavior and fire history should inform general land management objectives to avoid unintended consequences to ecosystem and public health due to altered fire regimes. These researchers advocated for "fire restoration", with the determination of the natural fire regime of an ecosystem, as the basis upon which a "conscious" fire management policy could be pursued. Sando (1978, p. 36) for example, argued that because fires will continue to occur and fire was such a major influence in the evolution of the species, management should "recognize…the constraints placed on our activities by the natural fire regime." Kilgore (1981, p. 58) stated that "[B]etter understanding of fire regimes is basic to our management of western ecosystems."

3.2.1 The Role of Fire Management in Land Management

The 1970s were a time of controversy and policy change throughout the Forest Service, not just in fire management. Many authors have described the Multiple Use Sustained Yield Act of 1960 (P. L. 86-517) as the last successful policy initiative by the agency to maintain discretionary control over national forest management based on managers professional judgment and expertise unencumbered by statutory constraints

(Hirt, 1994; Koontz, 2007). Many new laws were passed that greatly affected forest management such as the National Environmental Policy Act (NEPA) of 1970, the Endangered Species Act (ESA) of 1973 and the National Forest Management Act (NFMA) of 1976. The NFMA, in particular, was to have a great impact on forest management and was central to the debates over the meaning of fire management. The NFMA was the product of intense controversy and preceded by critical reports on the dominance of timber production in Forest Service management. The Bolle Report[12] of 1970 found that, despite the agency's multiple use mandate timber production trumped all other objectives and the culture of professional forestry within the agency was unresponsive to other concerns. The practice of clear-cut logging was particularly controversial but clear-cutting, in addition to its economic advantages, was also argued by many advocates to be a surrogate for fire where fire suppression was used to protect commercial timber thus opening up for debate the relationship between fire and timber management.[13] Following the *Monongahela* decision[14] the NFMA placed restrictions on clear-cutting and saved timber harvesting on National Forest lands but also required the agency to assess its lands to determine the suitability for the various land uses stipulated in MUSYA and to develop land and resource management plans (L/RMP) for each national forest, following analysis of environmental effects required by NEPA and ensuring persistence of species under ESA. It would take the Forest Service until 1982 to develop the planning rules that each national forest must follow in developing their

---

[12] Named after Arnold Bolle, dean of the School of Forestry at the University of Montana, the report was formally titled *A University View of the Forest Service* and was published as a Senate document by Senator Lee Metcalf of Montana, who commissioned the study.

[13] See for example the Eugene Register-Guard, March 12, 1972, p. 37.

[14] *Izaak Walton League v. Butz*, 522 F.2d 945 (4th Cir. 1975) which found clear-cutting to be illegal, in violation of the Organic Act (1897).

individual L/RMPs, more commonly referred to as Forest Plans, but the NFMA required

such plans to:

> be prepared by an interdisciplinary team. Each team shall prepare its plan
> based on inventories of the applicable resources of the forest; … (Sec.
> 6(f)(3))

> provide for diversity of plant and animal communities based on the
> suitability and capability of the specific land area in order to meet overall
> multiple-use objectives… (Sec. 6 (g)(3)(B))

The concept of fire management as the incorporation of fire knowledge in the

determination of "wanted from unwanted fire" raised the question of the relationship

between the objectives of fire management and those of land management more

generally. How and to what extent, in other words, should fire management, armed with

new knowledge of fire behavior and ecology, participate in and inform the determination

of land management objectives or, conversely, to what extent are land management

objectives to determine what aspects of fire behavior and ecology are considered? It was

a time of advocacy both for the discipline of fire management in forest planning and for

its subject matter – fire behavior and fire's natural ecological role. Presumably fire

management would have the opportunity to include fire considerations as part of the

interdisciplinary teams that were to prepare the future forest plans since fire has such a

large impact on the diversity of plant and animal communities. Orville Daniels, a pioneer

of the prescribed natural fire program in the Northern Rockies (who would later face

severe criticism as the Forest Supervisor in charge of the Canyon Creek Fire in 1988) in a

conference paper titled *Land Management Planning: Where Fire Management and*

Resources Meet noted that:

Fire has the potential to interfere with many of our land management decisions. This is true both of unwanted fire and the exclusion of fire from various dependent ecosystems. Any land management prescription must take into account these two factors…Thus, it is important that the fire management implications of various land practices be taken into account fully in land management planning processes (Daniels, 1979, p. 95-6).

Heinselman (1978) described five general fire management alternatives: (1) Fire Exclusion, (2) No fire-control program, (3) management of lighting-caused fires, (4) prescribed fire, and (5) mechanical manipulation of vegetation and fuels. The failure to "consciously pursue" one or a combination of these options, to ignore the interaction of the requirement for and effects of pursuing these options, will, Heinselman (1978, p 265) warned, "result in the unintended or haphazard implementation of one or more of these same options." Analysis of fire history and potential fire behavior to answer the basic questions of why, how and when should inform the flexible pursuit any of these option, singly or in combination, in any given ecosystem. While there was no consensus on precisely how to define the new mission of fire management nor how to determine "wanted from unwanted fire" it is clear that the majority of researchers and fire managers wrestling with these questions saw the role of collecting and analyzing information on fire behavior, history and ecology as fundamental to the incorporation of fire considerations into land management planning and implementation. This, however, went unheeded.

3.2.2 The End of Total Fire Control

While discussions continued over the ecological merits and administrative implications of the change from fire control to fire management, such as fire's role in

providing plant and animal diversity, it was the cost of suppression that finally led to an

agency wide policy change (Lotan 1981). The Office of Management and Budget (OMB)

had challenged the efficiency and effectiveness of Forest Services leadership's intention

to request continually rising budgets for fire suppression. This led to an internal analysis

and eventual proposal for an agency wide change in fire policy known as the Gale report

(Gale 1977, Lotan 1981). The Forest Service, according to the report, could not afford to

maintain the policy of total fire control. In 1978 the Forest Service revised its total fire

control policy of 1935 making the exceptions granted to a few forests in 1972 to allow

prescribed natural fire available to all national forests. The new policy allowed prescribed

natural fires and even promoted prescribed fire in areas covered by an approved fire

management plan. The new policy specified, for example, that:

- Fire management planning be totally integrated into Forest Service land
  management planning processes.

- In areas where natural resource conditions, such as wildlife habitat, can be
  improved by prescription fire and where plans have been approved for this
  purpose, the fire suppression action may be modified to meet these resource
  management objectives.

- Land managers are to make more use of prescription fire to protect, maintain,
  and enhance the natural resource values and esthetics within approved areas
  on the National Forest.

Unintended or Haphazard Implementation of Fire Management

The calls for fire management to be totally integrated with land management

planning were essentially ignored. Pyne (1982) described fire management and policy

during this period as "ambivalent," no longer total fire control but not really management

of fire either. While the National Park Service began to establish objectives specific to

fire and its ecological effects[15], the Forest Service's first round of forest plans were

developed largely by dividing up the forests according to suitability for various multiple

uses with fire treated as a use rather than an agent of ecological change that functions

without regard to human designations of use and value. Prescribed natural fires were

allowed in wilderness areas, prescribed fire in others in order to, as the fire policy put,

"protect, maintain, and enhance the natural resource values." Prescribed fire was used

largely to dispose of logging slash (activity fuels) following timber harvesting, which

increased dramatically following passage of NFMA. Prescribed fire was also used for site

preparation prior to replanting after timber harvesting, as required by NFMA, as well as

for improving wildlife forage.[16] This effectively meant that fuel management objectives

and activities were determined by the objectives of other resource programs, principally

timber, vegetation and wildlife management.

Analysis of fire history and the development of the natural fire regime concept

remained primarily a topic of fire research rather than a topic of concern to land

management. The recommendation to consciously base fire management activity on an

area's specific fire history and ecology went unheeded. Fire management expanded to

include prescribed fire and prescribed natural fire but focused on how to implement fire

prescriptions tied to the goals and objectives of other resource programs. The question of

the relationship between fire management and land management planning and the

formulation of land management objectives with respect to the fire behavior and ecology

---

[15] See for example Graber (1985) and Bancroft et al. (1985).
[16] See Schuster et al (1997) and Cleaves et al. (1999, 2000). Data collected for these reports indicate that for the 6 Forest Service Regions in the Western U.S. 43.5% of the acres burned using prescribed fire between 1985 and 1995 were for slash disposal.

of an area were rarely addressed directly. There was no process of deliberation at the programmatic level or local planning levels. Rather, the application of "fire knowledge" to fire management, and the relationship of fire management to land management more broadly, was piecemeal and ad-hoc with little oversight of the fire management planning process and the development of individual fire prescriptions. The development of fire prescriptions were determined largely by local capabilities with little institutional support for preseason analysis of fuels and potential fire behavior or fire history studies that would allow the conscious pursuit of policy options. Heinselman's (1978, p. 265) warning about "unintended or haphazard implementation" of fire management options were realized with the fires of 1988. These fires would eventually lead to the first major review of fire policy since the elimination of the total fire control policy in 1978. It would also increase attention on the role of fuels management.

The Fires of 1988

The Yellowstone Fires resulted in perimeters covering almost 800,000 acres, roughly 45% of the park, driven by prolonged drought, numerous lightning and human ignitions and abnormally strong and persistent winds (Christiansen et al. 1989). The Canyon Creek fire started in the Bob Marshal Wilderness and, fanned by a jet stream that dropped to the earth's surface, the fire spread eastward 21 miles in five hours. The fire spread over the divide out of the wilderness and onto the prairies west of Augusta, Montana with a final perimeter of 250,000 acres, the largest fire in Montana since 1910 (Daniels 1989). Both of these fires were initially allowed to burn as prescribed natural fires and, particularly those in Yellowstone, led to intense criticism of federal fire

management, especially the policy and practice of derisively called "let it burn."[17]

Following the fires an all-agency moratorium was put in place on the use of prescribed

natural fire and the Secretaries of Agriculture and Interior established a Fire Management

Policy Review Team (Review Team) in September, 1988 (Dilsaver, 1994).

The Review Team's direction was to review fire policy "to determine the

appropriate fire policies for national parks and wilderness" only, and not an "overall

management direction of national parks and wilderness areas" (Wakimoto 1990, p. 22).

Nor was the review to focus on the implementation of fire policy outside of wilderness,

such as the bulk of prescribed fire and suppression actions on Forest Service land. The

Review Team's report[18] found that the overall policy was sound but that clarification was

needed in several major areas. The primary criticisms revolved around the overall

inadequacy of fire management planning and the lack of funding and qualified staff to

carry it out. The Review Team pointed out, in particular, that there was "inadequate

attention to reducing hazardous fuels to allow for safe prescribed and prescribed natural

fire…Hazard fuel reduction programs have not been adequately funded in some cases"

(p. 14) Forest Service policies, the Review Team noted, "…require that prescribed fires

be managed with appropriated funds from the benefiting program" such as wildlife or

timber management rather than through dedicated funds and that "presuppression

activities have declined in real dollars in recent years" (p. 14-15). The Federal agencies,

---

[17] ABC News' anchor Hodel said it was "clear that this let burn policy is a disaster", while Montana Senator John Melcher assured constituents that the Park service and the Forest Service will "never go back to this policy" and two Senators from Wyoming called for the resignation of the Director of the National Park Service, William Mott, who was an ardent supporter of the prescribed natural fire program. See Shabecoff (1988) Park and Forest Service Chiefs Assailed on Fire Policy.
[18] *Report Concerning Fire Management Policy for National Parks and Wilderness.* Available at: http://www.nifc.gov/fire_policy/mission/1988_fire_ mgmt_preview_team_rpt.pdf. Last accessed January, 2009.

the Review Team noted "…must re-evaluate the opportunities to use prescribed burning (by planned ignitions) to achieve management objectives and to complement prescribed natural fire programs…hazard fuels must be reduced to protect selected areas, particularly developments within and adjacent to boundaries, from prescribed natural fire and high wildfire risk" (p. 18) The Review Team made many recommendations including:

- Development of a better understanding of agency objectives as they relate to fire planning standards and decision criteria.

- Additional studies of fire history, occurrence, and size in parks and wildernesses.

What the report illustrates, even with its narrow focus upon prescribed natural fires in parks and wilderness, is the general failure of the federal agencies to invest in "fire knowledge" in terms of both information collection and analysis of fire behavior, history and ecology as well as workforce development of the professional expertise necessary to collect, analyze and apply such information to fire planning. The size, severity and ecological consequences of the fires could not be determined with any certainty immediately after the fire when the Review Team conducted its investigation. However, Romme and Despain (1989, p. 695), using methods developed by Heinselman (1973) and Arno & Sneck (1977) later estimated the fire history of Yellowstone over the past 300 hundred years and determined that the fires extent and pattern of severity were not unusual for this ecosystem and that the fires in the park "should not be viewed as an abnormal event."

Arno and Brown (1989, p. 44), calling for a new initiative on fire management and policy, noted that "despite widespread adoption of the fire management concept a decade ago, forest fuels continue to increase faster than they are being recycled through harvesting, fire and decomposition…fuels management through prescribed fire or other cultural methods have been hampered…[while] vast sums of money are spent attempting to control severe fires in untreated fuels." The GAO (1990, p. 6), while agreeing with the findings of the Review Team, also found that strong resistance to the policy of using prescribed fire by managers who "still subscribe to the philosophy of suppressing all fires" severely hindered adequate allocation of resources to preseason analysis and planning. The Forest Service did revise its planning requirements in 1991,[19] adopting many of the Review Team's recommendation as to some of the specific decision making elements that must be addressed before a natural ignition could be managed as a prescribed natural fire. Agee (1993, p. 73) noted, however, that despite such revised direction for developing prescribed fire prescriptions the focus of prescribed natural fire decision making remained "to burn or not to burn" rather than the "how, when or why" of burning.

3.3   The Rise of Ecosystem Management

A principle reason decision making remained focused on burn or not burn rather than the how, when and why of burning, is due to the larger forest management policy context that unfolded following the fires of 1988. Land management was again in crisis and again centered on the Forest Service. The Review Team's recommendations, particularly that of "understanding of agency objectives" was at the center of this crisis

---

[19] Forest Service Manual (FSM) 5142.2 through 5142.24 (1991).

and "developing a better understanding" of how "they relate to fire planning" was central to how the controversy over its solution played out. This controversy came to be articulated as two different yet overlapping sets of problems and their corresponding solutions. On the one hand was the problem of ecological damage, the loss of habitat due to past intensive management and the threat to species viability mandated in the forest planning rules of 1982 implementing the NFMA. The problem was framed in terms of ecosystem sustainability, or where this term was too controversial, as ecosystem resiliency. The proposed solution to this framing of the problem was ecosystem management. The other articulation of the problem was framed more narrowly as a problem of forest health, characterized by the over-accumulation of brush and small trees that lead to increased insect and disease outbreaks and catastrophic fires. The proposed solution to the problem articulated in this way was increased active forest management more narrowly focused on thinning.

For a host of reasons, not least of which is the fact that it became agency policy, fire management leadership, and hence fire policy, aligned squarely with the problem framing and proposed solution offered by the concept of ecosystem management. As the Review Team investigating the fires of 1988 pointed out, both the Forest Service and Department of Interior fire management programs emphasized prescribed fire as the tool of choice for reducing hazardous fuels. But the widespread employment of this tool was constrained by a whole set of institutional arrangements and priorities. As unresolved issues in land management articulated in the 1970s again came to the fore, however, issues such as the Bolle Report's criticism of the near complete dominance of the discipline, practices and objectives of professional forestry in forest planning, ecosystem

management also offered fire and fuels management the opportunity of equal billing for its own objectives and practices based on fire knowledge through a reorganization of these organizational arrangements and priorities under ecosystem management.

Early Developments

The controversy over the northern spotted owl (*Strix occidentalis caurina*) in the Pacific Northwest that had been brewing throughout the 1980s came to a head when the owl was listed as threatened under the Endangered Species Act in 1990, following repeated attempts by the Forest Service under the Reagan administration, to avoid the listing.[20] This brought the last heyday of timber production on Forest Service lands to a halt.[21] The 1988 fire season was followed by yet more severe and costly fire seasons. Fires starting in the hills just outside of Oakland and Berkeley, California in 1991 had killed 25 people and destroyed over 2,500 homes. In May of 1992 the U.S. District Court ruled that the Forest Service had violated NEPA in preparing its Final Environmental Impact Statement (EIS) for the management of the spotted owl. Also in 1992, facing severe criticism at the "Earth Summit" in Rio de Janeiro on a host of issues, including forest management and the spotted owl controversy, President George H. W. Bush announced a new approach to forest management called ecosystem management.

Putting Meat on the Concept

In 1993, newly-elected President Clinton vastly expanded the concept of ecosystem management from its initial conception under President Bush and Forest Service Chief Robertson. Robert Lyons, the new Assistant Secretary of Agriculture for

---

[20] 55 Fed. Reg. 26114-2619 (June 26, 1990).
[21] Timber production dropped from about 12 billion board-feet in 1989 to 4 billion board-feet by the mid 1990s (Chilson, 1998)

Natural Resources and Environment, initiated the Forest Ecosystem Management

Assessment Team (FEMAT, USDA, USDOI, USDC and USEPA, 1993). Headed by the

new Chief of the Forest Service, Jack Ward Thomas, FEMAT's mission was to provide a

new evaluation and set of recommendations for forest management on the west side of

the Cascades.[22] The FEMAT report "was viewed by many as a hallmark effort to view

forest management from a broad ecological perspective, putting meat on the skeletal dicta

of the FS for beginning a new era of ecosystem management" (Marcot and Thomas,

1997, p. 11). The initial concerns for the northern spotted owl in particular and the

species viability requirements of NFMA[23] in general led to a focus on broader

ecosystems in their own right as a means of integrating multiple uses in a sustainable

fashion (Meslow, 1993).

Chief Thomas initiated an internal review called *The Forest Service Ethics and*

Course to the Future[24] outlining the new direction for the Agency. Speaking before

Congress in February 1994, he described this new direction as a "holistic approach to

natural resource management, moving beyond a compartmentalized approach focusing on

the individual parts of the forest. It…integrate[s] the human, biological, and physical

dimensions of natural resource management. Its purpose is to achieve sustainability of all

resources" (Thomas, 1994, p. 13). The GAO (1999b, p. 2) described this as a

fundamental shift in the agency's mission from "producing goods and services to

---

[22] Thomas was the first Chief not selected by his predecessor and the first biologist to head the agency. According to the Forest Service history website, former Chief Robertson and Associate Chief George Leonard were reassigned by the Clinton administration for not advancing changes fast enough. See Forest Service online history page at http://www.fs.fed.us/aboutus/history/chiefs/robertson.shtml last accessed Nov., 2008.

[23] 36 CFR §219.19.

[24] USDA Forest Service. 1994. *The Forest Service Ethics and Course to the Future* FS-567. Administrative document for internal distribution. Washington, DC. 9 p. For a brief description see http://www.foresthistory.org/ASPNET/Publications/multiple_use/chap7.htm. Last accessed January, 2009.

maintaining and restoring the health of the lands entrusted to its care." A new Ecosystem

Management Office was established in the Forest Service Washington Office and in 1994

the Ecosystem Management Interdisciplinary Team produced *A National Framework –*

Ecosystem Management to accompany the ethics outlined in the *Course to the Future* that

identified four key components:

- It includes understanding the role of fire, insects and disease, and drought
  cycles in shaping ecosystems and bringing that understanding to bear in
  national forest management decisions and actions.

- It requires developing and using measures of ecosystem sustainability while
  supporting the quality of life in those ecosystems (in rural, suburban, and
  urban settings). The effects of human use and habitation on ecosystem
  sustainability must be evaluated.

- It manages ecosystems to provide the uses, values, products, and services
  sought by the American people from national forest and grassland resources,
  including water, recreation opportunities, timber, minerals, fish, wildlife,
  forage, wilderness, cultural heritage, and aesthetics, while maintaining
  ecosystem health and diversity.

- Its workforce reflects the cultural and disciplinary diversity needed to provide
  the skills and abilities as well as the public partnerships and collaboration
  required for the effective interdisciplinary application of the ecosystem
  approach to managing multiple uses. The workforce is empowered to carry
  out the mission of the national forests and grasslands with accountability for
  achieving negotiated objectives.

The fire season of 1994 again brought attention to the problems plaguing fire

management and policy when 34 firefighters lost their lives, 14 on Storm King Mountain

during the South Canyon Fire on the White River National Forest (Butler et. al, 1998).

Chief Thomas chartered the Western Forest Health Initiative which released its report in

October 1994 (USDA Forest Service, 1995). The report recommended addressing the

problem of catastrophic fire by restoring ecological processes and focusing on priority

ecosystems. Particular emphasis was placed on low severity high frequency fire regimes, particularly low elevation ponderosa pine where ecological alteration was thought to be the most severe - the forests Weaver had warned about in 1943. These forests had been subject to the most intensive land use practices and where there was greater consensus on the need for management action since this fire regime also tended to encompass much of the Wildland Urban Interface (WUI). It also recommended a review of the interagency fire policy reaffirmed after the 1988 fires to bring it in line with the new mission and objectives of ecosystem management.

While the interagency Fire and Aviation Executive Board began work on the review of interagency fire policy, Forest Service Fire and Aviation Management began its own internal review of the agency's fire policy. The resulting report, *Course to the Future: Positioning Fire and Aviation Management*, released in May 1995 (USDA Forest Service, 1995 hereafter *FAM Course to the Future*)[25] recommended that:

- By the year 2005, establish a multi-funded, interdisciplinary account for restoration and maintenance of fire dependent ecosystems.

- Develop a workforce capable of achieving, restoring, and protecting these ecosystems at this scale.

- Establish prescribed fire objectives and assess fire consequences into the land management planning process.

- Intensify training of line officers to better redeem fire management responsibilities.

---

[25] The *FAM Course to the Future* was an internal document that could not be obtained for this research. The information referenced here is derived from descriptions in *An Agency Strategy for Fire Management: A Report from the National Management Review Team,* USDA Forest Service (2000a) as well as in Schuster et al. (1997), Cleaves et al. (1999) and GAO (1999a).

The *FAM Course to the Future* proposed a massive expansion of fuels

management, based on an estimated 39 million acres of Forest Service land at risk of

severe fires, primarily in the West.[26] Not all of these acres needed direct treatment

according to the *FAM Course to the Future*. Rather, what was recommended was

strategic planning for "landscape-scale prescribed burning," an expansion from roughly

570,000 to 3 million acres annually by fiscal year 2005.[27] This recommended six-fold

increase represented a significant shift in the role of fuels management within Forest

Service land management and planning. Forest Service economic reviews of fire and fuel

related practices and expenditures between 1979 to 1995 by the same team that derived

the 39 million acre figure (e.g. Schuster et al., 1997, Cleaves et al. 1999, 2000) suggests

that the projects undertaken by fuels management were almost entirely determined by the

objectives of other resource management programs, primarily timber management (for

logging slash disposal), silviculture (for vegetation management and site preparation) and

wildlife management (for habitat improvement). Cleaves et al. (1999) found that

nationally slash disposal burning accounted for just over 25% of the acres treated but

75% of the number of burning operations conducted per year, accounting for an estimated

---

[26] The 39 million acre estimate was derived from a separate internal report titled *Fire Economic Assessment Report* (Bell, 1995). This report was also unavailable for this research. Information on the contents of this report was derived from Schuster et al. (1997), Cleaves et al. (1999) and GAO (1999a).

[27] Cited in Cleaves et al. (1999). It should be noted that a "landscape" is not a scale and the term "landscape-scale" is thus rather enigmatic if not outright misleading. See Allen (1998) who also states the term "landscape-level" also promotes confusion. The most consistent use of the term seems to refer to any area larger than a forest stand or treatment unit. Landscape-scale (as well as landscape-level) is also often used to refer to a watershed or sub-watershed in the USGS hydrologic unit code (HUC) classification system (e.g. 5th level or 6th level HUC respectively) just as ecosystems are often delineated by HUCs for practical management purposes (such as conducting ecosystem analysis at the watershed scale (EAWS). This term, however, will be used through out this paper and is intended only to refer to whatever it is that that managers and researcher themselves are referring to.

63% of total annual burning costs.[28] In the western Forest Service regions (1-6), slash disposal accounted for 43.5% of acres treated.[29]

Moreover, because the history of fuels management was, for the most part, composed of prescribed burning, the proposed massive increase in fuels management discussed in the *FAM Course to the Future*, and these economic assessments upon which it was based, considered this increase to also be carried out mostly through burning; both prescribed fire and prescribed natural fire.[30] Mechanical treatments, such as pre-commercial and commercial thinning, was treated as a vital yet separate component of fuels treatment. They are the purview of other programs – vegetation (silviculture) and timber management. Under this proposed massive increase in prescribed fire and prescribed natural fire following the recommendations of the *FAM Course to the Future*, the objectives of fuels management would no longer be defined solely by the goals and objectives of these other resource management programs. Fire and fuels management objectives - landscape-scale prescribed fire - was to inform the establishment of desired future conditions in forest planning alongside the objectives of other resource management programs and what the *FAM Course to the Future* called "prescribed fire

---

[28] Schuster et al (1997) note that "Comprehensive information on the extent and expense of fuel treatment does not exist…We could not determine whether fuel treatment expenditures were for burning or some other method of fuel reduction…The current Forest Service accounting structure allows for more than 20 different work activity codes to be recorded under fuels-related fund codes. But only a subset (the PF-2's) pertain to on-the-ground applications of fuel treatment, and only a subset of those concern prescribed burning. Fuel treatment (including prescribed burning) expenditures are recorded under work activity codes for activity fuels reduction (PF-25) and natural fuels treatments (PF-24), including management-ignited (PF-242) and prescribed natural fire (PF-241)."

[29] Derived from data in Cleaves et al. (2000), which provided breakdowns by region but only summarized percentages nationally.

[30] See for example the background section of the interagency report *A Strategy for Increasing Fuels Treatment on Federal Lands in the Pacific Northwest* (1999) available at http://www.fusee.org/docs/fuelbreaks/strategy_fuel_treatment.html. Last accessed June, 2009.

objectives" and "fire consequences" were to be incorporated into the objectives, selection and design of timber and vegetation management projects.

The recommendations of the *FAM Course to the Future* tied this more active and role for fire and fuels management directly to the new agency mission of ecosystem management.[31] Fire and Aviation Management leadership, in other words, aligned itself with the new Forest Service leadership in order to re-engage the very same themes that had been debated in the 1970s - and summarily ignored in the first round of forest planning – on the meaning and purpose of fire and fuels management and its role in determining land management objectives and how these are incorporated into planning and decisionmaking. Jerry Williams (1995), then Forest Service Assistant Director for Fire Operations, described the new more involved role envisioned for fire management under the new paradigm of ecosystem management this way:

> The Forest Service will more completely develop and communicate the scientific rationale behind management of fire-adapted ecosystems…Align fire management programs to better complement one another… (prevention, pre-suppression, suppression, fuel management, and prescribed fire use) will be fully integrated, better reflect a common purpose, and complement one another toward an ecosystem management objective. These goals and actions signal important changes for Forest Service fire and aviation management. They require…an improved, more balanced fire management approach to land and resource management (Williams, 1995, p. 140).

The *Federal Wildland Fire Management Policy & Program Review Report* (USDA and USDOI, 1995, hereafter *Federal Fire Policy*) released in December, 1995 is remarkably similar to the *FAM Course to the Future*, unsurprising, perhaps, given the

---

[31] The title *Course to the Future: Positioning Fire and Aviation Management*, was even adopted from the internal review in which the new mission of ecosystem management was announced - *The Forest Service Ethics and Course to the Future.*

Forest Service remains the dominant agency in federal fire management. The *Federal Fire Policy* restated the general consensus on the existence of a massive wildfire and fuels problem and framed the necessary response squarely in terms of ecosystem management. The dominant themes that had been emerging to plague federal fire management since Weaver articulated his warnings in the early 1940's and again widely discussed in the early 1970s when fire control became fire management were reaffirmed:

> Although ecological knowledge and theories have evolved relatively quickly, the scope and process of land management have had difficulty keeping pace. Ecological processes, including fire and other disturbance, and changing landscape conditions are often not integrated into land management planning and decisions. With few exceptions, existing land management planning…is based on single-program goals that…preclude the ecosystem perspective in land management planning. This type of planning can result in an inefficient, fragmented, short-term approach to management that tends to ignore broad, interdisciplinary-based, long-term resource issues…Land management agencies now recognize the need to break down these barriers and seek cooperative, ecologically sound approaches to land management on a landscape scale. One way to break down these barriers is to involve all interests, including the public, scientists, resource specialists, and regulators, throughout the planning process (USDA and USDOI, 1995, p. 8).

"The task before us – the reintroducing fire – is both urgent and enormous" the *Federal Fire Policy* states. The executive summary begins. The *Federal Fire Policy* is an outline of principles, goals and organizational capacities interagency fire management should strive towards in an evolving process of organizational change. The central thrust of the *Federal Fire Policy* was to promote "a balance between suppression to protect life, property, and resources, and fire use to regulate fuels and maintain healthy ecosystems." (Zimmerman and Bunnell, 2000, p. 289). This was to be accomplished by the incorporation and integration of these goals and principles into fire and fuels management planning and operations guidance of each federal agency in order to, as the memorandum

accompanying the review put it, "move our approach to wildland fire management beyond the traditional realms of fire suppression by further integrating fire into the management of our lands and resources in an ongoing and systematic manner, consistent with public health and environmental quality considerations."[32] The first four "key points" in the executive summary largely capture these goals and principles of the fire *Federal Fire Policy*:

- Protection of human life is reaffirmed as the first priority in wildland fire management. Property and natural/cultural resources jointly become the second priority, with protection decisions based on values to be protected and other considerations.

- Wildland fire, as a critical natural process, must be reintroduced into the ecosystem. This will be accomplished across agency boundaries and will be based upon the best available science.

- Agencies will create an organizational climate that supports employees who implement a properly planned program to reintroduce wildland fire.

- Where wildland fire cannot be safely reintroduced because of hazardous fuel build-ups, some form of pretreatment must be considered, particularly in wildland/urban interface areas.

The *Federal Fire Policy* was rather vague on details but explicit that current plans and planning processes are entirely inadequate (for both land management plans and the fire management and project plans that must tier to them, as was pointed out in the previous fire policy review following the fires of 1988). The *Federal Fire Policy* was followed by the interagency *Wildland and Prescribed Fire Management Policy: Implementation Procedures Reference Guide* released in 1998 (USDA and USDOI, 1998, hereafter *Reference Guide)* which provided additional "direction, guidance, and assistance in interpreting the Federal Wildland Fire Management Policy." In this

---

[32] No page number given.

Reference Guide the term "prescribed natural fire" was replaced with "wildland fire use"

(WFU) and the term "appropriate suppression response" was replaced with "appropriate

management response" (AMR) to emphasize the move away from the historical emphasis

on suppression and control:

> Agencies must ensure that wildland fire management is fully integrated
> into land management planning. Every Agency Administrator must ensure
> that these policies are incorporated into all wildland fire management
> actions. Managers and staff personnel must actively embrace and
> implement the recommendations. Every employee of every agency must
> be committed to fully carry out implementation at the ground level.
> Agencies must change their expectations that all wildland fires can and
> should be controlled and suppressed (USDA and DOI, 1998, p. 4).

The *Reference Guide* described, in only slightly more detail than the *Federal Fire*

Policy itself, what the various planning levels entail, how they are supposed to "tier" to

one another and what the general content of each level of planning should include. Table

1 from the *Reference Guide*, for example, describes the relationship between land

management plans, fire management plans, and project-level plans for prescribed fire and

fuels management.[33]

---

[33] Reformatted from table in *Reference Guide* p. 20.

Table 1 Tiered Fire Management Planning (From Wildland and Prescribed Fire Management Policy: Implementation Procedures Reference Guide, USDA and USDOI, 1998)

Land Management Plan, NEPA (as applicable)	Fire Management Plan, NEPA (as applicable)	Wildland Fire Situation Analysis, NEPA (as needed), and/or Project-Level Analysis
1. Establishes the desired condition for management area (e.g. percent of area within a successional stage)	1. Describes the desired condition in context of fire management parameters	1. Develops alternatives from forest plan management -area desired conditions
2. Establishes air-quality	2. Describes operational procedures that meet land management plan objectives (i.e. number of planned ignitions occurring at one time)	2. Uses site-specific analysis of particulate production and plume drift
3. Establishes a range of acceptable management practices	3. Describes operational procedures to implement acceptable management practices	3. Identifies site-specific implementation practices
4. Establishes fuel-treatment priorities	4. Schedules fuel-treatment projects for management areas	4. Implements projects within the context of established priorities

The lack of specificity and the sense of earnest pleading rather than explicit direction in the *Federal Fire Policy* and the *Reverence Guide* is due in part to the fact that land management planning was itself fraught with uncertainty. Forest plan revisions under the NFMA were due and expected to begin shortly. A new proposed planning rule was released a month before the *FAM Course to the Future* but was withdrawn later that year.[34] Nonetheless, the ecosystem management approach had been found legally sound in litigation over the North West Forest Plan. The District Court for the Western District of Washington noted in its 1994 decision upholding the plan noted that "[g]iven the current condition of the forests, there is no way the agencies could comply with the

---

[34] 60 Fed. Reg. 18886 (April 13, 1995).

environmental laws without planning on an ecosystem basis" (in GAOb, 1999, p. 11).[35]

How fire management was to be integrated into land management based on the

ecosystem management approach remained unclear. Teensma (1996, p. 81) noted for

example that:

> Efforts to integrate fire management into land management planning date
> back at least to the early1970s…land managers and government regulators
> had become concerned about the environmental impacts of a highly
> effective fire suppression policy and…a concern that managers were not
> listening to those with knowledge of the ecological role of fire and its
> beneficial uses. It may seem discouraging that we are attempting to
> resolve some of the same issues and problems 20 years later…The
> essential question remains, 'How do we integrate fire into land
> management planning?

3.3.1 Ecosystem Management: Taking Fire Ecology Seriously

The Interior Columbia Basin Ecosystem Management Project (ICBEMP, USDA

Forest Service USDOI Bureau of Land Management, 1994) was initiated shortly after

FEMAT responding to President Clinton's direction to "develop a scientifically sound

and ecosystem-based strategy for management of eastside forests."[36] Forest Service

participation in the Sierra Nevada Ecosystem Project (SNEP), initiated by Congress in

1992, vastly expanded. Theses efforts attempted to focus on whole ecosystems through

an expanded set of scientific disciplines, such as landscape and disturbance ecology

practiced by the so called "o-ologists,"[37] as well as broad-based participation of the

public in the analysis and planning process. Whatever landscape-scale fire and fuels

management was to mean within the as yet to be revised land management plans, it seems

it was to be worked out alongside increased research into fire behavior and fire ecology

---

[35] This decision was upheld by the Court of Appeals for the Ninth Circuit in 1996 (GAOb, 1999).
[36] ICBEMP website, available at http://www.icbemp.gov/. Last accessed January 20, 2009.
[37] Wilkinson (1998).

to provide the content for these planning levels (such as "the desired condition in context of fire management parameters" in the table 1 above). The research branch of the Forest Service was fully supportive of these new initiatives surrounding ecosystem management with its heavy emphasis on science and numerous research efforts were undertaken focused specifically on fire and fuels management to answer just this question. Another implementation action called for in the *Federal Fire Policy Implementation Plan* was initiated in 1998 establishing the Joint Fire Sciences Program to expand agency and academic research and provide the "best available science" on fire ecology and behavior for incorporation into land management plan revisions and Fire Management Plans in order to reintroduce fire to the landscape and expand WFU through AMR.

The early advocates of employing fire in forest management, such as Harold Weaver and Harold Biswell, became sages among researchers advocating for restoration forestry. Arno (1996, p. 4), summarizing the proceedings of a conference titled "The use of Fire in Forest Restoration" in a chapter titled *The Seminal Importance of Fire In Ecosystem Management – Impetus for this Publication* noted that "perhaps the most widely recognized example of the negative effects of fire exclusion is the "forest health" problem on tens of millions of acres in the ponderosa pine (*Pinus ponderosa*) and related forests of the Inland West…Ironically, a government forester named Harold Weaver (1943) identified the problem almost 50 years ago…" Numerous agency research projects were initiated with titles like *Ecosystem Management, Forest Health and Silviculture* (Kaufman and Regan, 1995).

Fire history and ecology, by its very nature, focused on statistical patterns and variation of fire effects over time and space linking it easily to concepts central to ecosystem management, concepts such as biodiversity, species viability, sustainability and resilience. Heinselman's concept of the natural fire regime became linked with concepts from landscape and disturbance ecology, principally the concept of the "natural" or "historic" range of variability (HRV). From modeling work conducted for ICBEMP the HRV concept became the means of defining the bounds of sustainability and departure from HRV as a measure of ecosystem health (Quigley and Arbelbride, 1997). The concept of HRV, according to Morgan et al. (1994, p. 91-92) was developed as a means of describing the importance of ecological disturbance processes such as fire to the overall dynamics of ecosystems:

> Understanding ecosystem function and the magnitude of current departures from historical conditions can help identify risks to ecosystem sustainability…The historical range of variability provides researchers and managers with a reference against which to evaluate present ecosystem change. This is useful both for describing ecosystem dynamics and for measuring the effects of management activities. For example, the historical range of variability is useful as a standard in cumulative effects analyses of environmental impacts resulting from multiple management activities.

In 1997 the Forest Service's Fire Sciences Laboratory, Rocky Mountain Research Station in Missoula, Montana began the *Fire Regimes for Fuels Management and Fire Use* project, soon followed by the *Ecosystems at Risk* project. These were combined after receiving funding in the first round of projects sponsored by the newly established Joint Fire Sciences Program. This project eventually resulted in the coarse-scale (one KM^2 pixels) map for the entire continental United States of historic fire regimes, based on a classification similar to those advocated by Heinselman's (1978, 1981) pushing for

inclusion of fire ecology in forest management in the 1970s. The departure of current

conditions from these historic fire regimes, called condition class, a concept similar to

departure from HRV.[38] While some of the data was available for analysis in late 1999,

the coarse scale fire regime condition class (FRCC) map was not published until 2001

and was to become a central feature in the continuing effort – and controversy – over fire

management and its relationship to land management planning and decision making

following the fires of 2000.

3.3.2 Tensions over a Shifting Mission

While leadership within the Forest Service were advancing the ecosystem

management approach and fire management was expanding the role of fire within this

approach, there were many who opposed the shift in the agency's mission and the

proposed increase in wildland fire use (WFU) in particular. Some have suggested this is

because of the perceived loss of control over the Forest Service mission to the "o-

ologists" and to the public with its attendant shift from the traditional utilitarian

perspectives and objectives of professional forestry and forest resource protection - the

historical heart and soul of the Forest Service. Franklin (1998) noted that:

> Development of a new social consensus on the management of forest
> resources is proving to be much more challenging than most participants
> and onlookers imagined…Development of new information and its
> application in forest management are particularly difficult problems
> because the new information can alter basic premises and undermine
> assumptions (Franklin, 1998, p. 134).

Whatever their motives, the influence of those resistant to change within the

---

[38] Strictly speaking, condition class is a classification of departure from the mean rather than a measure of range of variability itself. Hardy et al. (2001) and Schmidt et al. (2002) do not describe condition class as departure form HRV though it will later be described as such by others e.g. Hann. et al (2003) and in the project scale FRCC assessment protocol developed by Hann and others released initially in 2003.

agency was substantial, and they were not alone. Mrowka (2003), a silviculturist by training who worked with Chief's Thomas and Dombeck on many efforts to galvanize internal support to institutionalize ecosystem management, called this contingent of agency managers opposed to this shift the *"back to basics proponents."* These managers "silently resisted" these changes because of their faith in traditional utilitarian forestry, focused on forest stand vigor achieved through active management using tried and true silvicultural techniques. This faith in traditional forestry was accompanied by a lack of faith that the pressing forest health crisis could be resolved through a vastly expanded landscape analysis and planning processes encompassing a vastly expanded conception of forest health with no clearly defined or accepted definitions for such things as ecosystems themselves, their sustainability or how to measure their historic range of variability, not to mention the required inclusion of a wide array of new disciplines and the public which would only bog down the needed work in endless debate.

At the same time that the ecosystem management concept was being fleshed out in the early and mid 1990s, with the initiation of large regional efforts of the FEMAT and ICBEMP assessments (to put "meat on the skeletal dicta" of a new direction for Forest Service land management) another response to the challenges facing forest management, particularly the specter of "catastrophic wildfires," took the form of a "forest health crisis." This framing of the problem focused more narrowly on structural characteristics of forest density rather than the functional characteristics of ecological processes emphasized in ecosystem management. The traditional emphasis on active forest management was reframed from its focus on timber management to a focus on forest restoration through silvicultural treatments. This framing of the forest health crisis

emphasized the need for immediate action. This framing of the problem was put forth in the report released by the National Commission on Wildfire Disasters, established by Congress following the 1988 fires.[39] Sampson et al. (1994) warned that without "the application of needed silvicultural treatments within a fairly short time (15-30 years), there is great danger that over the next century this region's forest legacy will be a series of large, uniform landscapes recovering from wildfires and other widespread ecosystem setbacks."[40]

A coalition of sorts formed between these back to basics proponents, the forest products industry and their congressional backers. This coalition perceived the forest health crisis and the problem of severe wildfire to be the result of constraints on active forest management. The forest health crises and the problem of increasing catastrophic fire was their ticket for reversing the precipitous drop in timber production since the spotted owl controversy. The Quincy Library Group, formed in northern California in response to the controversy and litigation over the California spotted owl habitat and the resulting decline in timber harvesting, released its Community Stability Proposal in 1993 which said very little regarding fuel reduction and the problem of severe fire. After 1994 most of the group's proposals were couched in terms of thinning to reduce catastrophic fire, promote forest health and sustain the local forest products industry. This culminated in the Herger-Feinstein Quincy Library Group Forest Recovery Act of 1997.[41] The salvage timber sale rider in the Emergency Supplemental Appropriations and Rescissions

---

[39] Wildfire Disaster Recovery Act of 1989, later Public Law 101-286 of May, 1990.
[40] Sampson was the chairman of the National Commission on Wildfire Disasters.
[41] See for example, the Quincy Library Group (QLG) archives at http://qlg.org/. See also the description of QLC at the Red Lodge Clearinghouse http://rlch.org/index.php?option=com_content&task=view&id=238&Itemid=36 as well as the critical review of QLC by Inglesby (1997) at http://www.fusee.org/docs/fuelbreaks/fuelbreak_schemes_copy.html Last accessed June 2009.

Act (1995), for example, expedited timber sales on burned federal lands that had

previously been disallowed in order to protect threatened and endangered species by

exempting them from administrative appeal, limiting their judicial review and easing

environmental analysis requirements. The stated purpose of salvage projects by their

proponents went beyond the old arguments of "recovering wasted resources" and touted

forest health restoration and fire hazard reduction.[42] Many environmental groups, for this

reason, dismissed the idea of a forest health crisis outright as nothing more than an

excuse to increase logging.[43] Others drew a sharp distinction between forest health and

ecosystem health by noting the utilitarian values of resource production implicit in a

narrow focus on tree sizes, densities and tree "predators" (severe fire, insects and

mistletoe) that characterize the discussion of a forest health by timber interests and their

Congressional backers' while ecosystem health encompasses the "full range" of complex

ecological processes, e.g. those studied by the "o-ologists" such as nutrient cycling, patch

dynamics and forest edge effects on succession and species habitat requirements (Kolb et

al, 1994). With the meaning of forest and/or ecosystem health undefined and hotly

disputed the nature of restoration and the type, intensity and scale of the needed

treatments were also hotly disputed. The Congressional Research Service (1995, p. 1)

noted that:

> Many observers suggested that the extent and severity of the fires was
> largely due to the poor health of the national forests of the West. It is
> widely accepted that livestock grazing, timber harvesting, and fire
> suppression over the past century have led to unnatural conditions --
> excessive biomass (too many trees and dead woody material) and altered
> species mix -- in the pine forests of the West; these conditions make the

---

[42] See for example the review of the issue by the Congressional Research Service (1996) *Forest Fires and Forest Health,* available at http://ncseonline.org/NLE/CRSreports/Forests/for-17.cfm?&CFID=12099146&CFTOKEN=60937532 Last accessed September, 2009.

[43] "There's No such thing as a Forest Health Crisis." New York Times, Monday, May 8, 1995.

forests more susceptible to drought, insect and disease epidemics, and other forest-wide catastrophes (including large wildfires)…However…[t]he damages of wildfires on lands and resources are often overstated…The recognition of…ecological benefits from fire was a major factor in the end of the 10-acre and 10:00 a.m. policies and their replacement with fuel management and prescribed fire (natural and otherwise). Finally, the possible extent of fuel management and forest health activities is largely undefined. To date, the discussions of prescribed burning, salvage sales, and other fuel management or forest health activities have identified neither the acreage needing treatment nor the likely treatment costs.

Opposition from the Old Guard

Forest Service Chief Thomas resigned in frustration in 1996, complaining that the efforts to comply with the Salvage Rider in particular side-tracked efforts to introduce more analysis and scientific evidence into agency decision making (Anderson 1999). Thomas was replaced (with his support) by Michael Dombeck in early 1997 (Anderson 1999). Dombeck, who previously served as acting director of the Bureau of Land Management and holds a Ph.D. in fisheries biology, was another break with Forest Service culture and precedent. Tensions within Congress remained high. In 1997 Congress placed a moratorium on forest plan revisions until new planning regulations were established. Secretary of Agriculture Glickman soon thereafter appointed a Committee of Scientists to develop guidance and recommendations for these new regulations as was done with the first round of forest plan regulation development in the late 1970s. Dombeck, however, moved aggressively with efforts to shift the agency away from the dominant utilitarian focus on timber production towards ecosystem management. Within his first two years as chief he replaced seven of nine regional foresters and all six deputy chiefs and renamed the Timber Management division the Forest Ecosystem division. Dombeck noted that "Over the past 50 years, the watershed

purpose of the Forest Service has not been a co-equal partner with providing other resource uses such as timber production. In fact, watershed purposes were sometimes viewed as a 'constraint' to timber management" (Anderson 1999, online, no page number).

Also in 1997 Representative Bob Smith Oregon (R. OR) introduced "The Forest Recovery and Protection Act" (H.R. 2515) which would have relied on revenue generating activity, principally timber harvesting, to fund forest restoration. Oregon Governor John Kitzhaber led the charge against the bill noting that "[m]ost of the needed treatments generate little if any revenue. We cannot fall back into the practice of heavy overstory removal to generate revenue, or the health of our forests will continue to decline" (Kitzhaber 1997, online, no page).[44] The issue of institutionalized financial incentives for timber harvesting brought about by permanently appropriated trust funds and special accounts (such as the Salvage Sale Fund, the Knutson-Vandenberg Fund and the Brush Disposal Fund) that are financed by retaining a portion of timber sale receipts, became a central target of chief Dombeck's attempted reforms. These funds, according to the Congressional Research Service (2000) provided an incentive to National Forests to focus on timber production because a portion of the timber sale receipts are retained by the forest for use on later projects.[45] These conflicts over forest management and funding soon engulfed the issue of fuels management since, as discussed earlier, fuels

---

[44] Statement issued by Governor Kitzhaber: *Governor responds to Congressman Bob Smith's Forest Health Bill*. Available at http://arcweb.sos.state.or.us/governors/Kitzhaber/web_pages/governor/press/p971008.htm Last accessed January, 2008. The bill eventually failed to pass a house vote in 1998.

[45] A portion of these receipts also go to state and county treasuries in lieu of taxes on federal land .This complicated issue is beyond the scope of this research but has been the subject of long running critiques of agency accountability regarding incentives for timber production and subsidized logging. See for example O'Toole (1988); Congressional Research Service (1994, 2000bc, 2004) and Oppenheimer (2001).

management up until the mid 1990's was predominantly focused on slash disposal and the principle source of funding for this activity was the Brush Disposal Fund. Congress tasked the General Accounting Office (GAO) later in 1997 with reviewing the Forest Service's efforts to address the "growing threats to national forest resources and nearby communities from catastrophic wildfire" and in particular how the agency intended to fund this effort.

3.3.3 The GAO's Call for a Cohesive Strategy

The tensions and conflicts between Forest Service leadership pushing the new mission of ecosystem management and the old guard, back to basic proponents within the agency resisting this shift is evident in description of the goals and objectives of the Forest Service's first Strategic Plan for 1997 to 2002, as required by the Government Performance and Results Act (GPRA 1993)[46] and the first accomplishment report released in 1997 under the Act's pilot phase. The first goal of the Strategic Plan reflects the new mission of ecosystem management - "Ensure Sustainable Ecosystems." Objective 1.2 under this goal is "Ecological integrity of forested ecosystems restored or protected to maintain biological and physical components, functions and interrelationships, and the capability for self-renewal." [47] It is under this first Goal and objective 1.2 that fuel management accomplishments are to be reported. The first accomplishment report however lists accomplishments under this first goal using

---

[46] USDA Strategic Plan 1997-2002: A Healthy and Productive Nation in Harmony With the Land, Forest Service Strategic Plan, USDA, Office of the Secretary (Sept. 30, 1997). There are three strategic goals identified: Goal 2 is "Provide multiple benefits for people within the capabilities of the ecosystem"; and 3 is "Ensure organizational effectiveness".

[47] Report of the Forest Service 1997, p1. Available at http://www.fs.fed.us/pl/pdb/97report/overview.pdf. Last accessed May, 2009.

traditional timber management criteria and measures characteristic of the objectives of

the back to basics proponents:

> The number of acres treated annually through the regular and salvage
> timber sale programs is indicative of the extent of maintenance and
> restoration of forested ecosystems on NFS lands and the implementation
> of forest plan goals and objectives. Timber sales are usually designed to
> incorporate multiple objectives, which may include insect and disease
> control, fuels treatment, and habitat restoration in addition to the
> production of wood. Because of this, reporting accomplishments in terms
> of acres treated better reflects the work being done to accomplish these
> objectives than do other measures of accomplishment (USDA Forest
> Service 1997, p. 4).

The only reference to the Fire and Aviation Management program states that

"…the agency champions firefighter and public safety, supports the role of fire in

restoring and sustaining healthy ecosystems, and integrates fire and aviation management

into the land management planning process" (USDA Forest Service 1997, p. 7). The

agency's first annual performance report, under goal 1 objective 1.2 (ecological integrity)

the report states:

> Nearly 1.5 million acres of prescribed burning and other fuel reduction
> treatments in 1998 enhanced forest health and diversity by reducing
> wildfire intensity, protected vulnerable urban-wildland interface areas,
> promoted forage productivity, and restored fire-dependent
> ecosystems…Stand improvements…such as precommercial thinning, have
> improved forest health by reducing stand density and allowing the
> remaining stand to grow more vigorously. More vigorous stands reduce
> the potential for insect and disease outbreaks and high-intensity fires, both
> of which impair forest health…Commercial timber harvests can be
> another tool used to improve and restore forest health.48

It was precisely the kind of disconnected prattle between the stated mission and

actions that the GAO's 1998 report targeted - a disconnect between the stated mission of

---

[48] USDA Forest Service, Results Act Performance and Accountability Report (1999). Webpage, no page numbers. Available at http://www.fs.fed.us/pl/pdb/98report/07_gpra_goal_1.html Last accessed May, 2009.

ecosystem management in which disturbance processes such as high severity fire are to

play their natural ecological role, on the one hand, and, on the other, measuring

accomplishment towards this goal with indicators such as stand vigor characteristic of the

agency's traditional timber production mission – a perspective that, as the above passage

makes clear, treats all high-intensity fire as impairing forest health. In testimony before

Congress the GAO (1998, p. 2) explicitly pointed out this disconnect in the agency's

stated mission and its accomplishment reporting of efforts towards achieving this mission

in noting that:

> The agency has taken an important first step toward becoming accountable
> for its performance by making clear that its overriding mission and
> funding priority, consistent with its existing legislative framework, has
> shifted from producing goods and services to maintaining and restoring
> the health of the lands entrusted to its care. However, it has not identified
> the actions required to correct decade-old problems with its data,
> measurement, and reporting.

While the GAO has regularly criticized the Forest Service and its individual

programs and practices to little avail,[49] the report resulting from this review of Forest

Service fuels management was to have a unusual impact on subsequent development of

federal fire management and policy (though not a resolution of the problems the GAO

identified). The Forest Service's response was completed just before the fires of 2000. It

was not released, however, until afterwards and became one of the three documents of

making up the National Fire Plan. Subsequently, some of its concepts found their way

into the legislative and administrative enactments of the President Bush's Healthy Forest

---

[49] Similar findings on this subject of accountability and the relationship between goals, measures and
funding stretch back to 1988 (GAO 1988) and have continued with the latest in 2009 (GAO, 2009ab). The
agency has also been criticized over problems of funding and accountability with respect to the backlog of
timber stand improvement (TSI) treatments paid for with timber receipts (K-V funds) which are
predominantly pre-commercial treatments now also considered fuel treatments and restarting and
developing an adequate prescribed fire program GAO (1990), issues directly related to the problem of fuels
management within the agency.

Initiative (2002) - though in an abridged and misrepresentative manner contrary to their intent.

The GAO's report *Western National Forests: A Cohesive Strategy is needed to Address Catastrophic wildfire Threats* was released in April, 1999 (GAO, 1999a). The GAO report repeated agency leadership's line that "[d]uring the 1990s, the Forest Service began to address the unintended consequences of its policy of putting out wildfires" and that past forest planning efforts "did not adequately consider historical fire disturbance cycles." It was for the most part, however, a scathing rebuke of the agency's failure to implement its own stated fire and fuels management policy, updated twice in the wake of the 1988 fires.

The GAO's principle criticism was that the agency proposes a six fold increase in fuels management acreage to address the estimated 39 million acres at risk but that the agency also says not all of these 39 million acres necessarily requires active treatment. However, the GAO pointed out, the agency has no strategy or systematic approach for differentiating which areas need treatment, what kind of treatments are necessary or how much it will cost. The GAO stated that the agency needs better data and a better data collection process and a cohesive strategy to systematically identify, prioritize and design these treatments. The focus of such a strategy, according the GAO, must be on illustrating how reducing risk will be accomplished consistent with the agency's other stewardship responsibilities.

The reliance on the timber program for fuels reduction and using acres treated as the measure of accomplishment was singled out for particular criticism precisely because

the objectives of the timber program are driven by funding and targets incentives that are not aligned with the objectives of wildfire hazard reduction and restoring the ecological role of fire, let alone other stewardship responsibilities of the agency's other resource management programs such as wildlife habitat and water quality. The bulk of hazardous fuels, the GAO pointed out, is non-merchantable surface fuels or small diameter trees and that areas that present the highest hazard may not be in areas with merchantable timber. The GAO also pointed out and timber management itself creates hazardous fuels in the form of slash and the timber program often conducts activities that are difficult to reconcile with the agency's other stewardship objectives making the needed fuels management projects more controversial and time consuming.

According to the GAO, the timber program's favored metric of acres treated, as noted in the above GPRA report, is poorly correlated with reduction of fire risk whether in terms of risk presented by fire or risk presented by treatments to other stewardship objectives and legal requirements, such as species viability and water quality. At the same time, the GAO points out, the use of acres treated as a metric of accomplishment exerts pressure on local units to meet acreage targets that may further exacerbates the difficulty of reconciling these various management objectives, especially fire risk reduction on the one hand and restoring the role of fire on the other, pointing out that 135 species of threatened, endangered or rare plants in the United States benefit from wildfire or are found in fire-adapted ecosystems.

The report acknowledged the lack of consensus within the agency and among outside experts and the public on what constitutes forest and/or ecosystem health, an

issue it had reported on previously (GAO, 1994, 1997a). It also acknowledge that this lack of consensus was related to and confounded by the lack of data on fire risk and ecosystem health necessary for the identification and prioritization of areas at risk, the design of appropriate treatments and the measurement of their effectiveness. To address these issues the GAO recommended that the Secretary of Agriculture direct the Chief of the Forest Service to develop and present to Congress a "cohesive strategy" for managing fuels consistent with its overall mission and legal obligations. Such a strategy, the GAO stated, would facilitate achieving some measure of consensus over conflicting definitions of forest and ecosystem health and facilitate agreement on the needed treatments. The GAO recommended the cohesive strategy include specific steps for:

1. acquiring the data needed to establish meaningful performance measures and goals for fuel reduction,

2. identifying ways of better reconciling different fuel reduction approaches with other stewardship objectives, and

3. identifying changes in incentives and statutorily defined contracting procedures that would better facilitate the accomplishment of fuel reduction goals.[50]

Forest Service Fire & Aviation Management Response to the GAO

In its initial response, included as an appendix to the GAO's report, the Forest Service stated that "We are committed to complete such a strategy in a timely manner…We envision this strategy to be fully integrated with all of the Forest Service missions and program areas, not just a strategy for the Hazardous Fuels Treatment Program" (GAO, 1999a, p. 52). An "Integrated Response Team" was established to

---

[50] The GAO also recommended that the agency develop a schedule indicating dates for completing each of these steps and estimates of the potential and likely overall and annual costs of accomplishing this strategy based on different options identified in the strategy as being available for doing so.

develop the strategy. However, in a follow up report on the agency's progress in developing a cohesive strategy, presented at a hearing of the House Subcommittee on Forests and Forest Health in June of 1999, the GAO pointed out that this strategy was being prepared within the State and Private Forestry division of the agency, the division in which Fire and Aviation Management is administratively housed. According to the GAO, the fact that the agency's response was not being prepared by the core division of the agency responsible for land management decisionmaking and agency policy - the National Forest System - together with the fact that the problem posed by wildfire is not reflected in the agency's GPRA Strategic Plan indicated that the Forest Service did not consider the wildfire and fuels problem a priority for the agency:

> Developing and implementing such a strategy presents a difficult
> challenge to the agency because the wildfire issue transcends the
> boundaries of both its regions and forests and its resource-specific
> programs…To date, we have not seen the strong leadership or the
> marshalling of funds and resources within the agency that would indicate
> to us that the Forest Service feels a sense of urgency and assigns a high
> priority to reducing the threat of catastrophic wildfires (Hill, 1999, p. 17).

It appears that Forest Service chief Dombeck used this opportunity to attempt to marshal internal support for his efforts to institutionalize ecosystem management and break down the barriers between the resource specific programs by bringing to bear the influence of fire management in his confrontation with back to basic proponents within the National Forest System. Citing such critical evaluations by the GAO and others, chief Dombeck,[51] commissioned an internal evaluation of the agency's Fire and Aviation Management program to accompany the externally oriented cohesive strategy being

---

[51] Dombeck replaced Jack Ward Thomas as Chief in 1997. Dombeck, like Thomas, was not promoted from the ranks of professional foresters, nor even from within the agency. Dombeck holds a PhD in fisheries biology and previously served as Acting Director of the Bureau of Land Management.

developed by the "Integrated Response Team." The Chief's stated objectives for the

evaluation were "to verify that current policy, direction, and resources are adequate to

manage the fire and aviation program into the foreseeable future, or to generate

alternative approaches that stage fire and aviation management for success in the

future."[52]

This internal evaluation of the fire program resulted in the report titled "*An

Agency Strategy for Fire Management*" (hereafter *Fire Management Review*[53]) released

in January, 2000 (USDA Forest Service, 2000a).[54] The *Fire Management Review*

reiterated the general themes of past GAO reports and testimony regarding the need for

change but in even more strident and scathing terms. The report concluded that the

agency's "current policy, direction, and resources" are manifestly not adequate to

implement the agency's own fire management strategy or the *Federal Fire Policy*. What

the GAO described rather blandly as a high degree of autonomy in local unit's

interpretation of policy and discretion in its implementation, the *Fire Management

Review* described as a systematic refusal of the larger organization to deal with the

problems of "Divergent views of agency goals"; "Different perspectives on roles and

responsibilities"; "Arrogant decision making (line and staff);" and the "Absence of fire

involvement in planning." The report notes:

> The standard approach of conducting a review, finding problem areas,
> developing recommendations, and implementing action plans does not
> seem to solve repetitive and recurrent issues. The approach to solving

these continuing, repetitive issues has always been the same and the results are also always the same…[The] issues raised repeatedly in program reviews seem to transcend fire management such that they require an agency solution, rather than a simple program fix (USDA Forest Service, 2000a, p. 4).

The report pointed out that the strategy outlined in the agency's *Course to the Future: Positioning Fire and Aviation Management* of 1994 (USDA Forest Service, 1994) has underlain the Forest Service's as well as the *Federal Fire Policy*'s "recognition that fuels management is necessary for success in reducing large fire costs and improving ecosystem health" but that key recommendations from the *Course to the Future* remain unimplemented. Particularly, the review noted, was the need for an integrated interdisciplinary approach towards "restoration and maintenance of fire dependent ecosystems [and] a workforce capable of achieving, restoring, and protecting these ecosystems at this scale" (USDA Forest Service, 1994, p. 2). The integration of fire and fuels management into land management decision making is "paramount," the review states, because it is, "in many places, nonexistent" (USDA Forest Service, 1994, p. 3) Land management decisions "should not create, or further promote, a paradox where fire as an ecosystem agent contradicts the intended land management goal, yet they frequently do" (ibid). The report describes the lack of integration between resource programs as a problem of "functionalism" stating that:

> Lack of integrated planning results in competing and conflicting direction and objectives. Many times land management decisions are compromised by creating conditions which cannot be sustained in fire dependent ecosystems. Functionalism is promoted when an integrated approach is not used in land management decisions. When professionals are not available to participate in land management decision making, resultant decisions suffer. Functions that are adequately represented will overshadow the missing function, leading to land management decisions of lesser quality. The same problems arise operationally when land management projects

are implemented. Functional budgets and programs promote competition among staff areas, single benefit resource projects, and narrowly focused personnel. This prevents integration, efficient funding and staffing of projects, and inhibits broad based understanding of fire's role in ecosystem management….Functionalism results in conflicting and competing agendas for limited agency resources…It appears that there are disconnects among Forest Service mission and culture, agency priorities and workforce (USDA Forest Service, 2000a, p. 4-5).

The report examined three options or "pathways" the agency could take to resolve the problems facing the fire management, including one that would nationalize fire and aviation management taking it out of the Forest Service all together. Stating that the linkage between fire and land management was too important to separate fire management from the land management, the recommended pathway was "redefinition" of the role of fire and fuels management within the agency to deal with the institutional barriers to integration posed by functionalism. This recommended redefinition involved expanding local fire management capacity so that "local resources stay local to provide effective initial and extended attack, and most importantly, to provide improved land management input and better integration into ecosystem processes and decisions" and adopting the cohesive strategy being developed by an Integrated Response Team responding to the GAO's 1999 report (GAO, 1999a) calling for a cohesive strategy.[55]

---

[55] The recommended pathway, more specifically, involved a two-pronged approach: 1) Development of a fully staffed, year around National Incident Management Organization (NIMO) to respond to large and complex wildfire incidents and 2) Enhancing local units initial and extended attack capabilities. The NIMO concept was intended to relieve the problem of local units of loosing key fire management staff during fire season while the expanded initial and extended attack capabilities are intended to increase the organizational capacity of national forests to "…maintain expertise of fire management personnel to better integrate fire management considerations for planning and implementation of local projects and land management activities"

3.3.4 The Forest Service Cohesive Strategy

The Integrated Response Team spent a year developing the agency's response to

the GAO's criticism titled *Protecting People and Sustaining Resources in Fire-Adapted*

Ecosystems: A Cohesive Strategy. *The Forest Service Management Response to the*

General Accounting Office Report GAO/RCED-99-65 (GAO, 1999a, hereafter *Cohesive*

Strategy). The *Cohesive Strategy* restated the familiar causes of the current fire and forest

ecosystem health problems noted by the GAO's - that past management practices

including fire suppression, logging and grazing had contributed to a fuel build-up that

predisposed 39 million acres of forest land predominantly in western low elevation, dry

forest ecosystems to uncharacteristic fire behavior and effects.

The problems associated with using the timber program reiterated by the GAO

and the scathing critique in the *Fire Management Review* regarding the functionalism and

lack of integration between resource management programs within the agency are only

hinted at in the *Cohesive Strategy* report. However, it indicates that while the tools of the

timber program are necessary to implement the strategy where mechanical treatments are

necessary, timber production, as an objective in itself or as a means of off-setting costs

will not guide the development of projects under this strategy:

> Better integration of existing program budgets could reduce the amount of
> money requested. In most cases, any receipts associated with treatments
> will not be significant due to the need to reduce the disproportionately
> large number of small, non-merchantable trees, brush, and shrubs that
> dominate short interval fire-adapted ecosystems and leave standing the
> larger, fire tolerant trees…To improve forest ecosystem health and reduce
> wildland fire risks at larger scales, action needs to be expanded over
> broader areas and coordinated among Forest Service research, state and
> private forestry, and National Forest System programs. Restoration and
> maintenance of fire-adapted ecosystems depends on…[u]nderstanding and
> valuing ecological processes as the means to sustain ecosystem (USDA

Forest Service, 2000b, p. 17-19).

The stated objective of the *Cohesive Strategy* was to "describe actions that could restore healthy, diverse, and resilient ecological systems to minimize the potential for uncharacteristically intense fires on a priority basis" (p. 12). The *Cohesive Strategy* attempted to be "consistent with the guiding principles" of the *Federal Fire Policy* and represents an effort to provide the conceptual basis for integrating fuels management within an overall ecosystem management approach using information about fire regimes and current conditions. Uncharacteristic fire is defined in terms of "wildfire effects…compared to that which occurred in the native system" (p. 57). The *Cohesive Strategy* adopted the ecological classification system of fire regime condition class (FRCC) as the means of determining uncharacteristic fire effects compared to native or historic systems. FRCC was the result of the work conducted to provide an ecological basis for fuels management within the ecosystem management paradigm that emerged from the *Fire Regimes for Fuels Management and Fire Use* and *Ecosystems at Risk* projects at the Forest Service's Fire Sciences Laboratory, Rocky Mountain Research Station in Missoula, Montana begun in 1997 (Schmidt et al., 2002).

Table 2 Historic Natural Fire Regimes (USDA Forest Service, 2000b).

Fire Regime Group	Frequency (Fire Return Interval)	Severity
I	0-35 years	low severity
II	0-35 years	stand replacement severity
III	35-100+ year	mixed severity
IV	35-100+ year	stand replacement severity
V	>200 years	stand replacement severity

Table 3 Condition Class descriptions (USDA Forest Service, 2000b).

Condition Class[1] descriptions		
Condition Class	Fire Regime	Example Management Options
Condition Class 1	Fire regimes are within an historical range and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within an historical range.	Where appropriate, these areas can be maintained within the historical fire regime by treatments such as fire use.
Condition Class 2	Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased). This results in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range.	Where appropriate, these areas may need moderate levels of restoration treatments, such as fire use and hand or mechanical treatments, to be restored to the historical fire regime.
Condition Class 3	Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals This results in dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range.	Where appropriate, these areas may need high levels of restoration treatments, such as hand or mechanical treatments, before fire can be used to restore the historical fire regime.
[1]Current conditions are a function of the degree of departure from historical fire regimes resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, and canopy closure. One or more of the following activities may have caused this departure: fire suppression, timber harvesting, grazing, introduction and establishment of exotic plant species, insects or disease (introduced or native), or other past management activities		

FRCC was proposed as the means of assessing ecological risk within a risk management approach, as called for in the *Federal Fire Policy* and in the GPRA Strategic Plan as well as the proposed accomplishment metric to replace acres treated in the strategic plan. Though "sound risk management" was not operationally defined (and remains undefined), the *Cohesive Strategy* stated that "[c]onsiderable progress can be made in reconciling stewardship objectives by assessing values at risk at national, regional, and local scales" (p. 77) The *Cohesive Strategy* states that fire regimes I & II:

…occupy nearly all the lower elevational zones across the U.S. They have been most affected by the presence of human intervention and our analysis shows that these types demonstrate the most significant departure from historical levels. The departures are affected largely by housing development, agriculture, grazing, and logging. These areas are at greatest risk to loss of highly valued resources, commodity interests, and human health and safety (USDA Forest Service, 2000b, p. 75).

The priority areas for treatment set forth in the *Cohesive Strategy* are broad categories of "resource values" to be protected or maintained arising from this analysis:

- Wildland-urban interface
- Readily accessible municipal watersheds
- Threatened and endangered species habitat
- Maintenance of existing low risk Condition Class 1 areas

While the description of these general priority areas and their relationship to FRCC presented in the *Cohesive Strategy* focused on the risk posed by fire to these "resource values" it is important to point out (as is done in later publications) that FRCC is not a measure of fire hazard or increased fuel loading.[56] Rather, it is a relative measure of fire's role in maintaining various characteristic ecosystem structures and processes and the relative degree of departure from these characteristic structures and processes. Fuel arrangement and loading, rates of spread and fireline intensity – factors commonly considered in estimating fire hazard and risk – are not components of FRCC classification. These ecosystem changes may lead to different fire behavior and effects but such differences depend on the specific nature of the change. FRCC is an explicit recognition that fuel reduction may or may not constitute restoration of forest ecosystem

---

[56] The FRCC Guidebook V 1.3.0 (USDA, USDOI & The Nature Conservancy, 2008) notes for example, that "[u]sers should note that FRCC is strictly a measure of ecological trends and not a fire hazard metric. Nonetheless, inferences about current fire hazard can sometimes be made after examining FRCC outcomes. For example, a savanna biophysical setting (BpS) heavily invaded by trees as a result of fire exclusion would often be considered to reflect both FRCC 3 and high fire hazard" (p. 13).

health. It is presented, in other words, as the conceptual basis for a formal risk assessment procedure that allows the weighing of tradeoffs between various management objectives in line with the agency's various stewardship responsibilities (e.g. hazard reduction and forest ecosystem health, corresponding with the first and second principles of the F*ederal Fire Policy* – safety and reintroducing the ecological role of fire, respectively).

Departure (condition class) is a measure of change and this change may or may not be characterized by a fuels buildup that leads to uncharacteristically severe fire behavior or effects. Fire regime IV and V, for example, are characterized by stand replacement fire. That is, these fire regimes are characteristically severe (as measured by overstory mortality) as illustrated by the fires in Yellowstone National Park. A reservoir or parking lot will change condition class and fire behavior and effects but not by making fire more severe but less frequent. Similarly, departure as a measure of risk to an ecosystem, entails that the system is at risk from any disturbance, whether through management action or "natural" events. That is, whether a disturbance (such as wildfire, prescribed fire or mechanical treatment) increases or decreases departure, depends on the nature of the departure (and of course on the structural or functional components of the ecosystem measured and the measurement methods used). Put another way, reducing fire hazard through thinning only reduces the departure if the thinned component of the ecosystem is the cause, or contributes to the cause of the measured departure. At the same time, thinning in those forest ecosystems that historically experience infrequent, stand replacement fire (e.g. Fire regime IV and V) may in fact increase the departure from historic conditions because it removes the fuel that supports "natural" severe fire behavior and effects. Where such activities are considered necessary for a hazard

reduction objective the *Cohesive Strategy* implies that FRCC should be measured as a means of estimating the ecological tradeoffs and potential mitigation costs involved.

The *Cohesive Strategy* (USDA Forest Service, 2000b) recommended a number "institutional" and "program management" changes to the GPRA Strategic Plan to address the disconnect and functionalism between fire management and land management pointed out by the GAO and reiterated in the agency's own *Fire Management Review* (USDA Forest Service, 2000a). Among these are "adjustments" to the Strategic Plan to reflect the priorities outlined in the *Cohesive Strategy* and codify FRCC as well as recommending that future forest plan revisions in turn reflect these adjustments and employ FRCC assessments as the basis for integrated restoration and management of fire adapted ecosystems. For example, the *Cohesive Strategy* recommends:

- Establishing ecosystem restoration as a performance element in the Forest Service Annual Performance Plan…Use changes in condition class as one of the measures for annual performance and accountability…(p. 35)

- Establish assessment procedures that integrate considerations of current ecosystem condition (status), probability of degradation from disturbance events (risk), and alternatives to reduce risk or improve conditions (opportunity). Include objectives at the national, regional and local scales for: watershed protection, species conservation, ecosystem resilience, and public safety. Coordinate information across all program areas…(p. 35)

- In Land and Resource Management Plan amendments and revisions: identify land by condition class categories…(p. 35)

- Consistent with Land and Resource Management Plans, develop fire management plans that provide for suppressing fires that would threaten public safety, communities, species habitat, or degrade ecosystems. Increase the management of natural ignitions for resource benefits where values and resources will be increased or improved. (p. 36)

- Design and implement systematic methods for broad-scale and landscape scale assessments of the history, status, and trajectory of ecosystem conditions; values at risk; and management opportunities for maintaining and restoring ecosystem integrity. (p. 73)

- Assess what fuel treatment works most effectively to protect communities and restore fire-adapted ecosystems. (p. 74)

Though it is perhaps only a coincidence that the *Cohesive Strategy* was released in the same Federal Register (November 9, 2000) as the final forest planning rule, the linkage between them is quite clear. [57] The *Cohesive Strategy's* confidence that "[c]onsiderable progress can be made in reconciling stewardship objectives by assessing values at risk at national, regional, and local scales" (p. 77) appears linked to an assumption that forest plan revisions will proceed forthwith under the 2000 planning rule.[58] The 2000 finale forest planning rule would require a single assessment framework to be employed at the forest and project planning levels. Section 219.20 "ecological sustainability analysis" of the final rule, for example, states that "characteristics of ecosystem diversity" include "a description of the principal ecological processes occurring at the spatial and temporal scales that influence the characteristic structure and composition of ecosystems in the assessment or analysis area" (65 Fed. Reg. 67574 (November 9, 2000)). The rule further states that:

---

[57] 65 Fed. Reg. 67514-67581 (November 9, 2000).

[58] It is interesting to note one of the comment and response items included with the final rule in the Federal Register: "Comment: Fire management strategies. Some respondents felt that the Forest Service should suppress fires. Allowing forests to burn was seen as a waste of resources to these people. Others asserted that the Forest Service should allow fires to burn, proposing that restoring fire disturbance regimes will, in turn, help restore ecological sustainability. Response: The Department does not believe that this rule is the appropriate place to resolve questions of fire management policy. However, the planning framework provided by this rule will facilitate resolving them at the appropriate scale. Fire may be an issue handled at the national or regional scale. For example, the Forest Service has recently developed new information about the risk of catastrophic fires that may be useful for planning …The collaborative and flexible planning process outlined in this final rule is fully consistent with ongoing efforts at the Forest Service to address fire risks to communities and the environment."

These descriptions must include the distribution, intensity, frequency, and magnitude of natural disturbance regimes of the current climatic period…and the identification of the risks to maintaining these processes. These descriptions may also include an evaluation of the feasibility of maintaining natural ecological processes as a tool to contribute to ecological sustainability…Plan decisions affecting ecosystem diversity must provide for maintenance or restoration of the characteristics of ecosystem composition and structure within the range of variability that would be expected to occur under natural disturbance regimes of the current climatic period. Except as provided in paragraph (b)(1)(iv) of this section, in situations where ecosystem composition and structure are currently within the expected range of variability, plan decisions must maintain the composition and structure within the range. Except as provided in paragraph (b)(1)(v) of this section, where current ecosystem composition and structure are outside the expected range of variability, plan decisions must provide for measurable progress toward ecological conditions within the expected range of variability (65 Fed. Reg. 67574 (November 9, 2000)).

The reformulation of Forest Service fire policy, first articulated in the1995 *Course to the Future: Positioning Fire and Aviation Management*, as well as the *Federal Fire Policy* of 1995 (USDA Forest Service, 1995), was conducted under the rubric of ecosystem management and sustainability that came to be defined through the concepts of disturbance ecology and the historic range of variability. Like the *Course to the Future* and the *Federal Fire Policy* (USDA and USDOI, 1995) the *Cohesive Strategy* is more of an outline of a strategy or a general set of guiding ideas and concepts by which a future strategy might be produced. Before the *Cohesive Strategy* and the 2000 finale forest planning rule were released, however, the fire season of 2000 erupted eventually burning more than 6.8 million acres of public and private land, more than double the 10-year national average. The events that followed had complex and confounding effects upon the policy and practice of fire and fuels management within the forest Service.

On the one hand, these fires seemed to provide the sense of urgency that the GAO

viewed as necessary to catalyze the commitment of resources to fuels and forest

ecosystem health problem. Fuels management has since become a major focus of agency

land management. In the fall after the fires, following recommendations of Secretaries of

Agriculture and Interior, Congress substantially increased funding for fire and fuels

management in fiscal year 2001 appropriations (P.L. 106-291) initiating what became

known as the National Fire Plan.[59] On the other hand, however, the direction from

Congress in these appropriations ignored key recommendations of the Secretaries, many

of which were derived from the as yet unreleased *Cohesive Strategy*. Moreover, these

fires occurred just before the election of a new president whose administration had a very

different agenda for natural resource management.

As the new administration made its appointments, the "back to basics" proponents

within the agency, who had been resisting the changes represented by ecosystem

management, ascended to leadership positions within the agency – except, apparently,

within Fire and Aviation Management. While the new leadership emphasized the need

for action in the face of the immanent forest health crisis and redirected agency policy

towards reducing analysis requirements to allow the increased use of traditional forest

management practices, particularly thinning, fire management leadership continued to

push for a larger role in land management decision making and to emphasize the need for

integrated planning and the large scale reintroduction of fire. The result is a plethora of

policies, strategies, plans and initiatives vying for consideration and entirely lacking in

coherence. Thus this new, more active role of fuel managers in forest management

---

[59] Forest Service fuels management rose from $70 million in FY 2000 to $205.2 million in FY 2001 and
has steadily increased since then (CRS, 2007).

decision making is focused on project planning and implementation and this takes place

in the absence of an overall strategy or vision. There is no direction or resources provided

for developing what the *Federal Fire Policy* and its implementation procedures reference

guide (USDA and USDOI, 1995, 1998)calls a landscape-scale planning framework at the

national forest level, the level where fuels management projects are developed and

implemented.

3.3.5 The National Fire Plan

The 2000 fire season began dramatically. An escaped prescribed fire on the

Bandelier National Monument in early May became the Cerro Grande fire burning over

47,000 acres including areas of the Los Alamos National Laboratory. The resulting

independent review noted serious deficiencies in planning and implementation reflecting

the same themes as previous critical reviews and reports that fuel management does not

appear to be a high priority and it is not well integrated into management decision

making. [60] It recommended that:

> The agency administrator must be held responsible and accountable for
> ensuring that any wildland fire management or prescribed burning activity
> is in compliance with the Federal Wildland Fire Management Policy and
> the Wildland and Prescribed Fire Management Policy. There must be clear

---

[60] *Cerro Grande Prescribed Fire Independent Review Board Report* of May 26, 2000 (USDOI, 2000) was actually formed by Secretary of the Interior Babbitt to review the findings of the *Cerro Grande Prescribed Fire Investigation Report* of May 18 and make further recommendation. The board report concurred with the investigation reports findings that the prescribed fire was improperly planned and implemented but absolved the National Weather Service of failure to follow existing policies. It should be noted, as pointed out in these reports but not covered in the media, that the original "slopover" that led to the prescribed fire being declared a wildfire was contained at 30 acres. It was an escaped backfire set as part of the suppression effort that escaped and spread beyond the Monument's boundaries. The recriminations of the two reports were directed at the poor planning and preparation for both the initial prescribed fire and subsequent suppression operations that led to conflict and misunderstanding over stated and pursued objectives. The GAO (2000) also conducted a review of the incident: Fire Management Lessons Learned from the Cerro Grande (Los Alamos) Fire GAO/RCED-00-257. These were then followed by the *Cerro Grande Prescribed Fire Board of Inquiry Final Report* of February, 2001 (USDOI, 2001). See the National Park Service website devoted to the incident with links to all reports at http://www.nps.gov/cerrogrande/. Last accessed may, 2009.

linkages and consistency among the prescribed burn plan, the Fire Management Plan, the Land Management Plan, and the Federal Wildland Fire Management Policy (USDOI, 2000, p. 9).

The review noted that "[w]hen agencies do fail, it is generally not because of a lack of adequate policy, standards and guidance, but a result of not following that guidance. Agencies write a plan, but do not live the plan" (p. 13). The report recommended that the team established to ensure implementation and consistency of the *Federal Fire Policy* be re-chartered to reevaluate the policy's Implementation Action Plan in order to address these shortcomings. The fire season, however, postponed this review until the fall.

Public outcry over the 2000 fires was intense. Frustration and recrimination ran high. To call it a public debate or public discourse would be poor description. It was as much a shouting match as a dialogue. It was, after all, an election year. Timber interests, and Presidential candidate George Bush, blamed the fires on poor federal land management, in particular the reduction in timber production over the past decade, for allowing forest to become overgrown and susceptible to insects, disease and catastrophic wildfires.[61] They advocated more aggressive timber management and invoked the theme of needless paperwork, what Representative James Hansen (Republican of Utah and a harsh critic of the Clinton administration's public lands policies) in 1999 had called a "paralysis of analysis" for hindering good forest stewardship (Vaughn and Courtner,

---

[61] "Fires aren't Clinton's fault but bad policy is, Bush says" Seattle Times, August 13, 2000. Available at http://community.seattletimes.nwsource.com/archive/?date=20000813&slug=4036481. Last Accessed May, 2009.

2005).[62] Environmental groups blamed the past focus on timber production and the lack of adequate attention to other values as the cause of ecosystem health and the catastrophic wildfire problems. They advocated against logging pushing instead for greater regulatory controls that focused on ecological restoration and treating fuels in the wildland urban interface.

The Congressional Research Service was tasked with reviewing the connection between timber production declines and wildfire increases but found none noting instead that "[i]t is logical, and widely accepted, that reducing fuels will reduce the severity and extent of wildfires, but no research literature documenting this relationship has been found."[63] Numerous fire researchers provided testimony before Congress during and after the fire season of 2000 to the effect that action is urgently needed but caution is warranted in the face of this lack of knowledge and the uncertainty that accompanies the complexity of fire behavior and ecology. Swetnam (2000), for example, in testimony before Congress noted that past climate, along with past management, was directly related the severity and extent of the 2000 fires but that a changing climate has increased the uncertainty over future ecological effects of fire and response to various kinds of treatments. Stephens (2000) echoed the view of many researchers in stating that:

> …the debate on whether we should use silviculture (including logging in some cases) to manage our national forests is unproductive, the real issue is the definition of desired future conditions and how are we going to get there and once there, how they will be maintained. The recent report of the Sierra Nevada Ecosystem Project highlighted these issues and explained the need for large-scale strategically located fuels treatments… the need for large increases in the use of restorative management practices is clear.

---

[62] Roll Call, April 19, 1999, on the thirtieth anniversary of the National Environmental Policy Act (NEPA), Representative Hansen (chair of the House Resources Committee) stated that NEPA implementation has become a sham, crushing federal agencies with process and paper work he called a paralysis of analysis.
[63] CRS (2000a).

Less clear, however, is the appropriate balance among silvicultural operations, mechanical fuel treatments, and prescribed fire… Each area of the country is unique but in most forest types that historically had frequent, low intensity fire regimes the most critical fuel complex from a fire hazard standpoint is the surface fuels, followed by the ladder fuels, and then the crown fuels…Economics and practicability in light of current stand and landscape conditions are important considerations that are often involved in managers decisions about which tools to use. However, to achieve goals for ecosystem integrity and sustainability, we also need much better information about the ecological consequences and tradeoffs of alternative management practices…For the most part, information necessary to answer such key questions is anecdotal or absent (Stephens, 2000, p. 2-3).

Despite the escaped prescribed fire that led to the Cerro Grande fire researchers and managers impressed upon the need for increased reintroduction of fire for both ecological and fuel reduction purposes. Others, however, cited Cerro Grande as a reason for rejecting the proposed increase in prescribed fire and wildland fire use proposed in *Federal Fire Policy* and the *Cohesive Strategy*. Responding to a draft copy of the *Cohesive Strategy*, the Quincy Library Group (Quincy Library Group, 2000) released its own "cohesive strategy" stating emphatically that fire should not be used where other treatments are feasible. It "isn't sufficient to clean up the forest" with fire, the report stated, they must be "thinned out" through silvicultural methods that will also help pay for the necessary treatments.[64] The National Association of State Foresters said the *Cohesive Strategy* relied too heavily on prescribed fire and fire use, that increasing these practices in themselves increased the risk of catastrophic widlfire and that the strategy, as with other ecosystem efforts such as the Sierra Nevada Ecosystem Project (SNEP) and

---

[64] A Real Cohesive Strategy, The Quincy Library Group's Response to the GAO Report and the Forest Service's Response, (2000). Available at http://www.qlg.org/pub/miscdoc/cohesivestrategy.htm. Last accessed March, 2009.

the ICBEMP did not emphasize thinning strongly enough. [65] It was in this atmosphere of

political problem framing and blaming that the National Fire Plan emerged.

In August of 2000, as this blame game and the fires themselves were at their

height, President Clinton ordered the Secretaries of Agriculture and Interior to come up

with a plan to respond to the "problem of catastrophic wildfires." Their plan, *Managing*

the Impact of Wildfires on Communities and the Environment: A Report to the President

in Response to the Wildfires of 2000 (Babbit and Glickman, 2000, hereafter: *Report to the*

President), was delivered a month later. The *Report to the President* set the stage for the

National Fire Plan when Congress acted on its recommendations in fiscal year 2001

appropriations.

The *Report to the President* was vague on specifics, reiterating many of the

themes raised in the *Federal Fire Policy* and the as yet unreleased Forest Service

Cohesive Strategy from which it adopted many of its recommendations, such as the need

to increase funding for fuels management; integrating fire and fuels management within

land management more broadly; prioritization on the wildland urban interface (WUI) and

ecosystems at risk. The report emphasized the need for collaboration between agencies

and with local communities and that this would be carried out in the context of ecosystem

management and the *Federal Fire Policy*, all of which will, the report suggested,

contribute to greater accountability in the use of the requested funding increase. It was, in

short, a plug for ecosystem management and the *Federal Fire Policy* - "Building on the

forest policies of the past eight years, the wildland fire policy, and the concepts of

---

[65] See NASF (2000) National Association of State Foresters, Resolution No. 2000-7: *Forest Service Cohesive Strategy for Reducing Wildland Fire Hazards* Available at http://www.stateforesters.org/node/577 Last accessed September, 2009.

ecosystem management, the Departments should establish a collaborative effort to expedite and expand landscape-level fuel treatments" (p. 2).

While vague, however, the *Report to the President* fell clearly on one side of the logging-for-risk reduction shouting match. The report reiterated the problems raised by the GAO (1999) over the use of the timber program due to its conflicting incentives and also responded to the problem of functionalism and lack of participation in the establishment of project objectives and the design of treatments. It also responded to the critiques raised in the Forest Service's *Fire Management Review* (USDA Forest Service, 2000) describing a culture of functionalism within the agency where fuels management objectives are often subsumed by other resource program objectives during project planning. The Report stated that "the Administration's wildland fire policy does not rely on commercial logging or new road building to reduce fire risks" noting further that:

> …the removal of large, merchantable trees from forests does not reduce fire risk and may, in fact, increase such risk. Fire ecologists note that large trees are 'insurance for the future – they are critical to ecosystem resilience.' Targeting smaller trees and leaving both large trees and snags standing addresses the core of the fuels problem (Babbit and Glickman, 2000, p. 7).

This was to be accomplished by the establishment of a cadre of "experienced personnel…dedicated full time to this activity" (p. 14) as recommended in the *Fire Management Review* (USDA Forest Service, 2000). Expediting increased fuels treatments by this dedicated cadre was to be accomplished through additional funding "to support non-fire disciplines (biology, wildlife, hydrologists, etc.) necessary to conduct planning and assessment activities" (p. 19) and "cabinet level oversight to ensure that the environmental reviews required by the National Environmental Policy Act, and all other

environmental requirements, are undertaken and completed on a timely basis" (p. 3) and "to support Endangered Species Act consultation work by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service" (p. 14).

Also in its proposed budget for fiscal year 2001, Chief Dombeck and Under Secretary Lyons proposed numerous changes in Forest service program budgeting. It proposed replacing several of the Forest Service's permanent and trust fund accounts, including those presenting the most egregious perverse incentives to focus on timber production at the expense of ecosystem management goals – the Salvage Sale Fund and Knutson-Vandenberg (KV) – with a new mandatory appropriation called Healthy Investments in Rural Environments (HIRE). Under the HIRE initiative, all receipts from timber harvesting would be returned to the national treasury rather than a portion of the receipts being kept at the national forest where harvesting takes place and the Forest Service Washington Office would allocate funding from the HIRE account back to the forests using transparent allocation criteria. Chief Dombeck and Secretary Lyons also proposed changes to its budget structure giving it more flexibility in how it allocates appropriations to its various resource management programs. This change from "benefiting function" to "primary purpose" allocation was supposed to make the pursuit of large scale ecosystem management easier. According to the Congressional Research Service (2000a) it would reduce the information available for oversight and congressional control of how funds were spent. At the same time, however, this increased flexibility was to be accompanied by clarified performance measures for each program, developed as part of the agency's update to its strategic plan under GPRA. Together these structural changes to Forest Service budget allocation was rationalized as provided greater

accountability for what is actually done on the ground than the current system, particularly for fuels management, which until then, had remained largely focused on slash disposal following timber harvesting.

Congressional response in its fiscal year 2001 appropriations later that fall provided for some of the Secretaries' recommendation in its proposed budget and the *Report to the President* but also reflected some of the sentiment expressed in the shouting match over fire and logging. Congress substantially increased funding for fuels treatments and, in a conference report, directed the agencies to work with the Western Governors Association (WGA), tribal and local governments and others to develop a collaborative fire and fuels management strategy. Congress also directed the secretary of Agriculture to publish the Forest Service's *Cohesive Strategy* (USDA Forest Service, 2000b) response to the GAO in the Federal Register as well as directing the Secretaries of Agriculture and Interior to publish in the Federal Register (within 60 days of enactment) a list of "all urban wildland interface communities" as defined by them, in consultation with state and local fire-fighting agencies.

Congress did not however accept the recommendation in the *Report to the President* to establish a dedicated fuels management work force in lieu of the timber program. Rather, it simply stated that "all contracting and hiring authorities may be used" (114 STAT. 1009) and that funding for hazardous fuel reduction may be used for "post-burn treatment" e.g. salvage logging. It accepted the proposed structural changes to Forest Service budget allocation from "benefiting function" to "primary purpose" providing greater flexibility but less oversight. However, Congress did not approve the

HIRE initiative to reform the incentive system for timber harvesting represented by the trust accounts (such as Salvage Sale Fund and Knutson-Vandenberg). In addition, rather than providing resources for and supporting the establishment of additional offices to ensure expeditious compliance with environmental regulations such as the National Environmental Policy Act (NEPA and the Endangered Species Act (ESA), Congress directed the agency's to "…evaluate the need for revised or expedited environmental compliance procedures including expedited procedures for the preparation of documentation required by section 102(2) of the National Environmental Policy…[and] may accord priority as appropriate to consultation or conferencing under section 7 [of the Endangered Species Act]…" (Pub. L. No. 106-291, 114 STAT. 1010 (2000))

This Congressional response to the *Report to the President* became known as the National Fire Plan. There is no plan as such, however. There is no single document or set of formal agreed upon principles, goals or objectives with the title National Fire Plan that can be referred to. In later references, as time goes on, the *Report to the President* will be cited as initiating the National Fire Plan.[66] Since the Forest Service's *Cohesive Strategy* was ordered published in this appropriation, and the two agencies (Department of Agriculture and Interior) were ordered to work collaboratively with the states, the *Cohesive Strategy* and the collaborative efforts developed under the auspices of the Western Governors Association (WGA) are together often referred to as the National Fire Plan. That is, the National Fire Plan was – initially - considered the loose amalgamation of:

- The Report to the President (Babbit and Glickman, 2000)
- FY 2001 appropriations directions

---

[66] See for example the official website http://www.forestsandrangelands.gov/reports/index.shtml.

- The Forest Service *Cohesive Strategy* (USDA Forest Service, 2000b)
- Interagency collaborative efforts under the WGA (the *10-Year Comprehensive Strategy* (WGA, 2001) and its *Implementation Plan* (WGA, 2002))

Precisely what the National Fire Plan entails is not exactly clear. Nor is it clear how the National Fire Plan relates to interagency fire policy, or to individual federal agencies fire management programs that are supposed to be adopting the principles and implementing the Action Items of the *Federal Fire Policy*. The many policy documents are themselves vague and often contradictory. The "supplementary information" in the Federal Register in which the Forest Service's *Cohesive Strategy* was released, for example, describes the *Report to the President* as providing "an overall framework for forest health and fire management."[67] In January, 2001 the *Review and update of the 1995 Federal Wildland Fire Policy* (USDA and USDOI, 2001, hereafter *2001 Federal Fire Policy*), was released. This review was initiated the previous spring following the Cerro Grande fire.[68] The Executive Summary of the *2001 Federal Fire Policy* describes the combination of the *Report to the President* and the Congressional direction in its 2001 appropriations together as comprising the National Fire Plan. However, rather than describing the National Fire Plan as providing the "overall framework for forest health and fire management," as the Federal Register does, the *2001 Federal Fire Policy* states that:

> While this Review and Update supports and complements the National Fire Plan, the two efforts are different. This Review and Update, with its findings and recommendations, provides a broad philosophical and policy foundation for federal agency fire management programs and activities,

---

[67] 65 Fed. Reg. 67479 (November 9, 2000).
[68] There is one document but, technically, the policy revisions are contained in chapter 3 of the review and the new policy is variously called the *Review and Update of the 1995 Federal Wildland Fire Management Policy* or the *2001Federal Wildland Fire Management Policy*.

including those conducted under the National Fire Plan. In contrast, the
National Fire Plan and similar interagency activities, focus on operational
and implementation activities. A major feature of the National Fire Plan is
the interagency (especially between federal and non federal entities)
aspect of risk reduction planning and implementation. In summary, the
2001 Federal Fire Policy contained in this report is focused on internal
federal agency strategic direction for a broad range of fire management
related activities while the National Fire Plan is a more narrowly focused
and tactical undertaking involving both federal and non-federal entities
(USDA and USDOI, 2001, p. i-ii).

3.4 From Ecosystem Management to the Healthy Forest Initiative

While the relationship between the *Federal Fire Policy* and the National Fire Plan

were unclear in the immediate aftermath of the 2000 fires, there was a great deal of

convergence of basic concepts and overall direction. The *2001 Federal Fire Policy*

committed the interagency fire management to "continue ongoing efforts to jointly

develop compatible, ecosystem-based, multiple-scale, interagency land management

plans that involve all interested parties and facilitate adaptive management" (Zimmerman

and Bunnell, 2000). The efforts led by the Western Governors Association (WGA),

initiated under President Clinton's Secretaries of Agriculture and Interior, resulted in *A

Collaborative Approach for Reducing Wildfire Risks to Communities and the

Environment: A 10-Year Comprehensive Strategy*, released in August 2001 (WGA,

2001), followed by an *Implementation Plan* in May, 2002 (WGA, 2002). The three

principles and four goals of the *10-Year Comprehensive Strategy* became the core

concepts of the National Fire Plan and they are based on many of the elements within the

R*eport to the President* and the Forest Service's *Cohesive Strategy*, such as the emphasis

on developing landscape-scale plans focusing treatment on risk in the Wildland Urban

Interface (WUI) and employing fire regime condition class (FRCC) classification system

for assessment, prioritization and design of forest ecosystem restoration projects. Thus, as initially developed, the National Fire Plan corresponded rather closely with the *Federal Fire Policy's* emphasis on developing collaborative landscape-scale planning efforts that attempt to balance risk reduction and the ecological role of fire.

These initiatives, however, never went beyond general conceptual outlines for the development of future, more detailed and prescriptive policies, strategies and plans. The envisioned ecosystem management based approach to integrated landscape-scale fire management planning never materialized. The *10-Year Comprehensive Strategy* (WGA, 2001) and its *Implementation Plan* (WGA, 2002) were developed just as the newly elected President Bush was reorganizing Forest Service leadership and began to implement his land management policy agenda that went in a very different direction to the previous administrations push for ecosystem management.

In August, 2002 President Bush announced the *Healthy Forest Initiative (HFI)*. While the administrative and statutory enactments of the HFI were billed as "implementing" the National Fire Plan[69] they represented a "modification" of the process, purpose and its core concepts and action items (in the diplomatic words of by then retired Forest Service Chief Dombeck,[70]). It would perhaps be more accurate to describe the enactments of Healthy Forest Initiative as ignoring the National Fire Plan and the *Federal Fire Policy* along with it.

---

[69] Sometime in 2006 the official websites for the National fire plan (www.fireplan.gov) and the Healthy Forest Initiative were merged into one, the current http://www.forestsandrangelands.gov/.

[70] "In 2002 President Bush's Healthy Forests Initiative called for modifications to the National Fire Plan that would expedite fuel-reduction projects by reducing environmental impact analysis, public involvement, and appeals and litigation associated with the National Environmental Policy Act (Office of the President 2002)." (Dombeck et al., 2003, p. 887).

The HFI was predicated on reducing analysis and planning. It was part of a larger

effort to transform land management policy in general, efforts that included the

suspension of the 2000 forest planning regulations (to which the *Cohesive Strategy* was

linked) and the development of radically different forest planning rule that made

ecological assessments such as FRCC discretionary. This larger effort essentially ended

ecosystem management and the multi-scale assessment and planning efforts upon which

it was predicated. Congressional appropriations have, for the most part, funded the

National Fire Plan as "modified by the HFI.

To explain the diverging trajectories of these various policy initiatives since the

fire season of 2000 requires explaining their development slightly out of sequence.

Thematically and politically, the *Federal Fire Policy* 2001 update and the development

of the Western Governors Association's *10-Year Comprehensive Strategy* that provides

the core principles and goals of the National Fire Plan lie along one general trajectory.

These will be described first. This will be followed by a description of the Bush

administration's institutional changes to the Forest Service and forest policy initiatives as

they affect fire and fuels management.

3.4.1 The 2001 Federal Fire Policy

The *2001 Federal Fire Policy* reiterated (yet again) the same basic themes and

critiques of past reports and reviews and recommended similar solutions. As with the

policy review following the fires of 1988, this review found that the policy itself was

generally sound but poorly implemented and in many respects not implemented at all.

The overriding goal and principle of the *1995 Federal Fire policy*, one that was

successfully implemented according to the review, was firefighter and public safety. The

principle critique of the review mirrored that of the Forest Services *Fire Management*

Review released a year earlier noting that "…the role and influence of fire have not been

adequately considered in the planning process" (p. 11). The review states that:

> [w]hen there was organizational will and commitment about an element of
> the 1995 Federal Fire Policy, that element was successfully
> implemented…Those most successfully implemented were those
> exclusively in the domain of the traditional fire management
> organizations. Implementation was least successful in areas requiring
> coordination and agreement among agencies or across disciplines within
> agencies…and there is little evidence that managers have been held
> accountable for implementation (USDA and USDOI, 2001, p. 11).

Repeating the finding from a 1999 large fire cost review the *2001 Federal Fire*

Policy noted "…the failure of most units to adopt Fire Management Plans that meet the

requirements of the 1995 Federal Fire Policy...Of particular concern is the lack of

consequences for failure to resolve differences among…disciplines, and for failing to

ensure integration among disciplines…Nor are there significant incentives or rewards for

efforts at implementation" (p. 17). The *2001 Federal Fire Policy* provides several

"Implementation Actions" that it said were key to overcoming these persistent problems

and ensuring successful fire management, the first of which is titled "Fire Management &

Ecosystem Sustainability." This implementation action begins by noting that currently

"[t]he relationship between fire management activities and other efforts to achieve

ecosystem sustainability is unclear" but states that "Fire Management Plans and land

management plans will…contribute to ecosystem sustainability" and specifies the

following actions to be taken by federal agencies:

a. Develop a comprehensive, interagency strategy for fire management to help achieve ecosystem sustainability.

b. Fire Management Plans and land management plans will appropriately incorporate mitigation, burned-area rehabilitation, and fuels reduction and restoration activities that contribute to ecosystem sustainability.

The *2001 Federal Fire Policy*, in other words, explicitly reaffirmed and strengthened its linkage to sustainability as articulated by agency leadership under the Clinton Administration, attempting to institutionalize ecosystem management in resource management planning. After all, the 2000 finale forest planning rules were released only two months earlier. As with the *1995 Federal Fire Policy*, which was released coincident with a proposed forest planning rule in 1995, there was an expectation that forest plan revisions would commence forthwith. Thus the *2001 Federal Fire Policy*, noting the release of the Forest Service's *Cohesive Strategy* two months earlier, recommended the coordination of such efforts under Action Item (a). Work began on action item (a) in early 2001. This became known as the Interagency Cohesive Strategy intended to "help provide Federal land management agencies with a unified approach to meet the goals of the 10-Year Comprehensive Strategy" (WGA, 2002, p. 22).[71]

3.4.2 The National Fire Plan's 10-Year Comprehensive Strategy

The *Report to the President* of August 2000 (Babbit and Glickman, 2000) had reiterated the recommendations of past fire policies (1990, 1995) for broad based collaboration across jurisdictions to deal with the complex problem of the ever increasing wildland urban interface (WUI). In Mid September, 2000 the Secretaries of Agriculture

---

[71] The draft Interagency Cohesive Strategy has also been referred to as the combined Cohesive Strategy, the 2002 Cohesive Strategy and the Integrated Strategy.

and Interior met with members of the Western Governors Association (WGA) and sketched out the broad outlines of a collaborative response and Congress' fiscal year 2001 appropriations direction largely reflected these agreements.[72] The result was "*A Collaborative Approach for Reducing Wildfire Risks to Communities and the Environment: A 10-Year Comprehensive Strategy* released in August 2001 followed by an *Implementation Plan* in May, 2002.[73] The emphasis and sensibility of the *10-Year Comprehensive Strategy* follows directly from that of the *2001 Federal Fire Policy* and the Forest Service *Cohesive Strategy,* stating in the preface that:

> The purpose of a long-term strategy for reducing wildland fire risks to communities and the environment is meant, in part, to correct problems associated with the long-term disruption in natural fire cycles. This disruption has increased the risk of severe wildland fires on some fire-prone ecosystems (WGA, 2001, pg 4).

There are three "core principles" and four "goals" to the strategy laid out in the *10-Year Comprehensive Strategy* and they reflect the priorities outlined in the *Report to the President* and Forest Service *Cohesive Strategy*. The core Principles are:

> Collaboration – Facilitate a collaborative approach at the local, regional, and national levels.

> Priority Setting – Emphasize the protection of communities, municipal, and other high-priority watersheds at risk. Long term emphasis is to maintain and restore fire prone ecosystems at a landscape scale.

> Accountability – Establish uniform and cost-effective measures, standards, reporting processes, and budget information in implementation plans that will fold into the Government Performance and Results Act process.

---

[72] Described in *10-Year Comprehensive Strategy* (WGA, 2001, pg 5) as leading to the directions given to the Secretaries of Agriculture and Interior in the FY 2001 appropriations.
[73] The *10-Year Comprehensive Strategy* was co-developed at a series of workshops by the secretaries of Agriculture and Interior, the Western Governors Association, the National Association of State Foresters, the National Association of Counties and the Intertribal Timber Council as well as representatives of several non-governmental conservation and industry organizations.

The four goals of the *10-Year Comprehensive Strategy* are:

1) Improve Prevention and Suppression;
2) Reduce Hazardous Fuels;
3) Restore Fire Adapted Ecosystems and;
4) Promote Community Assistance.

In between the release of the *10-Year Comprehensive Strategy* in August, 2001 and its *Implementation Plan* in May, 2002, the draft Interagency Cohesive Strategy (USDA and USDOI, 2002a) had apparently been completed sufficiently for use in formulating an outline of how the principles and goals of the *10-Year Comprehensive Strategy* were to be met.[74] The FRCC concept played a central role. The *Implementation Plan* describes generic "Implementation Outcomes," "Performance Measures" and "Implementation Tasks" for each of the four goals. The Implementation Outcome for Goal Two - Hazardous Fuels Reduction, for example is:

> Hazardous fuels are treated, using appropriate tools, to reduce the risk of unplanned and unwanted wildland fire to communities and to the environment.

The first "Performance Measures" is:

> Number of acres treated that are 1) in the Wildland Urban Interface or 2) in condition classes 2 or 3 in fire regimes I, II, or III outside the wildland urban interface, and are identified as high priority through collaboration consistent with the Implementation Plan…

---

[74]The interagency Cohesive Strategy was titled *Restoring Fire-Adapted Ecosystems on Federal Lands, A Cohesive Strategy for Protecting People and Sustaining Natural Resources*. The *10-Year Implementation Plan* (WGA, 2002)*,* Appendix A, describes it as "a combined effort between the Federal land management agencies to coordinate an aggressive, collaborative strategy for reducing fuel and restoring land health within fire-adapted areas. The Cohesive Strategy was developed to help provide Federal land management agencies with a unified approach to meet the goals of the 10-Year Comprehensive Strategy." It is also referenced in a Forest Service report on potential responses to the western bark beetle epidemic (http://www.fs.fed.us/foresthealth/publications/WesternBarkBeetleReport.pdf of 2002).

It is significant that the goals of hazardous fuels reduction (Goal Two) and

restoring fire adapted ecosystems (Goal Three) are distinct.[75] It is an implicit appreciation

or recognition that the goals and objectives of hazardous fuels reduction may not

necessarily be the same as those of restoring fire adapted ecosystems.[76] The terms –

'restoration', 'integrity' and 'fire prone ecosystems' – are defined in the *10-Year*

Comprehensive Strategy by reference to the Forest Service's *Cohesive Strategy* (USDA

Forest Service, 2000b), with its conceptual roots in landscape ecology aligned with the

agency's policy of implementing ecosystem management.[77] "Severe wildland fire" and

"catastrophic fire" are defined together as fire "that burns more intensely than the natural

or historical range of variability, thereby fundamentally changing the ecosystem…" (p.

16) As the FRCC classification makes clear, mixed and high severity fire is characteristic

of many ecosystems (fire regimes II, III, IV & V). Reducing the potential for severe fire

behavior and effects through hazardous fuels reduction in these fire regimes, in other

words, may increase the departure from the historic range of variability of certain

ecosystem components and processes and thus, according to the logic of the historic

---

[75] The first Performance Measure for Goal Three is the "number of acres in fire regimes I, II, or III moved to a better condition class, that were identified as high priority through collaboration consistent with the Implementation Plan…"

[76] Indeed, restoring fire adapted ecosystems encompasses a broader set of goals, objectives and activities than restoring the ecological role of fire – the second principle of the *Federal Fire Policy* – and the even more narrow goal, specific to operational the responsibilities of fire management, of returning fire to the landscape which simply means any kind of fire regardless of fire history.

[77] The *10-Year Comprehensive Strategy* (WGA, 2001) defines these terms thus, citing the Forest Service *Cohesive Strategy* (USDA Forest Service, 2000b): *Ecosystem Integrity* – "The completeness of an ecosystem that at geographic and temporal scales maintains its characteristic diversity of biological and physical components, composition, structure, and function (Cohesive Strategy, 2000)." *Fire-prone ecosystem* – "Ecosystems that historically burned intensely at low frequencies (stand replacing fires), those that burned with low intensity at a high frequency (understory fires), and those that burned very infrequently historically, but are now subject to much more frequent fires because of changed conditions. These include fire-influenced and fire adapted ecosystems (Cohesive Strategy, 2000)." *Restoration* – "The active or passive management of an ecosystem or habitat toward its original structure, natural compliment of species, and natural functions or ecological processes (Cohesive Strategy, 2000)."

range of variability concept, increase the risk to the ecological integrity of these ecosystems.

The *10-Year Comprehensive Strategy* (WGA, 2001) does not address in any detail how the tradeoffs inherent in this tension will be adjudicated, if not reconciled. The generally accepted prioritization of people over natural resources represented by the ordering of the first to principles of the *Federal Fire Policy* – safety first, ecology second - and in the *10-Year Comprehensive Strategy's* ordering of WUI first and ecologically degraded areas outside the WUI second (in condition classes 2 or 3 in fire regimes I, II, or III). The spatial and temporal complexities of determining risk to these two areas and how they interact are elided. The *10-Year Comprehensive Strategy* and its *Implementation Plan* are long on principles, goals and generic "action items"[78] or "implementation tasks"[79] but rather vague on how all this is to be synched up and integrated into a cohesive and comprehensive strategy. Like the *Federal Fire Policy,* the *Cohesive Strategy* and the *Report to the President* from which it draws, the *10-Year Comprehensive Strategy* and its *Implementation Plan* read more like strategies and plans to develop strategies and plans. These documents all look to the future. They are conceptual frameworks composed of lists of broad and reasonable sounding yet undefined terms and concepts that should (and presumably can) be further refined with more precision and operational utility in future strategies and plans relevant for decisionmaking at multiple organizational levels. The Forest Service *Cohesive Strategy* of 2000 (USDA Forest Service, 2000b), for example, states that:

---

[78] As they are called in the *Federal Fire Policy*.
[79] As they are called in the *10-Year Comprehensive Strategy* and its *Implementation Plan*.

At a national level, we are working to integrate information on human development, watershed condition, species and ecosystems of concern, noxious weeds, insects and disease, roadless areas, and plant community/ecosystem conditions by fire regimes….A standard process for integrating and interpreting this information needs to be developed. In assessing risk at the regional level, we need to integrate information including, but not limited to: human development, historic disturbance regimes, watershed condition, species and ecosystems of concern, invasive weeds, insects and disease, roadless areas, plant community/ecosystem conditions by fire regimes. This will require compilation of appropriate information at finer scales of resolution than that compiled for the national risk assessments. Based on regional assessments, priorities for landscape scale analyses and management action can be developed. On-the-ground treatment priorities are then identified by the goals, objectives, and strategies that are linked up through the agency to GPRA strategic goal for restoring and maintaining ecosystem health (USDA Forest Service, 2000b, p. 77).

Integrated multi-scale assessment and planning, such as described above, are presented as the framework within which to develop more detailed and prescriptive policies, plans and strategies. It is within such a framework that the tensions and tradeoffs between fuels reduction and restoration, between risk to people (loosely represented by the WUI concept) and risk to ecosystem integrity (represented by the FRCC concept) were to be addressed. It is how the *10-Year Comprehensive Strategy* and its *Implementation Plan's* recommendations were to be accomplished , recommendations to "[e]xpand and improve integration of the hazardous fuels management program" and "[d]evelop strategies to address fire-prone ecosystem problems that augment fire risk or threaten sustainability of these areas". One of the hazardous fuels reduction Implementation Tasks specifies "utilizing as appropriate" the Interagency Cohesive Strategy being jointly developed by the fire management staff from the Department of Interior agencies and the Forest Service. At the time the *10-Year Comprehensive Strategy Implementation Plan* was developed, however, it was still in draft form. This Interagency

Cohesive Strategy, however, went the furthest in detailing what integrated landscape-scale fire risk assessment and planning under the *Federal Fire Policy and the National Fire Plan* was to entail. It is thus worth discussion in further detail.

3.4.3 The Interagency Cohesive Strategy

The Interagency Cohesive Strategy (USDA and USDOI, 2002a) was initiated in early 2001 following the release of the *2001 Federal Fire Policy* review and Congressional funding initiating the National Fire Plan. It was intended in part to bridge the gap and clarify the uncertain relationship between the two and because the initial *Cohesive Strategy* was specific to the Forest Service and both the *Federal Fire Policy* (USDA and USDIO, 2001) and the National Fire Plan are interagency in scope. It was developed by many of the same fire management staff from the Forest Service that developed the *Cohesive Strategy* response to the GAO and fire management staff from the Departments of Interior agencies and was based largely on the concepts and principles outlined in initial effort. Its general aims were to provide a framework by which interagency and intergovernmental fire management agencies could develop collaborative plans for fire and fuels management across jurisdictional boundaries that integrated mitigating risk from fire while allowing fire to play its ecological role across the landscape, including its role in reducing fuels, within the new ecosystem management paradigm. Its specific aims were to produce a range of "strategic options" and their associated costs within this overall framework, as requested by the GAO, in order for Congress to make informed decisions for funding the National Fire Plan.

As the *2001 Federal Fire Policy* review noted, the relationship between fire management and ecosystem management and/or sustainability is unclear. One of the reason the *Federal Fire Policy* (2001), the Forest Service's *Cohesive Strategy* and the *10-Year Comprehensive Strategy Implementation Plan* (2002) appear more as conceptual outlines for the development of future, more prescriptive policies, strategies and plans rather than actual policies, strategies and plans in themselves is that the concept of integrated multi-scale assessment and planning is only a concept. Like ecosystem management, to which it is closely linked, it is not well defined and has few precedents (e.g. the Forest Ecosystem Management Assessment Team (FEMAT) and Interior Columbia Basin Ecosystem Management Project (ICBEMP) experiments). For the most part, integrated multi-scale assessment and planning described negatively by what it is not – traditional single resource, single scale management and planning - and by what it is intended to remedy – the unintended consequences of traditional planning, what Odum (1982) called "the Tyranny of small decisions." Hann and Bunnell (2001, p. 360), in the research conducted for the initial Forest Service *Cohesive Strategy* of 2000[80] list three fundamental issues with "traditional planning" that lead failure to achieve resource management objectives in general and fire management in particular:

1. Differences in scale of ecological processes and key ecosystem components are not addressed. Thus, management or mitigation not designed for the scale of the ecological or socioeconomic process may not be successful or may have unintended consequences on other ecological processes or components;

2. Key ecological processes of change and disturbance (for example succession, wildfire, and timber harvest) are not integrated with their effects on key ecosystem components (for example old forest dependent species, old forests, and timber to mills); therefore, managers are often unable to articulate the full range of risks that may follow from traditional independent management

---

[80] An overview of the results from the analysis presented in Hann and Bunnell (2001) discussed here was included as Appendix D of the Forest Service *Cohesive Strategy* of 2000.

practices, and consequently may not design projects aligned with the operation of natural ecological processes and maintenance of key ecosystem components; and

3. The traditional approach relies on the local administrative unit to understand temporal and spatial changes in conditions and does not provide a system to monitor or summarize changes across larger areas. Therefore, local managers are often unable to articulate the range of cumulative effects and regional and national managers are often unaware of the consequences or benefits of these effects.

Integrated multi-scale assessment and planning

Integrated multi-scale assessment and planning is described as the means to overcome the shortcomings of traditional resource planning by linking broad scale assessments and the plans with site specific assessments and project plans (often referred to as fine-scale or project-scale) at local management unit levels such as a national forest or district. This, apparently, is especially the case in fire and fuels management since wildfire is widely understood by both fire researchers and managers as a quintessential multi-scale phenomenon. The underlying premise behind the landscape approach is that fire behavior and effects occur at multiple scales such that fuels reduction or restoration treatments, which are necessarily conducted at the local level, must integrate their site specific prescriptions to these broader scales.

Figure 2 Conceptual framework for multi-scale assessment and planning (From Hann and Bunnell, 2001).
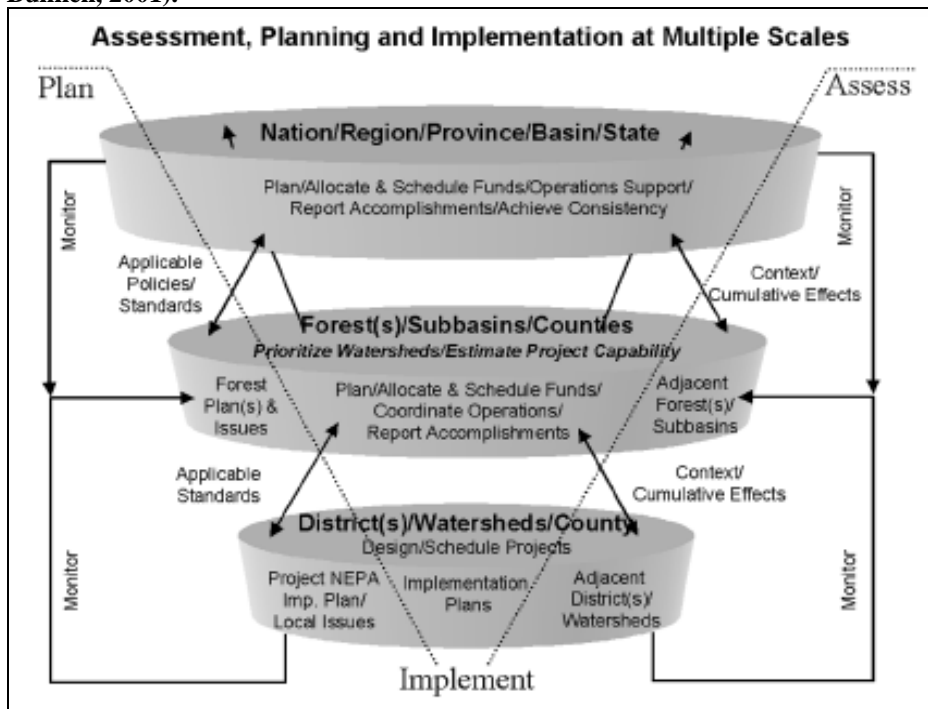
The draft Interagency Cohesive Strategy of 2002 (USDA and USDOI, 2002a) was based on this concept of integrated, multi-scale assessment and planning. It proposed using a consistent set or core variables and methods. It was intended to fit on the top ring in figure 2 representing the national level of assessment and planning using the core variables of FRCC and a coarse delineation of the wildland urban interface (WUI) defined in the Glossary of Wildland Fire Terminology[81] employed in the *10-Year Comprehensive Strategy* – "the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuel." Course-scale fire regime and condition class (FRCC) data for the continental United States came from the Forest Service's Fire Sciences Laboratory, Rocky Mountain Research Station in

---

[81]National Wildfire Coordinating Group (NWCG) Glossary of Wildland Fire Terminology is available at http://www.nwcg.gov/pms/pubs/glossary/index.htm.

Missoula, Montana, data that was not complete when the initial *Cohesive Strategy* was developed.

The draft Interagency Cohesive Strategy of 2002, in other words, was an attempt to elucidate only a general framework for fuels management assessment and planning at a broad scale (the upper tier in figure 1) using the basic WUI and FRCC concepts and coarse data. Assessment and planning efforts at regional and local levels are intended to tier to this broad framework, as outlined in the *Wildland and Prescribed Fire Management Policy: Implementation Procedures Reference Guide* (USDA and USDOI, 1998), which, recall from table 1 above, outlined the basic contents and linkage between land management plans, fire management plans and project level plans. For example, the *Reference Guide* specified that parameters for risk would be established in land management plans; that risk analysis processes would be established in the annually updated fire management plans and these procedures would be employed in developing site specific project level assessments and planning.

The draft Interagency Cohesive Strategy developed eight "strategic options based on classifying the landscape into three types: WUI landscapes; non-WUI landscapes adjacent to WUI landscapes; and non-WUI landscapes (often wilderness areas) buffered from WUI landscapes by adjacent non-WUI landscapes.[82] The general idea being that closer to and within WUI areas, where economic values are most concentrated, there will be greater emphasis on mechanical and prescribed fire treatments to reduce the severity

---

[82] Dividing managed lands into these three general classes is not uncommon. Arno and Brown (1989) proposed three zones of fuels management objectives in response to the failures revealed by the review of fires of 1988. The middle zone or class is often the most difficult to delimit ecologically or socially. Pyne (2004, p. 11) describes this middle class as "the lands in between" while Arno and Allison-Bunnell (2002, p. 133) use the term "general forest."

of wildfire while in the non-WUI landscapes buffered from WUI there would be greater reliance on allowing wildfires to burn for resource benefit (wildland fire use or WFU). FRCC was used to provide a relative measure of change in ecological conditions in order to determine where allowing a fire to burn may provide benefit or pose a risk to the various attributes that define the ecosystem. FRCC is intended to help prioritize and determine where and what kinds of treatments may be necessary in the non-WUI areas in order to allow fires to burn for resource benefit (WFU) and where such treatments are not necessary. In WUI areas FRCC was used to provide basic information to help determine what kinds of treatments may or may not be aligned with the ecological role of fire (e.g. reducing the potential for high severity fire in a fire regime historically characterized by high severity fire). That is, where reducing risk to the WUI increases risk to ecological sustainability. As the National Interagency Fuels Coordination Group, established 2001 within the National Interagency Fire Center (NIFC) puts it: "[i]t is the goal of each fire management program within each agency to assist in the effort of ensuring public and firefighter safety in reducing risks to communities while improving and maintaining ecosystem health."[83]

The key to a multi-scale landscape strategy, according to Hann et al. (2003), is agreement on and use of consistent definitions, methods and data for describing the core variables of the landscape or ecosystem. This assertion must be understood in two ways; a multi-scale landscape strategy requires consistent definitions, methods and data in order to coordinate actions across space and time at the different levels of planning. At the same time such a strategy is also intended as framework within which such agreement

---

[83] http://www.nifc.gov/fuels/overview/overview.html. Last accessed March 18, 2008.

may be reached on establishing the necessary consistent definitions, methods and data for describing the core variables (e.g. parameters for risk assessment at sub-regional levels in land management plans and a risk analysis process used for developing fire management plans and individual project plans and incident response called for in the *Prescribed Fire Management Policy and Implementation Procedures Reference Guide*). This is crucial because fire behavior and ecology is so complex there is currently no agreement on the relevant set of core variables, their definition or methods of data collection and analysis and hence no political or scientific consensus over how to conceptualize risk, either to people and economic values from fire or the risks and benefits of fire to ecosystems (e.g. the ecological role of fire and ecosystem sustainability). There is no consistent use of key terms, such as landscape, risk, fire frequency or severity because there is no consensus on how to measure them. And there is considerable debate and uncertainty over the efficacy of fuels treatments not only for modifying fire behavior but especially as a component of ecological restoration because fuels are so variable and are only one component of fire behavior and ecology. Moreover, the relevant components and effects change with the scale. As Wiens (1999) notes: "We can no longer...cling to the belief that the scale on which we view systems does not affect what we see.... This is quite a different way of viewing the world than that which was in vogue a decade ago, and it is by no means yet widely embraced by everyone."

Risk assessment, however, and multi-scale risk assessment in particular, does not require clearly specified goals and objectives, objects of analysis, analytical techniques or data collection methods. Rather, risk assessment is a process through which these elements of the process are operationally defined in order to allow formal analysis to

precede and inform decisions over various alternative courses of action. The Interagency

Cohesive Strategy did not specify a risk assessment process, however. What is meant

must be inferred. The use of the general concepts of the wildland urban interface (WUI)

and fire regime condition class (FRCC) to represent two forms of risk resemble the two

prominent conceptions of risk assessment in current use – that of risk *to* people and

economic values *from* natural hazards characteristic of guidance from the Federal

Emergency Management Agency (FEMA) and that of risk *to* ecological systems *from*

people's activities characteristic of guidance from the Environmental Protection Agency

(EPA). According to FEMA guidance (US FEMA, 2001, p. iii) "risk assessment is the

process of measuring the potential loss of life, personal injury, economic injury and

property damage resulting from natural hazards by assessing the vulnerability of people,

buildings and infrastructure to natural hazards." According to the EPA's Guidelines for

Ecological Risk Assessment (US EPA, 1998, p. 1) ecological risk assessment is "a

process that evaluates the likelihood that adverse ecological effects may occur or are

occurring as a result of exposure to one or more stressors…generated or influenced by

anthropogenic activity."

Both forms of risk assessment (FEMA's to people from nature and EPA's to

nature from people), involve the same basic steps: 1) problem formulation; 2) analysis

and 3) risk characterization. Problem formulation involves three phases; 1a) the clear

articulation of management goals, 1b) the identification of specific objects of

management (called objectives in the FEMA model and assessment endpoints in the EPA

model e.g. species habitat protection or WUI protection) broken down into explicit

(qualitatively or quantitatively) measurable attributes and 1c) the development of a

conceptual model that explicitly links the management goals to the measurable attributes of the object of management. Analysis involves two steps; 2a) characterization of sources and level of exposure to change agents to the identified attributes and 2b) the characterization of the effects upon these attributes from exposure to these change agents. The last step, risk characterization, is the integration and summary of exposure and effect relationships, ensuring that the conceptual model adequately captures the necessary relationships calculating or estimating degree of exposure to degree of effects to formulate an overall description of risk with an explicit discussion of uncertainty, assumptions and qualifiers. These are then compared against the decisions made in the three phases of step 1, problem formulation, to ensure that the right questions were asked in the first place – does the solution match the goals. This last step is crucial. Risk assessment is intended to highlight assumptions and sources of uncertainty. It is as much a process of communication, fostering mutual understanding between various perspectives and disciplinary expertise as it is a process of objectifying risk. It is also crucial to point out that the risk assessment process, as outlined by both FEMA and EPA guides, includes those at risk, or those with a stake in ecological systems at risk. Neither is intended to be performed

This above description is grossly oversimplified. It is in fact a very complicated process but the conceptual linkage between risk assessment and ecosystem management (as well as with compliance with the National Environmental Policy Act (NEPA) more generally) has been subject of a great deal of interest by interagency panels and research projects. The National Science and Technology Council released a report in 1999 (which included many Forest Service researchers and managers) noting that "The linking of

these two processes [ecosystem management and risk assessment] can bring improved

organizational and analytical consistency to the assessment of information in support of

multiple scales of resource planning and decision making needed for ecosystem

management" (NSTC, 1999, p. 8-2).[84]

The theoretical appeal of such an approach is that it provides a rational framework

for dealing with the complexity of ecological systems and the multiple ways of

conceiving of and measuring their components, the inter-relationships between these

components and measurements and the resulting uncertainties inherent in their

representation. Such an approach explicitly recognizes that perceptions of risk are highly

subjective and that there is no consensus on what an ecosystem is or how it should be

measured and nor how its "health" might be conceived and whether such a concept is

even appropriate (Suter,1993a, 1993b; Vigerstad and McCarty, 2000). Without the

benefit of systematic reassessment of the formulated problem and the conceptual model

linking the components and measures to specified goals, these inconsistencies and their

embedded assumptions are missed. "People have many automatic or routine ways of

dealing with risk that can substitute for analyzing risks…Many still approach risk

assessment as a way of justifying and documenting decisions that are already made. To

these persons, a good risk assessment will be disappointing because it will expose many

incorrect and unfounded assumptions" (NSTC, 1999, p. 8-26). Perhaps more important,

Hann et al. (2003, p. 7) warn, without a landscape strategy based on consistent method

---

[84] Dave Cleaves, who was one of the authors of the Fire Economics Assessment Report of 1995 that
established the figure of 39 million acres at risk and found that fuel reduction efforts were, for the most part
determined by the objectives of non-fire management resource management programs was one of the
authors of chapter 8 of this report focused on ecosystem management from which the above quote is taken.

and data, un-integrated, ad-hoc planning and treatment design may not only fail to

address all the relevant elements at or posing risk but may also be used to:

> …promote a hidden agenda, such as desire for road access, forest products, and more forage; or the reverse, such as reduced access, no mechanical equipment, and no products from public lands. From a landscape strategy perspective these agendas can be by-products of the prioritization and design, but should not take away from…risk reduction to people and ecosystems.

The draft Interagency Cohesive Strategy (USDA and USDOI, 2002) was

completed by July, 2002, just after the release of the Western Governors Association's

10-Year Comprehensive Strategy Implementation Plan. It was never released however. [85]

The ambitious yet ill-defined goals of collaborative landscape-scale fire and fuels

planning based on integrated multi-scale risk assessments have remained lofty and ill-

defined. These efforts to engage the complexities, uncertainties and lack of consensus

over the meaning of and relationship between fire risk and the ecological role of fire were

abandoned with the policy initiatives of the Bush administration and the Forest Service

leadership he appointed. Instead, the complexities, uncertainties and lack of consensus

are deployed against such an effort and many of the concepts and approaches proposed

for dealing with these complexities, uncertainties and lack of consensus.

---

[85] Since the Draft Strategy was never released it was unavailable for analysis for this research. The above discussion relies on the description provided in Hann et al. (2003), titled *A Cohesive Strategy for Protecting People and Sustaining Natural Resources: Predicting Outcomes for Program Options*
that reports on the analysis conducted for the Interagency Cohesive Strategy. This report and its findings are also discussed in NAPA (2002), Hann and Strohm (2002), GAO (2002, 2005b, 2008 and 2009a). Curiously, Hann and Beighley et al. (2003) indicates that it was presented at a conference in 2002 titled "Fire, Fuels and Ecological Restoration" but it no longer appear in the proceedings indicated and can no longer be found on the internet using multiple search engines. See the conference proceedings at http://www.fs.fed.us/rm/pubs/rmrs_p029.html. Last accessed March, 2010.

The two central concepts of the strategy - wildland urban interface (WUI) and the fire regime condition class (FRCC) - have been redefined and misrepresented neutralizing their role as a means of pursuing landscape-scale assessment and planning. It will turn out to be significant in the years to follow that the *10-Year Comprehensive Strategy's Implementation Plan* employs the WUI and FRCC concepts, in conjunction with acres-treated as the measure of accomplishment and accountability reporting. Because of this, the WUI and FRCC concepts are inscribed in the new policy initiatives such as the Healthy Forest Initiative (HFI) but in a manner that entirely misrepresents and contradicts their functional role as part of a broad framework within which to develop integrated and collaborative fuels management assessment and planning procedures. To tell this story requires going back to the early days of the new administration of President Bush and the organizational and policy changes ushered in by the new Forest Service leadership.

3.4.4 The End of Integrated Landscape-Scale Fire and Fuels Assessment and Planning

As is common with new administrations, many federal initiatives were put on hold pending review by the new administration for consistency with its own policies. Interestingly, however, the *2001 Federal Fire Policy* was not suspended or reviewed. Why it was not is uncertain, but perhaps it is because the policy is entirely discretionary and, as the *2001 Federal Fire Policy* pointed out, went largely unimplemented anyway. While the *Federal Fire Policy* and the Forest Service's specific fire management direction were not reviewed and revised by the new administration, the changes that were brought about by the new administration and agency leadership in the National Forest

System altered key elements upon which the *Federal Fire Policy* relied, as well as the

Forest Service's own fire policy outlined in the *FAM Coarse to the Future* of 1995.

Ecosystem management, as the conceptual approach to land management, was not

explicitly rejected. Nor was the *Federal Fire Policy's* principle of restoring the ecological

role of fire to the landscape, which was linked to the ecosystem management framework.

The underlying planning and decisionmaking framework upon which both were

predicated, however, and what linked the two together was abandoned - namely the

collaborative development and implementing of multi-scale assessment and planning

framework using a consistent set or core variables, data and methods.

The back to basic proponents within the agency and Congress initiated an indirect

campaign against assessment and analysis in general and NEPA in particular that

dramatically affected fire and fuels management. This campaign was based on the

framing of the problem of catastrophic fire due to declining forest health that coalesced

after the report by the National Commission on Wildfire Disasters (established by

Congress following the 1988 fires) that advocated "the application of needed silvicultural

treatments within a fairly short time frame" (Sampson et al. 1994). The problem of

hazardous fuels buildup due to the unintended consequences of decades of fire

suppression remained in agency portrayals of the current fuels problem but the other

causes of unintended consequences to forest health cited in earlier descriptions - logging

and grazing – disappeared from official agency pronouncements. The problem of

ecosystem sustainability requiring complex ecological restoration was reframed as a

simple problem forest density. And the simple solution to forest density was forest

thinning. Multi-scale planning and analysis in which Forest plans provide context and

broad scale baseline assessments to guide more detailed site specific planning efforts in

each forest's annual Fire Management Plan update which in turn were to guide individual

project specific planning was reduced to a problem of analysis paralysis and the need to

expedite treatments.

Forest Planning Rules Withdrawn Again

The 2000 forest planning rule was the principle land management policy put on

hold for review and revision by the new administration that affected fuels management in

the Forest Service. The other policy actions that directly affected fuels management

include the Forest Service GPRA Strategic Plan updates and, more importantly, the

Healthy Forest Initiative. With the review of the 2000 planning rule the silent resistance

by the back to basics proponents within the agency, became vocal and overt, joining that

of private commodity interests outside the agency and their allies in Congress. Thus

began a general assault upon the core premises behind ecosystem management. The 2000

rule, and the concepts upon which it was based, were controversial for many reasons and

contested from many quarters. The political contest centered on the concept of

sustainability linked to the need for considering the complex interconnectedness of

ecosystems, the degree of uncertainty surrounding this complexity and the need for

careful ecological risk assessment to guide collaborative, integrated multi-scale planning

and decisionmaking. Jim Geisinger (1999, p. 24), president of the Northwest Forestry

Association, for example, commenting on the Committee of Scientists report of 1997

upon which the rule was largely based, stated that:

[m]any of the recommendations in the report are not based on existing science but rather on theory and intuition …Much of the report implies that the committee believes current management practices are diametrically opposed to the concept of sustainability. We strongly disagree with this. The interdisciplinary plans currently in place, based on the multiple-use concept as required by law, do take into account the sustainability of resources.

Geisinger expressed a common sentiment that the problems facing the Forest Service were political interference from Washington and excessive appeals and litigation. The themes of fuzzy theories and inconsistency with professional forestry's conceptions of sustainability coalesced with claims that the problems facing forest management and forest health resulted from over burdensome regulations and endless procedures. In a letter to Secretary of Agriculture in February, 2001 the Society of American Foresters (2001, p. 1) stated that:

We are concerned about the regulation's treatment of sustainability. The Society of American Foresters holds sustainability of forest resources as a core value…The Forest Service's planning regulations place ecological values above social and economic values of sustainability. This is inherently unsustainable, inconsistent with the profession's concepts of sustainability… our concern is that the regulation is overly burdensome, and not consistent with the concept of multiple use.

The new administration had not yet made changes to top Forest Service positions but it was moving in the direction of its constituents in the forest products industry. An initial review by regional planners in February, 2001 found that the "intent of the new Rule is good" and "probably closer to what the public wants than the 1982 Rule" but "their ability to successfully implement these regulations in the short term raised many concerns" such as "the feasibility of implementing the analysis and monitoring requirements of the rule" (Larson et al., 2001, p. 2). Shortly thereafter, Forest Service

Chief Dombeck retired after being told the new administration intended to move "in a different direction" (Jehl, 2001). A "business process analysis" of the 2000 planning rule was then initiated. The results of this analysis, the *NFMA Planning Rule Review*, released in April, 2001[86], concluded that the planning rules:

> …do not appear to have been written with the objective of being implemented…even if the agency could acquire the skills and expertise needed for collaboration, social and economic and program management, it is unlikely that the budget or resources necessary to provide the policy and guidelines would exist. In addition, information management, landscape ecologists and geographic information systems skills necessary for implementation are not yet within the agency (Larson et al., 2001, p. 3).

The first major topic of concern brought up in the *NFMA Planning Rule Review* was the "new terminology and standards for forest planning" created by the requirement in 2000 rule to "… provide for maintenance or restoration of the characteristics of ecosystem composition, and structure within the range of viability that would be expected to occur under natural disturbance regimes of the current climatic period…" The review notes that:

> …terms in the Rule such as "range of variability," "natural disturbance regimes," and "current climatic period" are interesting concepts for science to pursue but they are also vague, immeasurable concepts that will cause endless debate and litigation when used as benchmarks or standards for success (Larson et al., 2001, p. 4).

Ecosystem Management Reduced to Rhetoric

This was the beginning of the end for ecosystem management as anything more than political rhetoric. Along with the emaciation of the ecosystem management concept went the aspirations of fire and aviation management for the development of increased

---

[86] Larson et al. (2001). This was conducted by the Forest Service's Inventory and Monitoring Institute who contracted with the Rapid-e Corporation.

technical and ecological skills and knowledge among its workforce, skills and knowledge

necessary for implementation of the *Federal Fire Policy*. A month after the release of the

NFMA Planning Rule Review the new Secretary of Agriculture, Ann Veneman, appointed

Dale Bosworth as Chief of the Forest Service, returning to the tradition of appointing a

forester from the ranks of the agency to its top position. 2000 planning rule was also

formally suspended in May and the process of developing new forest planning rules

began. This new effort focused on developing alternatives to the viability requirements in

the 1982 and 2000 rules (e.g. alternatives to the "interesting scientific concepts" tied to

sustainability). One of Chief Bosworth's first initiatives was to appoint a team to review

the factors negatively affecting forest management and planning.

By July, Bosworth and the new Undersecretary for Natural Resources and the

Environment, Mark Rey, had rallied the back to basics proponents within and outside the

agency behind the charge "analysis paralysis" (barrowed from Representative Hansen) in

a campaign to reorient agency policy back towards a focus on active management and

utilitarian uses of forest resources associated with stand vigor and resistance to crown

fire. The contest over the relationship between social and ecological values in the

conception of sustainability led to the elision of the definitions of severe catastrophic

wildfire as that which burns outside the historic range of variability, as employed in the

Cohesive Strategy and the *10-Year Comprehensive Strategy*, and the deployment of these

loaded terms in ways that suggest any fire that has unwanted impacts upon utilitarian

values may be considered severe and catastrophic, whether they are ecologically

beneficial and characteristic or not. In June, 2002, less than a month after the *10-Year*

Implementation Plan was released, Chief Bosworth's team investigating the factors

affecting Forest Service management and planning released their report titled "*The Process Predicament: How Statutory, Regulatory, and Administrative Factors Affect National Forest Management*" (USDA Forest Service, 2002a).[87] The report was used to bolster the claims that gridlock and excessive analysis requirements were hampering critically needed forest management. The executive summary begins:

> Despite a century of devotion to conservationism, the Forest Service today faces a forest health crisis of tremendous proportions. 73 million acres of national forests are at risk from severe wildland fires that threaten human safety and ecosystem integrity…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 USDA Forest Service, 2002a, p. 5).

---

[87] NFMA (1976) requires the agency to "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives and within the multiple-use objectives of a land management plan" (16 USC §1604 (g)(3)(B) (2000). The 1982 implementing regulations require the agency to manage fish and wildlife habitat "to maintain viable populations of existing native and desired non-native vertebrate species in the planning area" (36 CFR §219.19 (1982)). The *Process Predicament* stated that the "'viable populations' requirement is (1) responsible for much of the time and expense that goes into project planning, (2) far more time-consuming than the landscape-scale analyses of habitat diversity required by legislation, and (3) arguably more rigorous than any provision in the Endangered Species Act."

The subtle irony[88] of this statement is that this quoted figure of "73 million acres of national forests…at risk from severe wildland fires" was derived by summing up the area of National Forest land in condition class 2 and 3 in fire regimes I and II from the coarse-scale fire regime condition class mapping effort undertaken by the Missoula Fire Sciences Lab to support the development of the Forest Service *Cohesive Strategy* of 2000.[89] The same data and concepts used in developing the draft Interagency Cohesive Strategy. In other words, it was derived through calculating what the *NFMA Planning Rule Review* called "the interesting concepts" of fire regimes and historic range of variability (HRV) that would "cause endless debate and litigation when used as a benchmarks or standards for success." The ironic logic seems to be that concepts and methods from which this expanded figure of 73 million acres at risk is derived will not be employed in a strategic planning framework but rather the figure itself indicates the

---

[88] The not so subtle irony is that at the same time that claims of gridlock, analysis paralysis and process predicament are advanced, numerous long and arduous analysis and planning efforts, in addition to the 2000 forest planning rule, were halted or brought in for review and substantially rewritten only to fail repeatedly in court just as the 2005 and 2008 forest planning rules eventually did. Such was the fate of the Sierra Nevada Forest Plan Amendment aka the Sierra Nevada Framework, in California signed by Regional Foresters Brad Powell and Jack Blackwell in January, 2001 (USDA Forest Service, 2001). The Framework incorporated the finding s of the Sierra Nevada Ecosystem Project or SNEP (CERES, 1996) which included some of the most critical and explicit statements regarding the effects of past timber harvesting in exacerbating current severe fire behavior and ecology (Skinner and Chang, 1996). The Framework was substantially revised and re-released in January, 2004 leading to litigation, with some reports of agency biologists having been removed from the planning team - and their data from the plan – because, according to the Union of Concerned Scientists (UCS, No Date), they described the effects of fire as playing a maintenance role for, rather than a threat to, spotted owl habitat. (See http://www.ucsusa.org/scientific_integrity/abuses_of_science/spotted-owl.html). More recently, on August 13, 2009, the Ninth Circuit Court of Appeals ruled against the agency and forest products industry, who had appealed the previous District Court's ruling, that the agency had acted illegally in its consideration of alternatives in the revised 2004 framework. (Sierra Forest Legacy v. Rey, 577 F.3d 1015 (9th Cir. 2009). The case was remanded back to District Court. See http://www.fs.fed.us/r5/snfpa/ and http://www.sierraforestlegacy.org/FC_LawsPolicyRegulations/KFSP_FrameworkRevisions.php, last accessed June, 2009.
[89] The report cites the USDA Forest Service "Historical Fire Regimes by Current Condition Classes" Website (http://fs.fed.us/fire/fuelman/data_summery_tables.pdf). This weblink no longer works however. How this figure was derived is not explained in the *Process Predicament* report but it is explained in the Forest Service's revised GPRA Strategic Plan for 2004-2008, citing Schmidt et al. (2002), the formal publication coarse scale FRCC mapping project. The Strategic Plan is available at http://www.fs.fed.us/publications/strategic/fs-sp-fy04-08.pdf, last accessed May, 2009.

magnitude of the crisis and is deployed to emphasize the need to reduce the analytical

burden on local units that, from the perspective of the back to basic proponents within

and outside the agency, already know what needs to be done.

The Misrepresentation of Fire Regime Condition Class

The Process Predicament report is the beginning of the misrepresentation and

misapplication of the fire regime and HRV concepts embedded in FRCC. Henceforth,

FRCC is employed by agency leadership as if it corresponds to a simple measure *of* fire

hazard *due* to fuels buildup. Condition class, a generalized measure of ecosystem change

derived from the summing of the relative departure from historic conditions of the three

variables of fire frequency, fire severity and vegetation composition. FRCC does not

include a measure of fuel loading or forest density. It becomes employed, however, as a

classification of fire hazard or risk.[90] Recall from the description of fire regimes (Table 2

Historic Natural Fire Regimes) that fire regime II, which was included in the calculation

to arrive at this new number of "73 million acres of national forests," are not usually

forests but found primarily in grass and shrublands.[91] They have little to do with the

political battle over thinning for forest health or hazard reduction. More importantly for

understanding the obfuscation and confusion surrounding FRCC in particular and fire

risk and ecosystem restoration more generally, however, is that fire regime II is

characterized by a fire frequency of 0 to 35 years and by "stand replacement severity."

---

[90] See for example this statement by Senator Feinstien in 2002: "…the highest fire risk category [is] called class III. Of that class, 23 million acres have been designated by both the Forest Service and the Department of Interior as in vital need of emergency treatment. Those are the strategic areas that need hazardous fuels taken out of the forests to avoid catastrophic fire." (Feinstien, 2002). Available at http://feinstein.senate.gov/03Speeches/Protecting%20America%27s%20Forests.htm. Last accessed August, 2009.

[91] Note that according to this classification, fire regimes III, IV & V may occur in any vegetation cover type at this broad scale.

Stand replacement severity, according to this classification, are fires that historically

"consume or kill more than 80 percent of the basal area or more than 90 percent of the

overstory canopy cover" (Schmidt et al., 2002, p. 5).[92] The threat to ecosystem

components in fire regime II, in other words, may just as likely be not *from* severe fire

but from the *lack* of severe fire which, along with other factors such as grazing, may have

lead to a change in species composition.[93]

Hereafter, statements made by agency leadership (outside of Forest Service

research) and many others quote this figure of 73 million acres of national forests at risk

from severe wildland fires.[94] The earlier estimate 39 million acres disappears. Recall that

this 1995 estimate of 39 million acres, though crude, was based on an estimate of fuels

accumulation only, not broader ecosystem conditions and it was based on the assumption

of fuels management's traditional role of prescribed burning. This is what prompted the

agency to propose the massive increase in treatments in 1995 while at the same time

noting that not every acre required active treatment because many of these acres were to

be treated through allowing more fires to burn for resource benefit (WFU). Recall that it

was this assumption that prompted the GAO (1999a) to ask how many of the 39 million

acres initially identified actually required active treatment, how these areas will be

---

[92] Following the definition of Morgan et al. (1994). It should be noted that the scale dependent nature of this variable makes it important to be consistent when attempting to use it as a component of a measure of the Historical range of variability.

[93] It should be noted that a characteristically severe fire (90% overstory mortality) in an ecosystem characterized as fire regime III may indeed present a risk to its integrity if its high departure is such that little is left of its historic composition, such as due to invasive species, where characteristically severe fire could permanently reduce the remnant native species. Restoration in such a case likely has little to do with fuels reduction as traditionally conceived other than to prevent fire until species composition is restored.

[94] "Forest Service officials say 73 million acres, about 40 percent of all Forest Service land, are at risk of severe fires in coming years." New York Times, August 23, 2002, available at http://www.nytimes.com/learning/students/pop/20020624snapmonday.html, last accessed June, 2009. See also http://www.fs.fed.us/publications/policy-analysis/fire-and-fuels-position-paper.pdf, http://www.fs.fed.us/projects/four-threats/documents/firefuels-fs.pdf

selected and how these treatments will be designed while at the same time fulfilling its other stewardship responsibilities, such as the species diversity/viability requirements under NFMA (1976). Ensuring diversity was a principle motivation behind employing the HRV concept within the 2000 planning rule and hence the rationale for its incorporation into the *Cohesive Strategy* (and then into the *2001 Federal Fire Policy*) in the form of FRCC. The FRCC concept and assessment method was a means of prioritizing ecosystems for restoration not fuels reduction itself. Determining FRCC was intended as a means of performing ecological assessment in order to analyze tradeoffs between various treatments and their consequences to more thoroughly and efficiently comply with NEPA (1970), ESA (1973) and NFMA (1976) as well as identifying where treatments might yield merchantable timber – that is, as the GAO (1999a) inquired, in accordance with its myriad stewardship responsibilities.

In a twist on Franklin's (1998) observation quoted earlier regarding the potential of new information and its application (e.g. ecology and ecosystem management) to pose difficult problems because it can "alter basic premises and undermine assumptions" held by managers and policy makers alike, it appears that the opposite can also result - new information and its application can be altered and undermined to fit basic premises and assumptions held by management and policy makers. The back to basic proponents within the agency, Congress and the new administration began to successfully deploy a misrepresentation of FRCC to advance their basic premises and assumptions of the need for traditional active forest management (encapsulated in the phrase "thinning") and streamlined environmental regulation (encapsulated in the phrase "analysis paralysis"). In other words FRCC, a measure of departure from historic fire regimes was misrepresented

as fire risk and deployed against the need for assessing departure from historic fire regimes to inform fuels management planning.

Demise of the Interagency Cohesive Strategy

While the FRCC concept was being transformed from a rough indicator of ecological change and sustainability into a misrepresentation of fire risk, the Interagency Cohesive Strategy was also being transformed and ultimately cast aside. That is, the framework within which consistent definitions, methods and data for describing the core variables of sustainability and wildfire risk assessment were to be developed and agreed upon in order to implement collaborative, multi-scale fuels management planning was discarded while key terms and concepts of risk, wildland urban interface (WUI) and fire regime condition class (FRCC) were diluted of consistent meaning and analytical value.

In March, 2002 the director of the Forest Service's new National Fire Plan Office and the Department of Interior's new Office of Wildland Fire Coordination sent a memo[95] to their bureau chiefs committing the agency's to working with tribal, state and county agencies to develop coordinated fuel plans "consistent with the direction provided in" the Interagency Cohesive Strategy and the *10-Year Comprehensive Strategy*. In April, 2002, however, the Wildland Fire Leadership Council (WFLC), composed of the newly appointed heads of the federal land management agencies, was established and this new coordinating body would take the federal approach to fire and fuels management in a direction consistent with the new back to basics orientation of agency leadership.

---

[95] USDA, USDOI, NASF and NAC (2002) *Memorandum of Understanding: Development of a Collaborative Fuels Treatment Program*. Available at http://www.forestsandrangelands.gov/resources/documents/10-22-en.pdf Last accessed January, 2010.

WFLC was established at the direction of Congress, on the recommendation of the National Academy of Public Administration (NAPA, 2001) and the GAO (2002), to coordinate the many disparate strategies and plans that had been developed in wake of the 2000 fires, specifically the many federal fire management programs and their attempts to integrate under the *Federal Fire Policy*, and the state and county efforts under *10-Year Comprehensive Strategy*. The WFLC was supposed to oversee this coordination and the Congressional funding allocated to these efforts. The first meeting in May, 2002 Forest Service Chief Bosworth was elected Chair of WFLC and at the following meeting in June, 2002, the first operational meeting of WFLC, the draft Interagency Cohesive Strategy was discussed.[96] Several modifications were made including the addition of an emphasis on "value added commercial activities" and elimination of the references to the eight alternative strategic options and their associated funding levels – elements explicitly requested by the GAO (1999a, 2000). The most effective program option in the interagency cohesive strategy, based on restoration rather than simply fuel reduction, recommended tripling the fuels budget. The modified strategy document was approved by WFLC at its July, 2002 meeting awaiting only the creation of a signature page. It was never released however.[97]

---

[96] See WFLC minutes for June 4, 2002 are no longer available online. This author has a copy available upon request.

[97] The history of the draft Interagency Cohesive Strategies subsequently becomes murky and difficult to piece together. A subsequent memorandum of understanding on the development of a collaborative fuels treatment program (Hartzell and Leaverton, 2002), that was signed by the heads of WFLC and the signatories of the *10-Year Comprehensive Strategy* in January, 2003, made no reference to the Interagency Cohesive Strategy. Available at http://www.forestsandrangelands.gov/resources/documents/9-21-en.pdf Last accessed January, 2010. The January, 2003 MOU references the earlier March, 2002 memo committing to collaboration "consistent with the direction provided in" the Interagency Cohesive Strategy and the *10-Year Comprehensive Strategy* but states that it will "function independent of that process." References to the strategy disappear from WFLC meeting minutes until the May, 2004 meeting at which point Lynn Scarlet, Deputy Secretary, Department of Interior, reported that "The Cohesive Strategy is not yet approved. There is a dichotomy between creating a national strategy and the need for strong collaborative efforts at the local level." The agencies released a joint "Cohesive Fuels Treatment Strategy"

The Healthy Forest Initiative

The summer of 2002 saw another extraordinary fire season with 21 firefighter deaths, massive evacuations and over 7 million acres burned and 3,000 structures destroyed. As The Clinton Administration and agency leadership used the fires of 2000 to push their land management agenda, so too did the Bush administration and the new agency leadership use the sever fires of 2002. In August, President Bush, against the backdrop of the still burning Biscuit Fire in southern Oregon, announced the Healthy Forest Initiative (HFI). "We need to thin," President Bush stated. "We need to make our forests healthy by using some common sense...We need to understand, if you let kindling build up and there's a lightning strike, you're going to get yourself a big fire…The forest policy of our government is misguided policy," the President stated, characterized by "endless litigation" and "red tape."[98]

in 2006, which employed the misrepresentation of FRCC as a fuel loading and fire risk indicator. However, the GAO (2006, 2008) criticized this version for its lack of a strategic framework, that it provided no information upon which Congress or any interested party could discern how risk will be evaluated and what criteria will be used for prioritizing projects. The GAO (2006) reported that the Forest Service and Interior agencies said they have not released the Interagency Cohesive Strategy because the Office of Management and Budget (OMB) raised concerns about the accuracy of the data used to make budget projections for the eight alternatives presented. What is curious about this assertion is that these budget projections and alternatives are precisely what WFLC eliminated from the strategy in 2002. It should also be noted that the OMB had embarked on an initiative to rewrite federal agency standards for risk assessment, releasing its draft bulletin of technical guidance for review in January, 2006. This bulletin was roundly criticized for its industry bias, departure form accepted risk assessment standards and lack of scientific validity. The National Research Council was asked to conduct a review of the OMB risk assessment memo and in January, 2007 released its scathing conclusion that the guidelines should be withdrawn noting that "it adopts a new definition of risk assessment and ignores, without explaining, the important impact that risk assessment policies have on the process…agency risk assessments are [thus] more susceptible to being manipulated to achieve a predetermined result." (National Research Council (2007) p. 107). Available at http://books.nap.edu/openbook.php?record_id=11811&page=107.) This is precisely what Hann et al. (2003) warned against regarding the promotion of "hidden agendas" in reporting the result of their analysis and options for the Interagency Cohesive Strategy.

[98] Cited from CNN.com, August 22, 2002. Available at http://archives.cnn.com/2002/ALLPOLITICS/08/22/bush.timber/ Last accessed January, 2008. The announcement of HFI followed the initiation of the National Environmental Policy Act (NEPA) task force on May 20, 2002. The final report, *Modernizing NEPA Implementation* was not released until September, 2003, after many of the HFI's enactments were already put in place, but the elements of HFI announced in August appear to draw on the reports recommendations. Available at http://ceq.hss.doe.gov/ntf/report/totaldoc.html#executive Last accessed April, 2009.

The Healthy Forest Initiative had four basic components[99] 1) streamline

administrative reviews of forest health projects that "enable priority forest thinning (fuels

treatment) and forest restoration (reseeding and planting) projects to proceed quickly; 2)

amend rules to expedite the appeals process; 3) expedite project review for Endangered

Species Act compliance and 4) establish a streamlined Environmental Assessment

process for national Environmental Policy Act compliance. Back to basic proponents

were thrilled. Montana Governor Judy Martz, in her state of the state address of 2003,[100]

noted that:

> …we are working closely with President Bush to bring common sense
> back to forest management. We must manage our forests to reduce the risk
> of catastrophic fires. We will achieve that goal by giving the right tools to
> the forest managers and private businesses. In the process, we will bring
> back good logging jobs to communities like Hamilton and Stevensville,
> Seeley Lake and Frenchtown (Martz, 2003, no page).

Environmental groups and fire researchers were aghast. In September several

academic fire researchers published an open letter to President Bush and Member of

Congress stating:

> As fire researchers and ecologists, we are writing to you concerning the
> scientific basis for efforts to reduce risks from the kinds of forest fires that
> have attracted so much media and political attention in the western United
> States this year…responding effectively to this fire situation requires
> thoughtfulness and care. The fires are traceable to differing factors in
> different regions and forest types. Some have burned in forests where fire
> exclusion and land use have created unnatural accumulations of fuels
> while others have burned in a relatively natural manner. The most debated
> response to alleviating destructive fires in the future – mechanically
> thinning trees – has had limited study, and that has been conducted
> primarily in dry forest types. Thinning of overstory trees, like building
> new roads, can often exacerbate the situation and damage forest

---

[99] Executive Office of the President (2002) *HFI Factsheet.* Available at http://georgewbush-whitehouse.archives.gov/ceq/hfi_12-02_wh_fact_sheet.pdf. Last accessed January, 2008.
[100] Martz (2003). Available at http://www.stateline.org/live/details/speech?contentId=16161 Last accessed January, 2009.

health…No single cause can explain the variety and number of fires occurring this year in western forests. In some drier forest types, such as the semi-arid ponderosa pine ecosystems, fire exclusion aided by grazing and logging has produced accumulations of highly flammable fuel well outside historical norms. However, in many western forests, including parts of the Siskiyou (mountains of the Biscuit fire), Sierra Nevada, Cascades, and Central Rockies, much of the undergrowth is primarily the product of succession from past logging and other disturbance, rather than fire exclusion alone. In other settings, like southwestern chaparral and the lodgepole pine forests of the Rockies, succession naturally produces highly flammable communities, and periodic crown killing fires are inevitable and ecologically desirable. Drought conditions such as those seen across much of the West this year can produce extensive fires even in areas where fuel loads are "normal (Franklin et al., 2002, p. 1).

3.4.5 A New Forest Planning Rule: Integrated Assessments Optional

When a new proposed forest planning rule was released in December, 2002[101] the disturbance regime and HRV concepts were rehabilitated somewhat from their earlier disparagement in Chief Bosworth's *NFMA Planning Rule Review* as interesting scientific concepts irrelevant to forest planning and management. Two options were proposed in the 2002 rule for complying with species diversity requirements of NFMA, neither of which "specifically requires use of the concept of the range of variability under the natural disturbance regime of the current climatic period, but Option 1 identifies range of variability as being among the approaches that may be used to evaluate ecosystem diversity." When the final rule was released in January, 2005 it was described as "aspirational" in nature. The rule stated that it is "less detailed than either Options 1 or 2 with respect to specific ecosystem analysis requirements" and does not explicitly require "analysis of ecosystem diversity at multiple temporal and spatial scales, analysis of disturbance regimes, or analysis of the landscape context."[102] Unlike the 2000 forest

---

[101] 67 Fed. Reg. 72769 (December 6 2002).
[102] 70 Fed. Reg. 1021 (January 5, 2005).

planning rules with its proposed multi-scale planning using a single analysis framework

(based in large part on disturbance regimes and their historic range of variability (HRV)

to which the initial Forest Service *Cohesive Strategy* was linked via the FRCC concept)

the 2005 rules directed analysis solely at project level and even monitoring of their

effects was discretionary. In place of requiring ecological assessments and the

development of tiered planning framework, as well as part of the agency's argument that

the 2005 rules did not themselves require NEPA analysis, the 2005 rule introduced

Environmental Management System (EMS). EMS does not specify how legal obligations

and agency directions are to be achieved but rather establishes a process for documenting

how planning is done and what assessments procedures are used (if any since this is

discretionary under the new planning rule) by forest planning teams in developing their

plans that specify how laws and directions will be addressed. Direction for analysis was

to be provided in Forest Service Manual and Handbook but since the 2005 rules were

successfully challenged in court, as were the revised rule of 2008 this remains a moot

point.[103]

3.4.6 Removing the Strategy from the GPRA Strategic Plan

In 2003 the Forest Service revised its Strategic Plan FY 2004-2008 as required by

the Government Performance and Results Act (GPRA, 1993) releasing its report in

November, 2004. The new strategic goal number one was changed from "Ensure

Sustainable Ecosystems" to "Reduce the Risk of Catastrophic Wildland Fire." The

---

[103] The United States District Court for the Northern District of California in *Citizens for a better Forestry v. USDA*, 567 F.3d 1128 (9th Cir. 2009) ordered the Forest Service to cease implementation and use of the 2008 rules, in June, 2009. The 2000 rule, as amended, is now in affect. The new Secretary of Agriculture, Tom Vilsack, has initiated new forest planning rule development process.

description of this goal begins by restating the four goals of the *10-Year Comprehensive Strategy* but also repeating the misrepresentation of FRCC as fire risk, citing "…73 million acres of NFS lands…at high risk of ecologically destructive wildland fire (Condition Classes 2 and 3, Fire Regime I and II)" in the same manner as in the *Process Predicament* (2002) initiating the misrepresentation of FRCC and the rollback of ecosystem management. The new Strategic Plan retained the acres treated metric, ignoring the recommendations made by the GAO (1999a) and in initial Forest Service *Cohesive Strategy* (2000) for replacing GPRA performance measures with a measure of ecosystem restoration. The *Cohesive Strategy* (2000) is not mentioned and nothing even remotely resembling it's recommended "institutional" and "program management" changes to strategic planning are discussed, such as the recommendations in the *Cohesive Strategy* (2000) for:

- The establishment of assessment procedures that integrates current ecosystem condition, probability of degradation from disturbance and alternatives to reduce the probability of degradation or improve degraded conditions;

- Design and implement systematic methods for landscape scale assessments of the history, status, and trajectory of ecosystem conditions.

Though citing the *10-Year Comprehensive Strategy* as the source of its goals and objectives (which, recall, were adopted from the Cohesive Strategy), the new Forest Service GPRA Strategic Plan does not define catastrophic wildland fire as the *10-Year Comprehensive Strategy* does - wildfire "that burns more intensely than the natural or historical range of variability, thereby fundamentally changing the ecosystem…" It does not, in fact, define any terms at all. In place of any definitions of the objects towards which the strategy is aimed, or any program management changes to implement this

strategy, there is a vague recitation of sustainability and management actions even more

vacuous and disconnected than the 1998 Strategic Plan criticized by the GAO (1998b)

specifically for its lack of clarity and explanation of how the accomplishment metrics

adopted provide any kind of linkage between the proposed strategy and the management

actions that are supposed to achieve its goals. The 2004-2008 Strategic Plan states:

> In considering the Nation's and the Forest Service's future courses of
> action, the agency cannot say with certainty that any particular set of
> conditions for the Nation's forests and grasslands would have long-term
> sustainability. Sustainability is a dynamic target because environmental,
> economic, and social conditions (and the Forest Service's understanding
> of these three elements and their interrelationships) are always changing.
> Thus, sustainability is a journey that may have a range of acceptable
> outcomes, as well as a range of potential courses to achieve those
> outcomes…Future assessments will monitor indicator trends and provide a
> scientific basis for evaluating progress in achieving our mission (USDA
> Forest Service, 2004c, p. 25).[104]

---

[104] The USDA Office of Inspector General (OIG) audited the Forest Service for GPRA compliance in 2005
and their report begins by stating that "The Forest Service has not effectively implemented a
comprehensive strategy for collecting and reporting performance data, as it agreed to do in response to a
June 2000 Office of Inspector General (OIG) audit." The report continues by noting that agency "has a
long-standing history of not being able to provide Congress or the public with a clear understanding of
what employees accomplish with a multi-billion dollar budget ($4.8 billion in FY 2004)" and specifically
criticized the agency for failing to provide the leadership necessary to develop a cohesive strategy as called
for the GAO. The USDA OIG report *Forest Service Implementation of the Government Performance and
Results Act* is available at http://www.usda.gov/oig/webdocs/08601-01-HY.pdf. Last accessed March,
2009. The Strategic plan was eventually updated earlier than required. The current GPRA Strategic Plan for
FY 2007 – 2012 (USDA Forest Service, 2007) is even more ambiguous. It begins by stating guiding
principles which include "Forest and grassland restoration will help reestablish structural characteristics,
native species, and ecological processes…The agency's commitment to restoring the functional resiliency
of forests and grasslands to resist disturbance and change is the foundation of its management" (p. 4) The
GPRA requires a statement of goals, outcomes and performance measures. Goal One now reads "Restore
sustain, and enhance the nation's Forests and Grasslands." The Outcome is "Forests and grasslands with the
capacity to maintain their health, productivity, diversity, and resistance to unnaturally severe disturbance,"
while the Performance Measure is the "Number and percentage of acres treated to restore fire-adapted
ecosystems that are (1) moved toward desired conditions and (2) maintained in desired conditions" (p. 9).
FRCC has been dropped all together. There is no alternative for defining or determining "desired
condition" or "unnaturally severe disturbance" let alone some means of trying to reconcile the contradiction
in the above stated principle of restoration ecological processes to be resistant to disturbance and change
since disturbance and change are fundamental to ecological processes. Available at
http://www.fs.fed.us/publications/strategic/fs-sp-fy07-12.pdf Last accessed January, 2009.

3.4.7 The End of Landscape-Scale Fuels Management

There were several actions following the announcement of the Healthy Forest Initiative to implement its stated objectives. The new Categorical Exclusions (CE) from NEPA analysis for fuels reduction projects (enacted in June, 2003) and the Healthy Forest Restoration Act (HFRA, PL 108-148, December, 2003) arguably had the most impact on fuels management.[105] Both the CE and the HFRA have the stated objective of reducing the risk of catastrophic wildfires to communities and other values by restoring forest health. Both the CE and HFRA employ the FRCC concept attached to the same values to be protected as employed in the *10-Year Comprehensive Strategy*. However, as in *The Process Predicament* (USDA Forest Service, 2002a) that initiated the back to basics backlash against ecosystem management, the CE and HFRA employ the now familiar misrepresentation of FRCC as a measure of fire risk put forth in the *Process Predicament* and GPRA Strategic Plan for FY 2004-2008 eliding the distinction between fire hazard due to fuels buildup and a relative measure of change in fire's historic role and ecological effects. The CE and HFRA represent an elision of the multiple pathways or components of departure from historic conditions, only some of which are amenable to

---

[105] Other actions enacted under HFI are:

- Exemptions of CEs from citizen administrative appeals which normally automatically trigger an administrative review. This was overturned by a Federal District Court decision (Earth Island v. Pengelly, 376 F.Supp. 2d 994 (E.D. Cal. 2005) and subsequently upheld in Earth Island v. Ruthenbeck, 459 F.3d 954 (9th Cir.2006).
- Joint Counterpart Endangered Species Act Section 7 Consultation Regulations (68 Fed. Reg. 68254 (December 8, 2003)) which established special training courses for local managers who, once certified and with appropriate plans in place, could make determinations that proposed projects would "not likely adversely effect" threatened and endangered (T&E) species for National Fire Plan projects. Previously, and still for non NFP projects, such determinations must be made by consultants from the U.S. Fish and Wildlife Service (USFWS) or National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries). Additionally, USFWS and NOAA were instructed to weigh the short term negative effects against the long term benefits to T&E species of NFP projects.
- A streamlined Environmental Assessment (EA) process amounted to a template with directions to be concise.

fuels reduction and only some of these may be amenable to thinning. Perhaps more importantly, FRCC is employed solely as a criterion for the application of these new hazardous fuels project authorities – not as a means of gathering information on the causes of departure in order to develop and prioritize ecosystem restoration projects. In short, all fuels reduction is characterized as restoration and are reported as such in National Fire Plan accomplishment reports.[106]

There are two new CEs for hazardous fuels reduction activities that resulted form the HFI; CE #10 for mechanical treatment and prescribed fire, and CE #11 for post-fire rehabilitation treatment. CE #10 may be used for mechanical treatment of up to 1,000 acres and prescribed burning up to 4,500 acres, while CE #11 may be used on up to 4,500 acres of post-fire rehabilitation of habitat, heritage or infrastructure.[107] The sale of timber is allowed under both CEs but the stated objective of the project must be fuels reduction. CE # 11 is restricted to burn in wildfires areas while CE # 10 may be applied to areas:

1. in the wildland urban interface (WUI) or;

2. Condition Classes 2 or 3 in Fire Regime I, II, or III, outside the WUI or;

3. projects identified in community wildfire protection plans (CWPP).

---

[106] See for example Healthy Forest Reports on the National Fire Plan Website available at http://www.forestsandrangelands.gov/reports/documents/healthyforests/2008/healthy_forests_report_fy2008.pdf Last accessed Last accessed May, 2009.
[107] Neither CE #10 or #11 may be conducted in wilderness or impair suitability for wilderness, use herbicides, pesticides or require permanent roads.

The HFRA, while intended to streamline project development, is nonetheless a complex piece of legislation covering several forest management issues.[108] Title I, covering hazardous fuels management, is to be used to "reduce wildfire risk to communities, municipal water supplies, and other at-risk Federal land through a collaborative process of planning, prioritizing, and implementing hazardous fuel reduction projects." The criteria for HFRA authorized projects are similar to the CE. They may be conducted on:

1. Federal land in WUI;

2. Federal land in condition class 3 "in such proximity to a municipal water supply system or a stream feeding such a system within a municipal watershed that a significant risk exists that a fire disturbance event would have adverse effects on the water quality of the municipal water supply or the maintenance of the system, including a risk to water quality posed by erosion following such a fire disturbance event";

3. Federal land in condition class 2 located within fire regime I, II or III with similar criteria regarding proximity to a municipal water supply systems or streams as above.[109]

---

[108] There are 6 other parts to the HFRA: Title 1 Hazardous Fuels on Federal Land; Title II Biomass (utilization and research); Title III Watershed Forestry Assistance, Title IV Insect Infestation and Related Diseases; Title V Healthy Forest Reserve Program and; Title VI Miscellaneous, dealing with national monitoring of environmental threats. Projects carried out under HFRA authority replaced the post-decision appeals process with a pre-decision objection process (section 105) and established alternative judicial review procedures (sect 106) for projects by limiting the number of alternatives analyzed under NEPA depending on various combinations of the criteria under which HFRA applies such as whether project is covered in a Community Wildfire Protection Plan (CWPP) and whether it is within or outside the Wildland Urban Interface (WUI) and or within or outside 1.5 miles of an "At-Risk Community." See below for definitions.

[109] Also for: 4) windthrow, storm damage that threaten fire spread or insect and disease spread into adjacent ecosystems or threaten forest or rangland resources (undefined but usually understood as timber stands and grazing land) as well as 5) Federal land not covered in paragraph 1 through 4 that contain threatened or endangered species habitat if the natural fire regime is important or wildfire is identified as a threat to these species. The HFRA also included ideas not in the HFI or the initial McInnis bill (H.R. 1904) adopted by the House of Representatives in May, 2003 but included in the final bill after Senate debate. These include requirements for maintaining and restoring old-growth forest stands, requiring that HFRA authorized projects maximize retention of larger trees in areas other than old-growth forest stands and requiring that at least 50% of the dollars allocated for HFRA projects be used for at-risk community protection.

It should be noted that, like the successive Forest Planning rule revisions (USDA Forest Service, 2005, 2008), the categorical exclusion for fuels reduction projects was eventually found to be in violation of the National Environmental Policy Act (NEPA). The Ninth Circuit Court of Appeals ruled that the promulgation of the CE was arbitrary and capricious and thus a violation of NEPA in December, 2007.[110] Among the reasons given the court found that the CE as written lacked the specificity that would allow the significance of effects of activities carried out under its authority to be assessed in any meaningful way.[111] However, at the time data was collected for this research the CE was still in effect.

Having been initiated as part of a campaign against conducting assessment for fuels reduction and forest health restoration under the rhetoric of "analysis paralysis," these enactments of the Healthy Forest Initiative contain no discussion of how either fire risk or the ecological role of fire are to be characterized and analyzed. And they do not specify how this determination is to inform project planning and decisionmaking.[112] Nor are key terms such as restoration; forest health; resilience; ecosystem; or watershed defined in either the CE or HFRA.[113] The terms "at-risk community" and WUI are

---

[110] *Sierra Club v. Bosworth*, 510 F.3d 1016-1027 (9th Cir. 2007).

[111] In addition, the court found, the information used by the agencies to demonstrate that actions carried out under the CE's provision would not individually or cumulatively have significant impacts on the environment was collected after the CE was promulgated. Thus the court found that the agencies failed to properly assess its significance. Following the Ninth Circuits Ruling, the District Court for the Eastern District of California then enjoined the use of the CE in November, 2008. Forest Service Chief Kimbell issued a memo notifying all agency units to stop use of the CE a week later. The Forest Service Handbook (1909.15.30) was updated in April, 2009 with the fuels CE crossed out. Note that this occurred after the interviews for this research, presented in the next chapter, were conducted.

[112] There are provisions for a national risk assessment center however.

[113] Municipal water supplies are defined (Section 101) as the infrastructural components for water collection, storage and transport. Section 102 (authorized projects), however, also includes streams feeding such systems. All lands in the United States are classified into watersheds, the most common classification scheme used in the Forest Service is the USGS watershed classification system of hydrologic unit codes (HUC).

defined such that virtually any area may be considered at-risk and in the WUI[114] similar

to the list hastily gathered list, based on no specifications, published in the Federal

Register at the direction of Congress in fiscal year 2001 appropriations consisting of

11,000 communities ranging from several outbuildings to whole communities.[115]

Unlike the *10-Year Comprehensive Strategy* the term catastrophic wildfire is not

defined as fire that burns outside its natural range of variability. In fact (just as in the

GPRA Strategic Plan (USDA Forest Service 2004c, 2007) the term catastrophic wildfire

is not defined at all. FRCC is defined following the *Cohesive Strategy,* the Interagency

Cohesive Strategy and the *10-Year Comprehensive Strategy*, though its use as a measure

of the ecological role of fire is obscured and not linked to the term catastrophic fire. Fuel

reduction is defined as "methods for reducing hazardous fuels, including prescribed fire,

wildland fire use, and various mechanical methods such as crushing, tractor and hand

piling, thinning (to produce commercial or pre-commercial products), and pruning. They

are selected on a site-specific case and are ecologically appropriate and cost effective."[116]

What constitutes ecologically appropriate is unspecified. Actually conducting FRCC

assessments is discretionary - even though it is a criterion for employing CE or HFRA

---

[114] The term "at-risk community" is defined (in section 101, Definitions) as an area comprised by any community that is a) on the list of communities submitted in response to FY 2001 appropriations (66 Fed. Reg. 753 (January 4, 2001)) - a list collected without any criteria of inclusion or exclusion); b) group of homes and other structures adjacent to Federal land; c) an area in which conditions are conducive to large-scale wildfire disturbance and d) areas for which there is significant threat to human life or property. Community Wildfire Protection Plan (CWPP) is defined as any plan developed for the protection of an at-risk community. The Wildland Urban Interface (WUI) is defined as an area within or adjacent to an at-risk community identified in a CWPP. For areas without CWPPs, WUI is defined as a half-mile buffer around an at-risk community or an area within one and half miles of an at-risk community with steep slopes that create dangerous fire behavior or with other geographic features that can aid in fire control or is in Condition Class III as documented in project-specific environmental analysis.
[115] Urban Wildland Interface Communities Within the Vicinity of Federal Lands That Are at High Risk From Wildfire, 66 Fed. Reg. 751, 754 (January 4. 2001).
[116] The actual term used is "authorized hazardous fuels reduction project" and refers to the definition of "appropriate tools" provided in the Glossary of the *10-Year Comprehensive strategy Implementation Plan.*

authorities for projects in specific areas. The HFRA treats both monitoring and assessment as similar activities, both occurring after treatment. It calls for "periodic monitoring" (within 5 years) of a representative sample of projects using the FRCC Guidebook for "comparing end results to: (A) pretreatment conditions; (B) historical fire regimes; and (C) any applicable watershed or landscape goals or objectives in the resource management plan or other relevant direction."[117] Assessing FRCC post treatment defeats the specific purpose of prescribing FRCC as a criterion for employing CE or HFRA decisionmaking authority as well as the more general purpose of employing information on fire behavior and ecology to inform planning and decisionmaking. Moreover, results of FRCC Guidebook assessments are critically sensitive to the spatial and temporal extent of the area analyzed such that HFRA's direction for "comparing end results to: (A) pretreatment conditions; (B) historical fire regimes" cannot be achieved with any validity unless conditions were assessed prior to treatment and the follow-up monitoring was conducted in the same way at the same spatial and temporal scale.[118]

While legislation is often argued to be the inappropriate venue for prescribing detailed, site specific requirements, the HFRA includes objectives as well as criteria under which its authority may be employed without requiring any procedures to determine whether these objectives or criteria are met. There are, for example, no requirements or provisions that local units (such as a national forest) must formulate and

---

[117] HFRA Section 102 (g) (4). The *HFI/HFRA Interim Field Guide* (USDA and USDOI, 2004) does state that managers "should" conduct assessments at the appropriate scale using the FRCC Guidebook protocols. The first version of the FRCC Guidebook protocols for conducting "project-scale" assessments was released in the fall of 2003. The current version (1.3.0) was revised in 2008 (USDA et al. 2008).

[118] The FRCC Guidebook discusses the issue of scale and pre and post treatment comparison at length. It should also be noted the entire procedure results in information that is intended to inform the process of prioritizing locations and the design of treatments called "restoration context."

employ consistent definitions of what constitutes wildfire risk, poor forest health and ecologically appropriate treatments on their particular landscapes. There are no requirements or provisions to collect information on fuels conditions that affect fire behavior or the ecological role of fire. There are no requirements or provisions to specify how fuel reduction relates to fire behavior or the ecological role of fire, including its role in reducing fuels, and thus what constitutes risk reduction or forest health restoration. There are no requirements or provisions for identifying tradeoffs between the various means of achieving the objectives of community protection on the one hand and forest health restoration on the other.

The categorical exclusion (CE) from NEPA analysis requirements for fuels reduction projects and the Healthy Forest Restoration Act represent the antithesis of strategic multi-scale fuels management and planning. The purpose of categorical exclusions, their very definition, is that they are to be used when it can be demonstrated that there are no negative cumulative impacts thus allowing a project to go forward with minimal analysis. However, the whole point of the strategic, multi-scale planning is precisely to produce cumulative impacts across the landscape. This requires consistent broad-scale analysis to identify and prioritize areas for different types and sizes of treatment.

With FRCC misrepresented as fire hazard, the CE and HFRA provide maximum discretion to local managers to define "catastrophic fire," "fire risk," "forest health" and "ecological restoration" and to identify and prioritize fuel treatment location and type on an ad-hoc basis, unencumbered by a guiding strategy and a formal prioritization process.

With key terms undefined and assessment of the conditions these undefined terms

supposedly refer to being optional, virtually any kind of treatment in any location may

count as risk reduction and restoration. The USDA Office of Inspector General (OIG), in

a 2006 audit of Forest Service implementation of the Healthy Forest Initiative, echoed the

GAOs criticism of the agency's continuing failure to develop a cohesive fire and fuels

management strategy and for failing to develop "specific national guidance for weighing

the risks against the benefits of fuels treatment and restoration projects" noting that "the

identification and prioritization of projects is performed by and at the discretion of

individual field units" (USDA OIG, 2006, p. i-ii). "The emphasis on achieving acres

treated," the OIG concluded, "is overriding the need to accomplish more effective and

better-integrated treatments that achieve the desired fuel and restoration outcomes"

(ibid.). According to yet another critical GAO (2007) report on the failure to develop a

cohesive and integrated strategy or a requirement to consistently employ any kind of

formal risk assessment process "virtually any project can qualify as high priority" (GAO,

2007, p. 65).[119]

3.5   Summary: Whither Fuels Management Policy?

In testimony before a Congressional Oversight Hearing in 2005 on the Forest

Service and DOI's implementation of the HFRA and the GAOs five year update report[120]

on the agencies' progress in developing and issuing a cohesive strategy, Governor Janet

Napolitano of Arizona, Vice-Chair of the Western Governors Association (WGA) gave

testimony on the implementation of the *10-Year Comprehensive Strategy*. Governor

---

[119] The GAO subsequently released two additional reports on the same topic in 2008 and 2009a.
[120] GAO (2005), *Wildland Fire Management: Important Progress Has Been Made, but Challenges Remain to Completing a Cohesive Strategy*, GAO-05-147.

Nepolitano stated that "there is a need for a clarified vision of restoring fire-adapted ecosystems, including landscape contexts that emphasize the use of fire as a management tool" (Napolitano, 2005, p. 3) Included in her testimony were findings from a report prepared for the WGA by an independent panel which recommended the completion of the Interagency Cohesive Strategy in order for the promise of the National Fire Plan to be realized. The report found that:

> The institution of new directives related to the Healthy Forests Initiative (HFI) and the Healthy Forests Restoration Act (HFRA) over the past year has made certain collaborative efforts more complicated. Further, the strong emphasis on fuels (Goal Two) under HFI/HFRA comes at the expense of other 10-Year Strategy goals, most notably restoration (Goal Three) and community assistance (Goal Four)… Clarity on how stakeholders can effectively participate in the federal planning process, particularly in incorporating non-federal concerns, is needed. Enhancing the collaborative selection of fuel treatment projects is also needed to improve implementation of Goal Two. A lack of understanding of the collaborative process, consistency in implementation and differing interpretation of fire regime condition class (FRCC) were given as major stumbling blocks. Cumbersome budgeting processes, fuel target pressures and confusion of definitions impede working across jurisdictional boundaries (WGA, 2004, p. 2-4).121

The independent panel's report to the Western Governors Association also stated that the Wildland Fire Leadership Council (WFLC) "does not provide for meaningful participation by non-federal stakeholders and tends to pre-determine outcomes prior to its meetings" (WGA, 2004, p. 2). Recall that the Interagency Cohesive Strategy was initiated precisely to provide the clarified vision Governor Napolitano called for and provided the basis for the distinction between fuels reduction and restoration (Goals Two & Three)

---

121 The *Report to the Western Governors on the Implementation of the 10-Year Comprehensive Strategy*, prepared by the WGAs Forest Health Advisory Committee (FHAC). Available at http://www.westgov.org/wga/initiatives/fire/tempe-report04.pdf Last accessed January, 2009. The text of the Oversight Hearing is available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_house_hearings&docid=f:98808.pdf. Last accessed January, 2009.

employed in the *10-Year Comprehensive Strategy*. It was to be the basis for developing

mutual understanding of key concepts and the consistent use of terms denoting these

concepts as well as the methods for analyzing them, such as FRCC and fire risk, and

incorporating the results into a collaborative planning process. In June, 2004, however,

WFLC gave the reason for not releasing the Interagency Cohesive Strategy as "a

dichotomy between creating a national strategy and the need for strong collaborative

efforts at the local level."[122]

The increasing cost of fire suppression has led to a series of large fire cost reviews

highly critical of the failure of the Forest Service to implement core elements of the *2001

Federal Fire Policy*.[123] Many have reached similar conclusions and made similar

recommendations regarding the need for strategic and integrated planning across

jurisdictions to the report for the fire season of 1999 (USDA Forest Service, 2000d) that,

together with the Cerro Grand fire investigations (USDOI BLM et al., 2000), prompted

the 2001 update to the 1995 *Federal Fire Policy*.[124] A 2004 large fire cost review

conducted for the Wildland Fire Leadership Council itself[125] noted that while hazardous

---

[122] See the minutes of the WFLC meeting for May, 2004. Available at
http://www.forestsandrangelands.gov/leadership/meetings/meetingnote05182004.shtml Last accessed
January, 2009.

[123] These large fire cost reviews are conducted by independent panels, usually with the assistance of retired
agency personnel, whenever fires exceed $10 million. The large fire cost review process has been
undergoing revision with the increasing frequency of large expensive fires since 2002. The National
Wildfire Coordinating Group (NWCG) was tasked with developing an interagency guide for conducting
such reviews in 2007.

[124] USDA Forest Service (2000) *Policy Implications of Large Fire Management: A Strategic Assessment of
Factors Influencing Costs*. This is the review that revealed that only 5% land management units, such as
national forests, had developed fire management plans as required by the 1995 *Federal Fire Policy*.
Available at http://www.fs.fed.us/fire/management/Large_Fire_Mgt.pdf Last accessed January, 2009.

[125] *Large Fire Suppression Costs: Strategies for Cost Containment: A Report to the Wildland Fire
Leadership Council From the Strategic Issues Panel on Fire Suppression Costs* (WFLC, 2004). Available
at http://www.forestsandrangelands.gov/reports/documents/2004/costmanagement.pdf Last accessed
August, 2009.

fuels treatments have significantly increased since the initiation of the National Fire Plan,

this increase is uncoordinated and inadequate noting that:

> …a paradigm shift in thinking about hazardous fuels reduction
> effectiveness is required and can be started by ceasing to use acres treated
> as a results measurement for program accomplishments…Federal agencies
> must move beyond current hazardous fuels reduction strategies toward a
> more holistic wildland fire management program…it is apparent that
> current fuels reduction strategies are not able to address the full magnitude
> and scope of the fuels problem (WFLC, 2004, p. 26-7).

A large fire cost review of the fires of 2007 conducted by the Brookings Institute,

found that none of the 21 land management plans or fire management plans it reviewed

included what the panel considered to be the necessary guidance and direction or the

requisite data and information that would allow for implementation of a collaborative and

integrated strategy across jurisdictions and as called for in the 2001 *Federal Fire

Policy*.[126] In response to these many critical reviews and the *Federal Fire Policy's*

requirement for periodic review of progress towards implementation, the National Fire

and Aviation Executive Board (NFAEB), which oversees all interagency fire

management policy, initiated a review in 2004 of fire and fuels management modeled

after the Department of Defense's Quadrennial Defense Review (QFR). The resulting

report (called the Quadrennial Fire and Fuels Review – QFFR) released in 2005, like the

many reviews before it, reiterated the need to develop a process within which integrated

and collaborative multi-scale, cross jurisdictional plans could be developed:

---

[126] Brookings Institution (2008) *Assessing Progress Towards an Integrated Risk and Cost Fire
Management Strategy*. The list of elements the panel considered in reaching this conclusion were 1) fire
history and past fire behavior; 2) types and levels of fuels and type, age and location of fuels treatments; 3)
communities and structures; 4) WFU objectives and; 5) direction for Appropriate Management Response
(AMR). It is interesting to note that the panel had to develop its own review criteria because such a list of
elements is not explicitly stated in any policy direction or guidance. Such elements are merely suggested.
This and other large fire cost reviews are available at http://www.fs.fed.us/fire/publications/ Last accessed
February, 2009.

Broad-scale landscape management planning with ecosystem emphasis
will set the stage for informed decisions on the prioritization and location
of fuel treatments…Interagency, interdisciplinary planning teams will
need to focus on landscape, fire planning unit or other large scale
endeavors, to plan and establish objectives for ecosystem management and
fire's role (NWCG, 2005 p. 35).

The QFFR cited the draft Interagency Cohesive Strategy (languishing in the hands
of the Wildland Fire Leadership Council since 2002) as a "landmark step" in laying the
foundation for "refocusing" fuels management at the landscape-scale. While praising
efforts such as the Healthy Forest Initiative, the QFFR also provided an oblique rebuke to
the notion of "analysis paralysis" reducing the role of environmental analysis in
decisionmaking, particularly at the forest planning level, stating that "Satisfying NEPA at
the highest level reduces the amount of NEPA work done on a project-by-project basis,
saving time and more fully addressing important ecosystem issues" (NWCG, 2005 p. 27).
The cover of the QFFR report notes, however, that the panel's analysis and
recommendations "does not purport to represent any official policy or program decision
by the NFAEB and the federal agencies."[127] The status of the QFFR, in other words, is
that of recommendations for policy. No follow-up has been reported however.

The core mission strategies outlined in the 2005 QFFR and the organizational
capabilities that must be developed in order to implement them were again reiterated in

---

[127] Note that the report is the product of a panel of federal agency and external experts convened by the Fire
and Aviation Executive Board (NFAEB). Though the report was released and available on many agency
websites, including the National Fire Plan site noted above, there has not been an official statement
endorsing or rejecting the report's findings. While this review process was underway, however, the GAO
(2005b, p. 16) reported that "the Quadrennial Fire and Fuels Review is intended to result in an overall
federal interagency strategic planning document for wildland fire management and risk reduction and to
provide a blueprint for developing affordable and integrated fire preparedness, fuels reduction, and fire
suppression programs. Because of this effort's consideration of affordability, it may provide a useful
framework for developing a cohesive strategy…"

the subsequent quadrennial review of 2009.[128] Interagency fire management leadership, in other words, continues to insist on the need for collaborative, multi-scale assessment in fire and fuels management planning and for the objectives of fire management to be incorporated into land management planning more generally. As with the scathing *Fire Management Review* (USDA Forest Service, 2000a), that accompanied the Forest Service's initial *Cohesive Strategy* (USDA Forest Service, 2000b), pointing out that review after review reveal the same institutional failures and proposes the same institutional solutions it becomes apparent that fire and fuels management policy implementation remains captive to other agency interests and political forces.

The 2001 F*ederal Fire Policy* and the *10-Year Comprehensive Strategy* remain in place, in other words, but their stated goals and objectives remain unrealized – that is, collaboratively developing strategic landscape-scale planning processes within which key terms and concepts are defined, the ecological role of fire (including its role in reducing fuels) and the risk posed to communities by fire are analyzed, their tradeoffs assessed and the results incorporated into the decisionmaking process. These disparate policies and strategies moreover, are listed or referenced in one form or another in many formal venues, including the agency directives, such as the Forest Service Manual for Fire Management (FSM 5100) or the Fire Management Analysis and Planning Handbook (FSH 5109.19) along with direction (in other handbook chapters) for complying with the categorical exclusion and the Healthy Forest Restoration Act. There is no guidance whatsoever as to how all these directions are to be interpreted or reconciled. The FSH simply states, for example, that local forests must develop goals for their fire

---

[128] This review was titled Quadrennial Fire Review (QFR). Available at http://www.nifc.gov/QFR/QFR2009Final.pdf Last accessed September, 2009.

management program and "Discuss how these goals contribute to accomplishing regional or national strategic plans such as the 10-Year Comprehensive Strategy, National Fire Plan, Cohesive Strategy, and Forest Service Strategic Plan, as well as wildland fire policy" FSH 5109.19.52.2 (2003).[129] The *Interagency Strategy for the Implementation of the Federal Wildland Fire Management Policy*, released in 2003, obliquely summed up the problems facing federal fire management in the current political climate thus:

> Fundamentally, however, wildland fire policy improvements are attempting to marginalize a much deeper, much more systemic, and more problematic public lands policy dilemma. Until larger, overarching land/resource policy issues are reconciled, wildland fire policy evolution can only inch forward on the heels of undesirable outcomes in firefighting and fire use…Record-setting wildfires beg the need to explore the extent to which land/resource management objectives…continue to "fuel" - however inadvertently - unacceptably high suppression costs, resource losses, and disruption to local economies (USDA USDOI, 2003, p. 13).

There is no comprehensive and rational fire and fuels management policy (Franklin and Agee 2003; Stephens and Ruth, 2005). With the Forest Service's GPRA Strategic Plan reflecting nothing more than a vacuous aspirational journey and efforts to develop an Interagency Cohesive Strategy steadfastly resisted by agency leadership (outside of Fire and Aviation Management), there is no clear articulation of the role of fire and fuels management within the Forest Service land management more generally. With Forest planning under NFMA (1976) in limbo, after the 2000 proposed rules for plan revisions were withdrawn and two subsequent rules overturned by the courts (2005 and 2008) direction for fire and fuels management in forest plans remain as they were

---

[129] This is the latest version of this handbook. Recall the *Fire Management Review* (2000) that accompanied the Forest Service's initial *Cohesive Strategy* (2000) criticizing the functionalism within the agency discussed earlier. This review specifically pointed out the disparate nature of fire and fuels direction spread throughout the FSM and FSH and recommended that integration of direction should accompany integration of programs and their funding.

specified in the first round of forest plans developed in the 1980's, which is to say largely

absent or suppression oriented. With the enactments of the Healthy Forest Initiative

(particularly the Categorical Exclusion and HFRA) with no definition of key terms and

concepts and it's emphasize on expedited implementation over assessment and analysis,

all fuels treatments, regardless of type, size and location, count as risk reduction and

forest health restoration. The de facto fuels management policy is achieving annual

acreage targets, conducting only as much analysis as necessary in order to get projects

implemented as quickly as possible within budget.

CHAPTER FOUR

THE STRUCTURE AND PROCESS OF FUELS MANAGEMENT PROJECT PLANNING IN THE U.S. FOREST SERVICE

4.1   Introduction

Recall from chapter three that the very purpose and objectives of fire management have been debated and contested since the Forest Service policy and program name was changed from *fire control* to *fire management* in the mid-1970s. Despite a lively and long-running debate among professionals, researchers and program managers over the nature of what was then called "fire knowledge" or "fire management considerations" and the proper role of this knowledge and these considerations in the formulation and implementation of land management policy and objectives, fire management has remained largely focused on fire preparedness and incident response. Successive wildfire seasons of unprecedented cost and magnitude continue to strain the agency's ability to manage the social and ecological impacts of wildfire. Integrating fuels management into land management planning has been proposed for decades as a means reducing these impacts. Following the fires of 2000, fuels management received significant attention and funding from Congress such that fuels managers now participate in project planning at a historically unprecedented level. Yet fuels management remains disconnected from fire management and land management more generally.

Wildfire is an archetypal landscape phenomenon that does not recognize administrative boundaries, whether those of federal agencies, states or private lands, nor the internal boundaries within them such as Forest Service management areas, districts or project boundaries. Because of the perceived fuels and forest health problem and its perceived linkage to the increased incidence of large, destructive and costly wildfire events, numerous policies and strategies have been formulated over the years by interagency Fire and Aviation leadership (e.g. the Federal Fire Policy of 1995 and 2001, the *Cohesive Strategy* of 2000) as well as other authorities (e.g. the states and counties in the National Fire Plan). These policies and strategies attempt to address the lack of integration between incident management, fuels management and land management across jurisdictional boundaries. All of these policies, strategies and plans have, in one form or another, stressed the need to move beyond the current "stand-scale" or "project-level" focus of fuels management, what Joy (1999) and the GAO (2005ab) called "ad-hoc" planning, and adopt "strategic landscape-scale" fire and fuels management planning.

Because the fuels and forest health problem is perceived to be so vast and interconnected, these policies and strategies emphasize prioritization based on risk. Fuel reduction and forest restoration treatments should be conducted in the areas at highest risk from negative consequence fire. These policies and strategies thus call for a "risk management-based approach" to the assessment of fire risk and the ecological role of fire. The definition of what constitutes fire risk and negative ecological consequences of fire depend on how a person defines and places value on forest health and a host of ecological conditions. There is no consensus on the definitions values. This risk management based approach was intended to be embedded in collaborative planning

efforts to characterize risk and forest restoration in an effort to help build consensus. This risk assessment process is supposed to inform fuels management decisionmaking and project planning, such as the choice of fuels treatments options and their tradeoffs, in order to develop the "strategic" aspect of "landscape-scale" fuels management. This has not occurred.

Numerous internal audits and critical reviews by a host of different agencies have pointed out that these recent fire policies and strategies have not been implemented. The Forest Service's continued failure to develop forest planning rules and the Bush administration's Healthy Forest Initiative and Congresses' annual appropriations have discouraged the development of landscape strategies or comprehensive fire and fuels assessments and planning. Fuels management project planning is "ad-hoc" (Joy, 1999, GAO, 2005ab). The increased levels of fuels treatments is carried out at the local forest level with little overall guidance or strategic plan. No definitions or criteria have been established to determine what constitutes fire risk or the ecological role of fire or restoration. The new emphasis on and increased funding for fuels management has in effect been appended to the extant project planning and decisionmaking structures and processes of each national forest. To understand the gap between fuels management policy and practice requires understanding the actual practice of fuels management. This chapter seeks to answer the following questions:

- How are fuels management projects identified, prioritized and developed into project proposals? Or, more simply, how are fuels management projects planned?

- What are the key factors that affect fuels management project planning?

This chapter is composed of four sections. Section 4.2 describes the new role that fuels management now plays in project planning and decision making. Section 4.3 provides an overview of the project planning process, the key factors that affect the development of fuels management projects and the structure and process within which this process takes place. This overview is followed by a more in-depth discussion of these two components that make up the practice of project planning; Section 4.4 describes in depth the two sets of key factors reported by participants that most directly affect fuels management project planning. Section 4.5 describes the organizational structure of NFMA analysis. This chapter provides the background for chapter five which describes in detail the practice of fuels management project development and planning and the process of addressing these two key factors.

4.2 The New Role of Fuels Management in Forest Service Project Planning

When Congress initiated the National Fire Plan and substantially increased funding for fire and fuels management with fiscal year 2001 appropriations, the role of fuels management changed dramatically. "The big impetus was in 2000 when it gained that much more national attention" noted one forest Assistant Fire Management Officer (AFMO). "The National Fire Plan and those things that came out of the National Fire Plan, people said, 'whoa, yeah, we really need to take another look at this and how we're doing business.'" (KDR6) This funding increase led to what several local managers referred to as "the big fire hire." This hiring boom increased the permanent workforce of fuels management employees at the district level. As one district AFMO described it "In the past everyone used to mostly be seasonal…but then post-2000, with the shift in

emphasis and the shift in funding, [we had] an opportunity to get some people on board that that's going to be their focus" (KNH16).

This new attention on fuels and new thinking about how fuels management was "doing business" shifted the focus to a different kind of fuels reduction activity than had been practiced previously. "[W]e had targets to reduce fuels generated from the timber harvest [and] wildlife habitat improvement" noted one Forest AFMO, "I think that was more what people's idea of fuels reduction was…'yes, we can burn that unit post harvest, no, we can't burn that one, we need to pile that one'…the role was to do the BD plan, the brush disposal plan…Community protection, whatever, we really weren't looking at that" (KDR6). A fuels specialist put it most succinctly stating simply, "we were the janitors, the cleanup guys" (HRM13). "Now it's shifted," noted one assistant Forest Planner, "to how we can manipulate the fuels in a stand to change the fire behavior." (KJG28).

This shift from janitors in support of other program activities, principally timber sales and wildlife habitat management, has also put fuels specialists in the new more active role of initiating projects for the purpose of modifying fire behavior. "Now they're in that arena of identifying and proposing projects" (HDH17) noted one forest planner. This transition to a more active role in project planning and decision making, however, has not been without its challenges because no real policy or guidelines have been passed down to the local level. Fuels management has more or less been thrown into the complex and ill-defined process of project planning in the Forest Service. As one forest planner described it:

...part of the experience that some of the fire folks have had is that...they were asked to go out and identify some fuel treatment projects. 'We need acres. Go find me some acres and draw me some polygons and we'll come up and have a proposal'...[A] lot of those folks were thrown into that assignment not having had a lot of previous NEPA experience in terms of program activities and forest plan requirements...[T]hey had experience identifying, obviously from a fuels point of view, here's some areas that need treatment [but then] coming back and finding that they had to do some significant modification...or even drop some because there were other resource considerations being applied that they weren't aware of at the time...those interdisciplinary things are probably more apparent to them now... there's a lot of other factors that come into play...(HDH17).

Along with fuels manager's new role in project planning are a whole new set of expectations and requirements – legal compliance requirements and the "interdisciplinary things" they entail. In their previous role of supporting other natural resource program activities, specialists from these other programs were responsible for ensuring compliance with laws such as the National Environmental Policy Act (NEPA, 1970) and National Forest Management Act (NFMA, 1976). These acts require the use of interdisciplinary (ID) teams of resource specialists to analyze project proposals. One AFMO noted that "[w]hen I first started, fire wasn't really involved in the ID team much..." (KDR6). Participation on interdisciplinary teams is now considered crucial for fuels management project planning for two principle and interrelated reasons. One is the myriad of issues surrounding legal and regulatory compliance. As one assistant forest planner put it "NEPA-wise, fire's shifting from support, reacting to other actions to being the highlighted action which needs more information from the NFMA side of planning, more detail because that is your purpose and need, the driver for action in NEPA" (BKB30). Another reason that participation on interdisciplinary teams is now more important is because compliance requirements of laws and regulations such as

NEPA and NFMA are closely linked to the types of activities conducted. The types of activities conducted are themselves linked to different sources of project funding such as brush disposal (BD) or Knutson-Vandenberg (KV) trust accounts, or the Wildland Fire Hazardous Fuels (WFHF) budget line item appropriated annually from Congress. The 2006 Fire Management Plan for Kootenai National Forest, for example, illustrates the importance these interconnected aspects of fuels managers new role when it states:

> …participation and interaction in identifying issues, concerns and opportunities as a member of an interdisciplinary team is crucial to the success of the project from a fuels standpoint. Determination of funding (BD, KV, WFHF, etc) mixes with realistic costs…is crucial in achieving the desired benefits.…fuels projects should be identified as management opportunities during the NFMA phase of planning.[130]

This brief discussion of to fuels managers' new more active role in project planning provides a glimpse into the process into which they have been inserted and the key factors that must be negotiated as a result. What is referred to in the passage above as the "NFMA phase of planning" is the term used in the Forest Service to describe the process of developing a project proposal. The following section provides a brief overview of the project planning process called NFMA analysis that fuels management now finds itself engaged in. It also provides a brief introduction to the key factors that affect the process of developing fuels management project proposals and the organizational structure within which this process takes place. This process, these factors and this structure are intricately intertwined. This overview sets the stage for a more in-depth discussion of these two key factors and their to the Forest Service's organizational structure within which project planning takes place.

---

[130] Kootenai National Forest Fire Management Plan (2006) Section IV, p. 88.

4.3   Overview of NFMA Analysis

Project planning is dynamic and fluid and the factors that influence it are complex and interconnected such that understanding one aspect entails understanding another. In its most generic sense, planning refers to a set of decisions and actions that establish guidelines for future decisions and actions (Forester, 1989). The first step in project planning is deciding what the project is. A project does not exist "out there" on the landscape waiting to be picked up, its costs and environmental impacts readily apparent and analyzable for compliance. Projects have to be constructed and developed. The term planning as used by managers is really a catch all term that includes this construction. The final objectives and mix of treatments of the project is never certain at the outset. All participants in this research in one way or another described project planning as a process of refining an initial, very general conception of a project, what one district Assistant Fire Management Officer (AFMO) called a "glimmer of an idea" (BLM3), into a well-defined and implementable project proposal called a proposed action. This construction and refinement of a well defined proposed action is achieved through an intense process of negotiation between many actors, such as the AFMO, their district ranger and other resource management specialists.

In the Forest Service, this dynamic series of negotiations through which a glimmer of an idea for a project is transformed into a well defined and implementable proposed action is described using a concept called the *NEPA Triangle* (figure 1). This concept comes from the Forest Service's *NEPA/NFMA Forest Plan Implementation Training Course (1900-01)* (hereafter 1900-01 Course). The 1900-01 Course employs the concept of the NEPA triangle to provide a conceptual framework and set of terms for

making sense of the dynamic process of project planning in the Forest Service. At the top

of the NEPA triangle is an ideal rational planning and decisionmaking instrument called a

proposed action. The proposed action is a document that contains a well-defined problem

(referred to as the purpose and need for action), the project's objectives and the proposed

set of management activities to achieve these objectives. Thus, NFMA analysis, on the

left side of the NEPA triangle, represents all the activities and decisions that go into the

construction of a proposed action. The term NFMA analysis and the set of activities it

designates thus has less to do with the actual National Forest Management Act (NFMA

1976) legislation, from which it takes its name, than it does with differentiating the

activities and decisions leading up to a proposed action from those that take place

afterward.
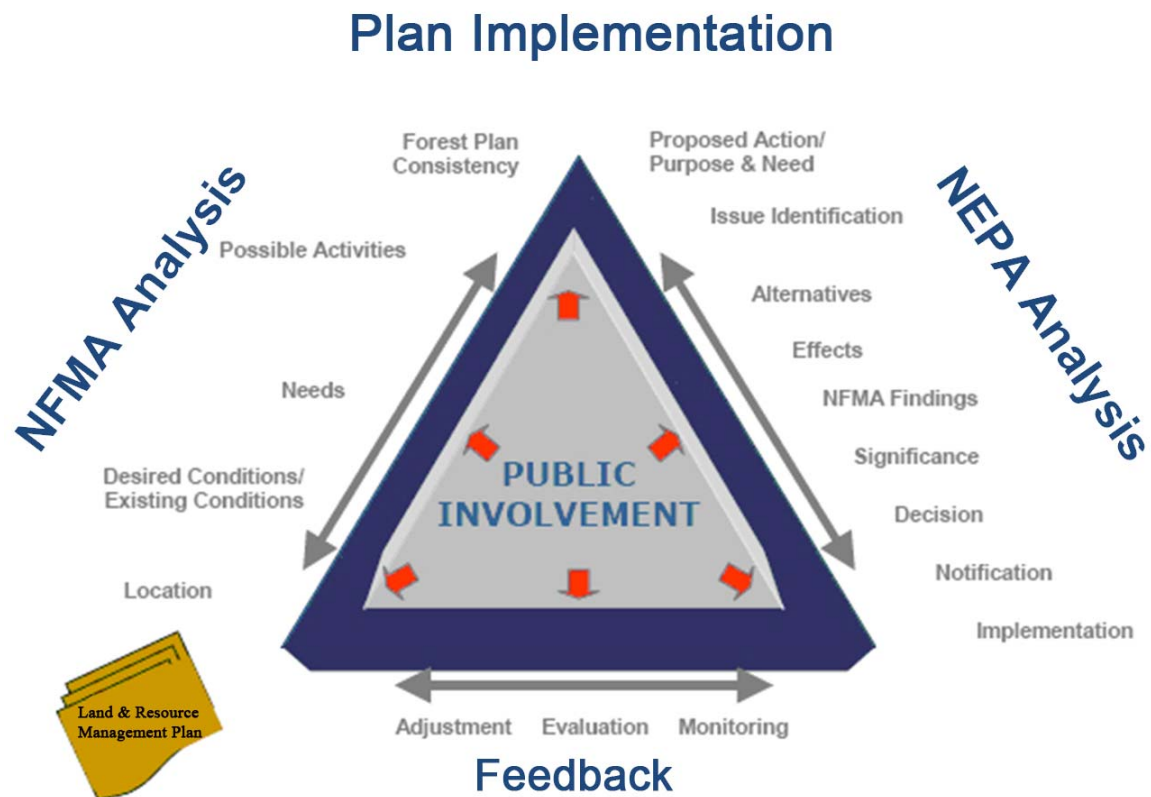
Figure 3 The NEPA Triangle

The statutory and regulatory requirements of National Environmental Policy Act (NEPA 1970) begin once a proposed action is released. NEPA analysis, on the right side of the NEPA triangle, represents all the activities and decisions that go into compliance with NEPA. NEPA stipulates three levels of analysis that correspond to what is formally referred to as the nature and complexity of a proposed project. NEPA compliance differs between small, relatively discrete projects carried out under a categorical exclusion (CE) to large and complex projects carried out under an Environmental Impact Statement (EIS). Small CE projects cost substantially less then large EIS projects and take much less time from project initiation to the signing of a decision document and implementation. Between the CE and EIS, in terms of compliance requirements and thus both time and money allocated, is the Environmental Assessment (EA). Since all projects must comply with NEPA, it is primarily through meeting NEPA requirements that managers comply with other laws, such as the National Forest Management Act (NFMA) and the Endangered Species Act (ESA, 1973) as well as agency direction and guidance. Providing guidance on the development of projects that meet the myriad compliance requirements is, in fact, the function of the NEPA triangle concept and the purpose of the 1900-01 Course.

NFMA analysis is intended to lead to efficient development of project proposals that are as implementable as possible, that is, projects that are budgetarily and administratively feasible, statutorily compliant and as litigation-proof as possible. As one forest planner put it, "…our hope is that by the time you get to a proposed action, you have something that is pretty well defined and laid out that if you were to make the

decision today that you could implement that and be in compliance with laws and regulations and Forest Plan standards" (HDH17). While it is through NFMA analysis that projects are developed in anticipation of compliance requirements, setting the stage for formal compliance evaluation during NEPA scoping of a proposed action on the left side of the triangle, NFMA analysis itself is extremely ill-defined. There are no formal requirements or direction for its conduct. The Forest Service Handbook, in fact, does not even discuss it. This lack of explicit direction appears deliberate. It allows all the decisions made in the construction of a project proposal to be characterized as non-decision. "Why conduct NFMA analysis," the 1900-01 Course work book asks rhetorically, "if it is not required and there is no decision?" The answer provided is "flexibility" to "narrow the scope of consideration" of a proposed action but "no decision means…generally no laws or regulations to obey."[131]

There are two important interrelated consequences of this effort towards efficient development of proposed actions that are in compliance and ready for a decision and implementation. One consequence is that NFMA analysis is an exercise in anticipation, an attempt to determine the compliance requirements of a proposed action in advance of the formal NEPA scoping process. The second consequence is that this effort to determine compliance requirements takes place as the proposed action is being developed. This entails that determination is not simply a matter of anticipation but also a matter of choice. The different levels of NEPA compliance (CE, EA and EIS) are used to help define a project. Put more simply, projects are constructed to fit within these compliance requirements – especially in the case of the new CE for fuels reduction.

---

[131] Forest Plan Implementation Course 1900-1 Notebook and Class Exercise, p. 3-Unit 5, 10/30/2007 edition.

Although formal decisions as to the type and extent of activities involved and the level of NEPA analysis employed, are not formally made until after NEPA scoping of a proposed action, the decisions that actually determine the nature and complexity of a project are made when developing the proposed action during NFMA analysis. The fundamental nature and underlying assumptions of a project, its purpose and need, objectives and suite of treatments employed to meet these needs and objectives, are rarely altered as a consequence of NEPA scoping. Rather, they are merely altered in extent to some degree. The alterations that occur to a project after a proposed action is released essentially amounts to tinkering around the margins. The real work of project development occurs during the flexible and ill-defined process of NFMA analysis. Therefore, understanding the process of NFMA analysis requires understanding the factors that are the primary focus of manager's attention during NFMA analysis and how these factors relate to the organizational structure of Forest Service planning and decisionmaking is the key to understanding the developments of fuels management projects. The myriad of interrelated issues and considerations discussed most by managers interviewed for this research may be grouped into two closely interrelated sets of factors: 1) targets and funding and 2) compliance with law, regulation and agency policy, the threat of litigation and the cost of data collection and analysis determined to be necessary for compliance and to mitigate the threat of litigation. Each of these sets of factors is described briefly below in order to set the stage for a discussion of how they relate to the organizational structure of Forest Service planning and decisionmaking that follows.

Targets and Funding

The Forest Service is organized around several distinct but overlapping types of activities such as timber management, vegetation and wildlife management, and fire and fuels management. These are referred to as resource management programs. Each resource management program, such as hazardous fuels, timber or watershed and wildlife management, receives an annual budget allocation to meet its target. While each resource management program is responsible for meeting its program target, the forest as a whole, is responsible for achieving the targets of all resource management programs, called integrated accomplishments. Individual resource management programs do not control the allocation of their program budgets. The Forest Leadership Team controls program budgets and the Forest Leadership Team is responsible for meeting all program targets on the forest, a target called an integrated accomplishment. The Forest Leadership Team allocates funds from individual programs to specific projects. The cost of project development and planning is directly tied to the second key factor - compliance with law, regulation and agency policy, the threat of litigation and the cost of analysis..

Compliance with Law, Regulation and Agency Policy, the Threat of Litigation and the Cost of Data Collection and Analysis

Determining compliance with federal law, regulation and agency direction is difficult. Different combinations of activities to meet the targets of the different resource management programs lead to different kinds and degrees of environmental impacts. These different levels of impacts determine what is required for statutory, regulatory and agency policy compliance. These impacts also affect the level of controversy and thus the

threat of litigation – especially if the project involves timber harvesting. As one District AFMO noted "if it involves logs on trucks you can bet it will be challenged" (HDL5).[132] Projects are planned and implemented under what are referred to in the Forest Service as decision authorities. When managers discuss the costs of compliance they talk almost exclusively in terms of the increasing requirements of the three levels of NEPA decisionmaking authority – CE, EA and EIS – because, as described above, all projects must comply with NEPA. These different levels of NEPA have different restrictions on the kind and extent of activities that may be undertaken with them. They also require different levels of analysis to be in compliance.

The Organizational Structure of NFMA Analysis

The development of a proposed action during NFMA analysis is principally a process of negotiation between specialists from different resource management programs and members of the Forest Leadership Team, principally the district ranger on whose district a proposed project is located. These negotiations are aimed at aligning these myriad elements of program objectives and targets, funding sources and costs, and a resource specialist's time required to perform analysis and design for mitigation measures so that a proposed action will meet the legal requirements associated with the selected level of NEPA compliance, either a CE, EA or an EIS. This process of negotiation transforms an initial glimmer of an idea for a project into a proposed action within budget

---

[132] Laband et al. (2006) analyzed data collected by the GAO on fuels reduction project appeals from 2001-2002 found that 90% of appealable projects (NEPA EA and EIS) that included fuels reduction objectives were appealed in Forest Service Region One, 13% higher than any other region and that projects that included timber production were 13% more likely to be appealed than projects without timber production.

constraints and help meet individual program targets as well as the forests integrated

accomplishment requirements.

These negotiations take place within an organizational structure and division of

assessment, planning and decisionmaking responsibilities that long preceded the passage

of the National Environmental Policy Act (1970) and National Forest Management Act

(1976). The invention of the 1900-01 Course and the concept of the NEPA triangle in

many ways appears to be an attempt to adapt the requirements of these laws into this

structure.[133] This organizational structure in turn provides what little structure there is to

the purposefully flexible and ill-defined non-requirement of NFMA analysis. National

Forests are divided into districts. Each forest is headed by a forest supervisor and the

districts are run by district rangers. The forest supervisor, their staff and the district

rangers make up the Forest Leadership Team. It is the Forest Leadership Team that

develops the annual budget, prioritizes projects and allocates funding and resource

specialist's time to the various projects on the forest. This list of prioritized and funded

projects is called the program of work. Project ideas are brought by the district ranger and

presented to the Forest Leadership Team as a management opportunity to meet the

various program objectives of the forest. If they are funded and included on the annual

program of work, they are passed back to the districts for further refinement into a

proposed action by a group of resource specialists called an Interdisciplinary Team (ID

team), under the supervision of the district ranger. It is during this later refinement into a

proposed action that the ID team, following the broad parameters established by the

---

[133] I was unable to determine the precise date when the 1900-01 course and the concept of the NEPA triangle was first developed. Instructors for the Course that I attended indicated it was developed in the late 1980s, soon after the first round of forest plans were established.

Leadership Team, attempts to construct project proposals that are compliant with law, regulation and agency direction. The following section provides a more detailed discussion of the two sets of factors that are the principle focus of negotiation during NFMA analysis: targets and funding and legal compliance & the threat of litigation.

4.4   Key Factors of Project Planning

When managers describe the process of planning fuels reduction projects and the things that most affect the development of a proposed action their descriptions revolved around two sets of key factors: 1) targets and funding and 2) compliance with law, regulation and agency policy, the threat of litigation and the cost of data collection and analysis determined necessary for compliance and to mitigate the threat of litigation. The term "factor" is used here in the same way that it was used by managers when describing what takes most of their attention and most affects project planning. However, the term factor denotes a sense of sharp distinctness that is belied by manager's actual description of the interrelatedness of these topics.

4.4.1 Key Factor One: Targets & Funding

As described earlier, the Forest Service is organized around several distinct but overlapping types of activities such as timber management, vegetation and wildlife management and fire and fuels management. These are referred to as resource management programs or simply programs. Each program has different metrics by which its accomplishments are accounted and these accomplishments are tied to its budget. This is called a program target. For fuels management, the program target is acres of

hazardous fuels treated. The Forest Service allocates funding to each resource

management program by budget line item (BLI) each with a unique Fund Code. WFHF is

the Fund Code for the hazardous fuels reduction program.[134] Each fall every National

Forest must formulate its budget request to the Regional Office (RO). These proposed

budgets are composed of the sum of what each program estimates can be accomplished

for a given level of funding. Sometime in the spring the RO disperses the actual funding

level, along with any changes to the funding and target levels. Because of this linkage

between targets and budgets, achieving annual targets has a profound impact all planning

activity conducted on the forest. As one Assistant Forest Planner described:

> It's kind of like this, I'm not sure how to put it to be politically correct, but
> it's basically a funding-needs driven target…when it comes down to brass
> tacks, we're talking about forest level targets which in essence promises
> funding…[If] we promise X amount of acres, whether it's in timber and/or
> fuels reduction, then we get a certain level of funding promised by the
> Regional Office through the WO [Washington Office] because it's
> contributing to the overall target…It's kind of like this little numbers
> game (BJG30).

According to Kaufman (1960 and 2006), accomplishment targets represent a

"special kind of direction," and have a long history in the Forest Service. Targets mesh

well with and reinforce the agency's bias towards action, what Kaufman described as its

"can-do" attitude, an attitude that remains alive and well in the Forest Service today.

"The agency has a history of producing outputs," noted one fuels specialists, "it's a

---

[134] WFHF stands for Wildland Fire Hazardous Fuels. Fund Codes are also referred to as Program Codes.
Fire Management within the Forest Service is comprised of several programs, the three main ones being
Wildland Fire Suppression (WFSU), Wildland Fire Preparedness (WFPR) and Wildland Fire Hazardous
Fuels (WFHF). Under certain circumstances WFSU and WFPR funds may also be used for fuels reduction
work and count towards the fuels target. Acres burned in a Wildland Fire Use (WFU) fire may count
towards acreage targets only if WFHF funds have been expended on planning efforts for those acres. This
policy, or rather what is formally called policy implementation, will change beginning in 2009 with the
elimination of the distinction between wildfire suppression and WFU. The policy governing the counting of
acres for target accomplishment has not yet been released at the time of this writing.

project driven culture and every fuels project feels pressure to get the job done"(HGJ19).

Targets also fit well into the decentralized hierarchy of the Forest Service's

organizational structure. Each organizational level of the organization is given a great

deal of discretion as to how they meet their targets. This provides a great deal of

flexibility for the local units to work within the biophysical, bureaucratic and legal issues

encountered in developing and implementing project proposals. As one District AFMO

described it:

> …you get a regional target, what the region wants. They give that to the
> respective Forests to breakout, they'll say how many acres. 'Here's your
> baseline. You need to get something done…They divvy it up at the SO but
> then it's up to each respective district to kind of do what they want to do
> with it…It's a game I think (KMM31).

Although managers are given a great deal of discretion as to how they meet

targets, the funding attached to each program's target does entail constraints that must be

navigated during project planning. "Targets do not always reflect what the forest feels it

needs to be doing" noted one Forest Planner (BSH9). This is because the combined

funding appropriated for each program's annual target is rarely sufficient to cover the

costs of meeting the combined targets and objectives of all resource management

programs on a forest. This forces managers' attention to the costs per unit of

accomplishment, such as acres treated for fuels management, and how to mix and match

different program funds to meet multiple program targets, which makes this allocation of

funding seem like a "little numbers game." As one District AFMO bluntly stated:

> …it comes down to a function of cost per acre…it's a function of being
> able to hide dollars or offset [costs] through other disciplines, timber being
> an example…If you can offset it by different Fund Codes, it makes it look
> like you're doing it for cheaper costs per acre…because timber paid $150
> an acre we offset Hazardous Fuels [by] $150…Or link up to Rocky

Mountain Elk Foundation or some other, you know, offset your costs that way, through grants and stuff,…but was it still $300 to treat? Probably so. (BJP29).

Each of program's Fund Code has constraints upon the kinds of activities it can fund. These constraints are governed by what are called Primary Purpose rules[135] and are described in the Forest Service Handbook and in the Program Direction that accompanies each resource management program's annual allocation (e.g. its Budget Line Item). These rules are rather vague, but generally state that funding from any particular program's Fund Code should be spent on planning and implementing projects that accomplish the targets and objectives of that program. The fiscal year 2007 Program Direction for Wildland Fire Management, for example, states that WFHF funds may be used for project planning or implementation "only if the reduction of hazardous fuels is included in the purpose and need statement of the environmental analysis document." [136] The Forest Service Handbook states that "[w]hen the primary purpose of fuel treatments

---

[135] This began in fiscal year 2001. Previously the budget was allocated according to what was called the "benefiting function" in which funds were allocated to several line items. According to the Congressional Research Service (2000) this new allocation process "would give the agency more flexibility in how it spends appropriations. However, it would reduce available information about how the agency spends money, and thus could reduce Congress's control over agency spending on specific activities." Available at http://www.ncseonline.org/nle/crsreports/forests/for-29.cfm Last accessed January, 2008.

[136] The 2007 Program Direction also states that 50% of WFHF funds are to be spent in the Wildland Urban Interface (WUI), as defined in the Healthy Forest Restoration Act (HFRA)The definition of WUI in the HFRA, however, is not clear cut. It depends on how it has been defined in a local Community Wildfire Protection Plan as well as the proximity to what is called an at risk community. HFRA Title I defines an at risk community as: "(A) that is comprised of - (i) an interface community as defined in the notice entitled ''Wildland Urban Interface Communities Within the Vicinity of Federal Lands That Are at High Risk From Wildfire'' issued by the Secretary of Agriculture and the Secretary of the Interior in accordance with title IV of the Department of the Interior and Related Agencies Appropriations Act, 2001 (114 Stat. 1009) (66 Fed. Reg. 753, January 4, 2001); or (ii) a group of homes and other structures with basic infrastructure and services (such as utilities and collectively maintained transportation routes) within or adjacent to Federal land; (B) in which conditions are conducive to a large-scale wildland fire disturbance event; and (C) for which a significant threat to human life or property exists as a result of a wildland fire disturbance event." The List of list of communities defined in the Federal Register of 2001 mentioned above was the result of a "data call" in which forests across the west were asked for a list of communities at risk with no specific criteria given. Also, community wildfire protection plans, as called for in the 10-year Comprehensive Strategy of the National Fire Plan, may also be used for determining the applicability of HFRA authority and such plans may designate what constitutes WUI and communities at risk.

is the accomplishment of [other] resource objectives, and not fuel reduction, finance the treatment of work with program funds determined by applying the Primary Purpose principle."[137]

The mixing and matching of funds from different program Fund Codes, particularly aligning fuels projects with timber sales to reduce the costs charged to each individual program is in fact encouraged as part of Forest Service leaderships's interpretation of "integration" and "accountability" required by the National Fire Plan. The 2007 Program Direction defines integration as "[c]oordinated planning and/or implementation that accomplishes multiple outputs, outcomes, goals, and/or objectives." In addition, line officers (forest supervisors and district rangers) are evaluated on the extent to which they "accomplish multiple outputs, outcomes, goals," what the Program Direction refers to as a unified target. This interpretation of integration and accountability is another reason the mixing and matching of program targets and funding is perceived as a little numbers game.[138]

The 2007 Program Direction describes a "set of integrated and structured principles to motivate and measure successful integration." These principles take the form of four types of target accomplishments that must be reported by each resource

---

[137] FSH 6509.11g.51.3 – Wildland Fire Management. The Primary Purpose principle (FSH 1909.13.33.43) simply states that the "primary need, rather than actual work performance, influences appropriation and functional responsibility for certain expenses." Need refers to objective as in the relationship between project objectives and project purpose and need in a proposed action.
[138] Essentially, integration through mixing and matching funding sources results in a lack of accountability. Forest Service program budgeting has been the source of ongoing criticism and scrutiny for decades because the agency has been unable to account for actual project costs and the actual expenditures from each program's BLI. The Congressional Research Service (2000d) noted the Forest Service's administration of the BD and KV funds "have been widely criticized both for alleged misuse of the funds and for the agency's poor accounting of their performance." See also GAO (1997b), *Forest Service: Unauthorized Use of the National Forest Fund GAO*/RCED-97-216 and GAO (1998a), *Forest Service: Better Procedures and Oversight Needed to Address Indirect Expenditures* GAO/RCED-98-258.

management program: Core; Integrated; Contributed; and In-Kind Accomplishments.[139]

These four types of accomplishment are built into the new accomplishment reporting

database called FACTS (Forest Service ACtivity Tracking System) within which the

activities and funding sources of all projects for all resource management programs

within the agency must be entered.[140]

A good example of the types of activities carried out by each resource

management program and how it is determined if a treatment meets the Primary Purpose

Principle is illustrated by what are called Activity Codes. Activity Codes are used for

reporting the four types of target accomplishments in FACTS described above.[141] There

are 52 Activity Codes for fuels management, divided between treatments of activity fuels

and natural fuels. Activity fuels are those materials that result from timber and vegetation

management program activities usually referred to as slash. Natural fuels are any live or

dead vegetation not directly resulting from timber or vegetation management activity.

Activities range from passive to intensive, such as "natural abatement," which is not

---

[139] The 2007 Program Direction describes these four types of accomplishments as follows:
1. *Core Accomplishment(s)* – Accomplishment achieved through direct expenditure of Forest Service funds. Core accomplishments are typically the performance measures in the same resource as the specific budget line item (BLI).
2. *Integrated Accomplishment(s)* – Results of integrated projects that achieve multiple goals and objectives. Integrated accomplishments are typically the performance measures not tied to the resource area of the BLI funding the work. In other words, integrated accomplishments are those that were achieved using funds from one or more BLI that are not associated with the resource program tied to that particular accomplishment measure.
3. *Contributed Accomplishment(s)* – Accomplishment achieved throught [sic] the application and expenditure of dollars contributed by partners and non-Forest Service cooperators. Contributed accomplishments are typically any performance measures tied specifically to collected partnership funds.
4. *In-kind (or Volunteer) Accomplishment(s)* – Accomplishments achieved through the application of non-monetary contributions (material, supplies, services, labor). (p. 14-22 & 23)

[140] FACTS reporting was phased in beginning in 2005 and required for all programs beginning in fiscal year 2007. Fuels management accomplishment entries in FACTS are automatically uploaded into the interagency database for tracking fuels management accomplishments called NFPORS established by the National Fire Plan.

[141] See FACTS Appendix B: Activity Codes. Available at
http://www.fs.fed.us/r1/kootenai/maps/gis/documents/facts_app_b.pdf Last accessed November, 2009.

really an activity but simply letting the material decompose naturally, to thinning

resulting in merchantable timber. Many wildlife habitat activities also overlap with fuels

and vegetation management activities, such as wildlife habitat prescribed burning and

wildlife habitat precommercial thinning. However, many more activity codes do not

overlap. The mixing and matching of different program Fund Codes entails mixing and

matching different types of program activities and objectives as defined (loosely) by the

primary purpose principle of each resource management program's budget. The more

closely the activity codes match up the easier it is to make the case that a primary purpose

principle of one program's budget overlaps with the objectives of another.

The most common sources of funding mixes for fuels reduction projects outside

of the WFHF fuels budget, according to managers, comes from the Forest Products

program responsible for timber sales (Fund Code NFTM)[142] and from non-appropriated

trust accounts that are funded by retaining a portion of the receipts from timber sales. The

two most important are the Brush Disposal (BD) and Knutson-Vandenberg (KV) trust

accounts.[143] Forest Products funds (NFTM), as the name implies, can only be used for

activities that result in timber sales (measured in board-feet for which each Forest's

timber program has a target specified in its NFTM budget line item direction). BD funds

(Fund Code: BDBD) are restricted to treating activity fuels resulting from timber

harvesting. KV funds (Fund Codes CWKV and CWK2) were historically restricted to

reforestation of the timber sale area or subsequent timber management activities that do

---

[142] This used to be called Timber Management, hence TM in the Fund Code.

[143] The Forest Service has 18 such permanently appropriated accounts independent of annual appropriations including the Timber Salvage Fund, the Payments to States fund, the Recreation Fee Demonstration Program and the national Forest Roads and Trails Fund.

not immediately result in timber sales called timber stand improvement (TSI).[144] The

allowed uses of KV trust monies was expanded in 2005, however, so that they may now

be used outside the sale area that generated the funds and for a variety of other activities

such as "watershed restoration, wildlife habitat improvement, control of insects, disease,

and noxious weeds, community protection activities, and the maintenance of forest roads

within the Forest Service region in which the timber sale occurred: Provided that such

activities may be performed through the use of contracts, forest product sales, and

cooperative agreements."[145] Fuels treated with KV funds, in other words, are not

supposed to be the result of timber harvesting activity (activity fuels, that may be paid for

with BD funds) but may be used for natural fuels resulting from wildlife habitat

improvement or control of insects or activity fuels produced through timber stand

improvement treatments.

Annually appropriated funds such as Hazardous fuels (WFHF) must be spent in

the fiscal year they are allocated such that, as one District AFMO put it "at the end of the

year you, well, use it or lose it" (KMM31). Unlike hazardous fuels and other annually

---

[144] Both reforestation and timber stand improvement, according to the GAO (2005a), are two of the many management activities that have been chronically underfunded and for which there is growing backlog of required work. Replanting is required within five years of harvesting while timber stand improvement has no statutory timetable and is thus often deferred. Following this report KV was amended in (FY 2006 appropriations, Public Law 109-54) creating the two funds within KV described above - CWKV (Cooperative work, Knutson-Vandenberg, sale area projects) and CWK2 (Cooperative work, Knutson-Vandenberg, regional projects). These chronically underfunded activities have been reorganized under new Fund Codes – Wildlife, Fisheries & Habitat Management (NFWF) and Vegetation & Watershed Management (NFVW) respectively. The activities carried out with these Fund Codes (which receive budget line item (BLI) appropriations every year) are now also eligible for funding from these reorganized KV accounts. As the names imply, CWCK funds are available to the forest generating the revenue while CWK2 may be used anywhere within the Forest Service Region that the timber revenues were collected. Prior to this amendment, KV funds were restricted to use on the Forest in which the revenues were generated and only for reforestation, timber stand improvement and other "enhancements" of resource values in the area. It is also interesting to note that reforestation and timber stand improvement activities used to have their own program codes but were combined, along with range, watershed improvement and noxious weed management into the current NFVW program yet only some of these activities may be paid for with KV funds.
[145] FSH 2409.19 Zero Code (2008).

appropriated funds, however, BD and KV funds rollover from year to year, thus making

them more predictable than WFHF or NFTM funds. BD and KV funds also do not have

targets attached to them. The funding available from BD and KV accounts in any given

year depends on the amount of timber sold on that particular forest or region.[146] The

generation of revenue from timber sales to add revenue to the BD and KV trust accounts,

together with the annual timber target for the Forest Products program introduces a large

incentive to align timber projects with fuels management projects.[147] As one district

AFMO described it:

> …there's a lot of money that comes with [timber sales], but also a lot of
> pressure for a district ranger or a forest supervisor to "get the cut out," you
> know…[I]t's a pretty heavily used factor on how things are
> determined…most likely isn't, the driving factor on why we do a project
> but it will, you know, everything else equal…let's treat this stand but not
> that stand, treat this area and do this type of treatment but not over there
> because there's nothing to pay for it. (KNH16)

For fuels managers to achieve annual targets within budget, they must figure out

how to align some fuels projects with timber production in order to use (and generate

revenue for) the BD and KV accounts so that WFHF funds can be used where timber

revenue is low or not an option. As one district AFMO described it: "…at FACTS

training they said you can't spend BD or KV on this or that…it's like, well, we have

to…You just have to get work done that's associated with a timber sale. You have to be

able to split between your [BD and KV] trust funds and to pick up any extra stuff out of

[WFHF] hazardous fuels" (KMM31). Not all fuels management acres are met through

---

[146] A portion of these trust account funds not used, however, must be returned to the treasury at the end of the fiscal year. Managers gave the figure of 30% of unallocated receipts must be passed on to the Regional Office. There is thus a different kind of incentive to "use-it-or-lose-it" at play with trust account funds.
[147] See CRS (1994, 2000cd and 2004). The GAO (2007) also notes that congressional committee reports have consistently emphasized putting priority on fuel reduction projects in the WUI, which are more expensive, as well as projects using mechanical treatments, which, unlike prescribed burning, may result in merchantable timber or may be contracted out providing jobs to the local community.

aligning with timber management objectives and funding offsets or with funding sources

from outside partners, such as the Rocky Mountain Elk Foundation.

Fuel managers also report the need to balance the cost of individual projects with

the overall fuels program budget. In any given year, more expensive projects must be

balanced with what they call "easy acres." These are treatments with minimal costs per

acre[148] accomplished by identifying and developing projects using WFHF funds that

overlaps with the targets and objectives of other programs such as wildlife but are less

expensive to carry out. For example, prescribed fire may be used for what is referred to

as maintenance underburning but it also benefits wildlife browsing habitat.[149] Such

treatments are generally cheaper to implement because they, as one District AFMO

described it "usually mean no [mechanical] pre-treatment and require minimal [fire] line

construction by using landscape features for [line] holding" (BLM3). As another District

AFMO described it:

> [Projects X and Y are] not part of the timber target, strictly a hazardous
> fuels target…just doing maintenance underburning… the urban interface
> has got like $800, $1,000, $1,500 an acre to treat…You need a balance of
> easy acres to maintain your program cost…The Region still says [our
> Forest] needs to be down to [an average] $200 an acre…Hence, we're
> going after some easy acres on [Projects X and Y]… It's not just lower
> cost per acre. I mean, wildlife's going to have some benefit with the
> habitat improvement. (BJP29).

Some acres are easier than others not just because they are composed of activities

that are cheaper to implement per acre in certain areas. They are also easier because of

---

[148] Also reported by the USDA Office of the Inspector General (2006. Hartsough et al (2008) note that estimates of the actual cost of treatments vary widely and are notoriously subjective with little consistency in their calculation. And due to the structure of the reporting databases, such as FACTS, along with the loose procedural controls governing how these databases are populated, the resulting data provides only a very rough estimate of actual expenditures.
[149] Natural Fuels Underburn (FACTS Activity Code 1113) which overlaps with Wildlife Habitat Prescribed Fire (FACTS Activity Code 6101). Maintenance underburning used to be called ecosystem underburning.

the level of planning required and thus the cost of analysis. Target accomplishment is measured in acres treated, however, not acres planned for treatment.[150] Though program funds spent on planning and analysis are tracked in the FACTS database, project planning and analysis does not count towards target accomplishment. This leads to a distinction in the effort to balance program costs to meet acreage targets within budget between the costs of planning and analysis, on the one hand, and cost of implementation on the other. As one District AFMO described it "…for us, out on the field, we're trying to accomplish two things; one is implementation …the next is planning for the next set of projects." (BJP29). Fuels managers refer to the current set of projects that have gone through planning and analysis and are ready to be but have not yet been implemented as "shelf stock."[151] This shelf stock allows managers to estimate their targets when formulating program budget requests submitted to the Regional Office each fall. As the AFMO put it "you try to get your shelf stocked up to par…try to kind of somewhat stay a year ahead of yourself in target acres…" (KMM31). However, he continues, "The more you spend on planning, the less you have for implementation… it's just a juggle…it's very hard to out-year plan on other projects…" (KMM31).

Out year planning is difficult for many reasons. Budgets are uncertain because budgets and targets proposed by each forest in the fall are rarely the same as the actual

---

[150] If a treatment is to be carried out through a contract, however, the acres can be reported in FACTS as accomplished once the contract is awarded, whether or not the work has actually taken place.

[151] The term shelf stock is used loosely to refer to two kinds of projects. There are many treatment units within a project and that the actual site specific prescription for a treatment unit, such as a burn plan or a silvicultural prescription, is written after the NEPA decision document is signed. It refers to both the larger mix of signed proposed actions from which numerous unit prescriptions are written as well as to a mix of site specific unit prescriptions. This is especially important for prescribed burning where effort is made to write unit specific prescriptions that can be implemented under a variety of seasonal conditions known as prescription windows (e.g. early or late season, north or south aspect, high or low elevation etc. effected by weather, phonological and smoke dispersal conditions).

budget and target received from the Regional Office in spring, which is the beginning of prescribed burning season. The annual Program Direction that accompanies the annual budget also contains various directions from agency leadership responding to congressional committee reports regarding the types of program activities or locations that should be emphasized in expending funds to meet targets. In addition, the reporting of accomplishments in FACTS, for example, "is not dependent upon the funding source(s) used to complete NEPA planning."[152] That is, there are no primary purpose restrictions on how program funds are spent on planning.

Managers report that what makes out-year planning truly difficult is that the costs of planning and analysis is itself fraught with uncertainty. This is because the mix of different program activities and objectives included in a project (e.g. commercial thinning that meets both fuels and timber program targets or maintenance underburning that meets both fuels and wildlife program target) incur different types and degrees of ecological impacts. These different activities and their impacts in turn require different levels of planning and analysis to comply with various laws, regulations and agency policies as well as different levels of public controversy. One AFMO noted for example that: "as it is we're fighting just to keep enough shelf-stock on the books, at least from a fuels planning standpoint, just to meet target, based on what they keep telling us we need to get every year. Well, the problem is that if projects get locked up in the courts...we're screwed" (BJP29).

Fuels mangers describe the effort of balancing program costs between project implementation and planning as an effort to maintain a set of projects with different

---

[152] USDA Forest Service FY 2007 Program Direction, p. 14-10.

levels of planning and analysis requirements and costs. This is expressed most often in terms of the different levels National Environmental Policy Act (NEPA) and the associated increasing expense of complying with its requirements. Environmental Impact Statements (EIS), for example, are the most extensive and expensive; Environmental Assessment (EA) less extensive and expensive and; Categorical Exclusions (CE) the least extensive and cheapest to comply with. As the District AFMO quoted above continues "Some of them are EISs, some of them EAs, some of them are CEs to try and maintain that balance of specialist's time, trying to effectively get targets done…have a rotation of projects in the mix…" (BJP29). It is the effort to balance program costs between implementation and planning that links the set of factors characterized by targets and budgets to the other set of interrelated factors most frequently discussed by managers: the compliance with law, regulation and policy, the threat of litigation and the cost of data collection and analysis.

4.4.2 Key Factor Two: Compliance with Law, Regulation and Agency Policy, the Threat of Litigation and the Cost of Data Collection and Analysis

The Forest Service has perhaps the most diverse and sweeping range of goals specified in an uncoordinated and fragmented welter of organic statutory provisions, site-specific legislation, environmental protection mandates, appropriation riders and judicial decisions (Keiter, 2006; Biber, 2009). Of these many fragmented statutes, the National Environmental Policy Act (NEPA 1970), the Endangered Species Act (ESA 1973) and the National Forest Management Act (NFMA 1976), along with the regulatory guidelines and agency directions implementing them, receive the most attention in court and hence are given the most attention by mangers during NFMA analysis. These three statutes are

intertwined by the Forest Services rules and procedures for complying with them. For example, the ESA's purpose of conserving endangered and threatened species and their habitats has been inscribed into the NFMA's diversity requirements and hence into forest plans. As described previously, it is through complying with NEPA that the fragmented welter of legal, regulatory and agency-specific direction is addressed. For example, the Forest Service incorporates biological evaluation procedures as part of its NEPA process to comply with the requirements for agency consultation with the Fish and Wildlife Service regarding the impacts of agency projects on threatened or endangered species and their habitat under the ESA's section 7.

In 2003, the Healthy Forest Restoration Act (HFRA, 2003), was added to patchwork of statutes along with the various other administrative enactments of the Healthy Forest Initiative (HFI), such as changes to the ESA's section 7 consultation requirements. The changes brought about by HFI, initiated under the rubric of reducing "analysis paralysis," had their principle effect on NEPA compliance. The determination of NEPA compliance is thus a principle focus when developing a proposed action during NFMA analysis. Thus a more detailed description of NEPA requirements, particularly those specific to fuels management brought about by HFI, is required to understanding how managers attempt to efficiently construct proposed actions during NFMA analysis.

NEPA establishes three different levels of analysis and documentation of potential environmental impacts. These three levels are: Categorical Exclusions (CE), Environmental Assessments (EA) and Environmental Impact Statements (EIS). Which level of analysis and documentation must be employed depends on what is referred to as

the "nature and complexity" of the proposed action and its potential effects. These effects

are measured in three ways: direct, indirect and cumulative effects. CEs require the least

analysis and are typically used for small projects and typically take one to two years to

prepare. There are 17 categories of ground-disturbing actions that may be categorically

excluded. CE #10 may be employed for fuels reduction and # 11 for post-fire

rehabilitation and fuels management. These two CE categories are most relevant to fuels

managers. EAs are conducted when a proposed agency action does not fit one of the

categories of actions that may be categorically excluded but the level of potential effects

are determined not to be significant and thus do not warrant a full EIS. An EA may thus

be sufficient in itself, leading to a finding of no significant impact (FONSI) or it may

indicate that potential impacts of a proposed action may be more significant than initially

determined and thus require further analysis in an EIS. EISs require the most intensive

analysis and documentation and can take several years to complete.

Arguably, the most important source of compliance concerns that factor into the

determination of the level of analysis and documentation required of a proposed action

are proximity and level of potential effects upon what are called "extraordinary

circumstances." The Forest Service Handbook lists several conditions that should be

considered in determining if extraordinary circumstances exit. If extraordinary

circumstances are determined to exist the proposed action may not be categorically

excluded and warrant analysis and documentation in an EA or EIS. Typical examples of

extraordinary circumstances are threatened or endangered species or their habitat,

wetlands and municipal watersheds, and Native American cultural sites.[153]

---

[153] FSH 1909.15.30.4 (2004). The actual list of conditions is:

Interagency and public participation in the determination of the nature and complexity of a proposed action and its potential effects that determine the level NEPA analysis and documentation (CE, EA or EIS) are accomplished through a process called "scoping." The scoping requirements under NEPA begin when a proposed action is released. [154] Though the Council of Environmental Quality (CEQ) does not require scoping of projects that are categorically excluded, in the Forest Service CEs also undergo scoping.[155] It is through scoping that the issues and concerns raised by the public as well as those of other agencies' [156] over the level and extent of potential effects of a proposed action are elicited. For EAs and EISs, the concerns and issues raised during scoping lead to the development of alternative sets of activities to meet the goals and objectives of the project. CEs do not require the development of alternatives, but issues and concerns raised during scoping are supposed to be taken into account in the design of the final project.

---

1. Federally listed threatened or endangered species or designated critical habitat, species proposed for Federal listing or proposed critical habitat, or Forest Service sensitive species;
2. Flood plains, wetlands, or municipal watersheds;
3. Congressionally designated areas, such as wilderness, wilderness study areas, or national recreation areas;
4. Inventoried roadless areas or potential wilderness areas;
5. Research natural areas;
6. American Indians and Alaska Native religious or cultural sites, and
7. Archaeological sites, or historic properties or areas.

[154] According to the Council of Environmental Quality (CEQ) regulations, a proposal is said to exist when an agency is "at that stage in the development of an action when an agency subject to the Act has a goal and is actively preparing to make a decision on one or more alternative means of accomplishing that goal and the effects can be meaningfully evaluated." (40 CFR §1508.23, 1978).
[155] FSH 1909.15.30.5 (2004) noting that "Scoping is required for all FS proposed actions, including those that would appear to be categorically excluded (ch.10, sec. 11). Scoping is important to discover information that could point to the need for an EA or EIS versus a CE as well as to inform the public. Scoping complexity should be commensurate with project complexity."
[156] Such as the Fish and Wildlife Service (FWS) consultation requirements under Section 7 of the Endangered Species Act.

The regulations regarding scoping (40 CFR § 1501.7) and the interpretation these regulations in the Forest Service Handbook provide a great deal of discretion for how scoping is conducted. NEPA requires an interdisciplinary approach to scoping but it is left up to the responsible official who will eventually sign the finale decision document to select the leader and members of the interdisciplinary (ID) team that will conduct scoping and analysis and documentation that follow scoping.[157] The responsible official also selects the set of concerns and issues raised during scoping that will receive consideration and be included in alternatives developed to achieve the goals and objectives of the project.[158] In addition, the responsible official, in consultation with the ID team, to determine how to "identify and select data sources, analysis methods, and set standards of accuracy" and to "determine the depth or detail of the analysis."[159]

In addition to the standard regulations issued by the CEQ for NEPA compliance the legislative and administrative enactments of the Healthy Forest Initiative establish additional criteria that must be met. The new CE # 10 for fuels management may only be used for projects limited to 4,500 acres of prescribed fire and up to 1,000 acres of mechanical treatment (such as commercial or pre-commercial thinning) and may be employed in areas defined as: 1) in the wildland urban interface (WUI) or; 2) Condition Classes 2 or 3 in Fire Regime I, II, or III, outside the WUI or; 3) projects identified in community wildfire protection plans (CWPP). The HFRA streamlines NEPA compliance

---

[157] The team "must have the expertise to identify and to evaluate the potential direct, indirect, and cumulative social, economic, physical, and biological effects of the proposed action and its alternatives" (FSH 1909.15.12.1(2004)).
[158] FSH 1909.15.12.32 & 33 (2004).
[159] FSH 1909.15.12.31 (2004). This direction also advises the responsible official that "When formulating analysis and evaluation criteria or standards, be sure to consider Forest Service objectives identified in legislation, policies, and plans, as well as issues raised by the public in the scoping process. Refine these criteria and standards, as necessary, during the course of the analysis."

by requiring the analysis and documentation of fewer alternatives. It has similar criteria as the CE minus the acreage limitation.[160]

These new statutory and administrative procedures brought about by the Healthy Forest Initiative were designed to streamline and expedite fuels management project planning. However they also introduce significant uncertainty over what compliance actually entails. The *Healthy Forest Initiative and Healthy Forest Restoration Act: Interim Field Guide* (USDA and USDOI, 2004), for example, notes that "[e]xcept for the [HFRA's] authorization to analyze fewer NEPA alternatives (Sections 104(c) and (d)), most of the requirements of Section 104 are consistent with normal NEPA practices."[161] While HFRA may be "consistent with normal NEPA practice," the changes made to NEPA implementation under other elements of the HFI have altered what "normal NEPA practice" actually consists of. The new categorical exclusion for hazardous fuels reduction is a case in point.[162]

---

[160] Reduced NEPA analysis requirements under HFRA may also be employed for projects in areas with two other sets of conditions 4) windthrow, storm damage that threaten fire spread or insect and disease spread into adjacent ecosystems or threaten forest or rangeland resources (undefined but usually understood as timber stands and grazing land) as well as 5) Federal land not covered in paragraph 1 through 4 that contain threatened or endangered species habitat if the natural fire regime is important or wildfire is identified as a threat to these species. The HFRA also included ideas not in the HFI or the initial McInnis bill (H.R. 1904) adopted by the House of Representatives in May, 2003 but included in the final bill after Senate debate. These include requirements for maintaining and restoring old-growth forest stands, requiring that HFRA authorized projects maximize retention of larger trees in areas other than old-growth forest stands and requiring that at least 50% of the dollars allocated for HFRA projects be used for at-risk community protection.

[161] USDA and USDOI (2004), p. 9.

[162] The CE is formally described as "revised procedures for implementing NEPA and CEQ regulations". See 68 Fed. Reg. 33814 (June 5, 2003). Also as part of HFI new directives were issued by the Council on Environmental Quality (CEQ) in 2002 requiring the U.S. Fish and Wildlife Service (FWS) and the National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries) to consider the potential long term benefits of fuels reduction when assessing potential effects on listed species from projects in the preparation of Environmental Assessments (EA) carried out under the National Fire Plan for "fuel reduction and fire-adapted ecosystem restoration" projects. New procedures for consultation with these agencies under section 7 of the Endangered Species Act also accompanied these new rules for fuels management activity. This took the form of special training courses for Forest Service personnel and the establishment plans and criteria for species and habitat protection approved by FWS or NOAA that allows

The direction for the use of CEs in the old Forest Service Handbook from 1992 called for an EA when one or more resource conditions are present that might indicate the existence of extraordinary circumstance. In other words, the mere presence of these conditions precluded the use of a CE, making the decision between using CE or EA relatively straightforward. The direction in the Forest Service Handbook released in 2004, after the changes brought by the Healthy Forest Initiative were enacted, states that these are "resource conditions that should be considered" but that "the mere presence of one or more of these resource conditions does not preclude use of the categorical exclusions. It is the degree of the potential effect of a proposed action on these resource conditions that determines whether extraordinary circumstances exist."[163] This chapter was updated again in 2007 changing this last sentence to read "It is (1) the existence of a cause-effect relationship between a proposed action and the potential effect on these resource conditions and (2) if such a relationship exists, the degree of the potential effect of a proposed action on these resource conditions that determines whether extraordinary circumstances exist."[164] These changes, moreover, pertain to all CEs not just the new one for fuels management.

The Healthy Forest Initiative was ostensibly intended to streamline NEPA compliance. These changes to "normal NEPA practice," however, in conjunction with the wide discretion granted the responsible official and the ID team to determine the type and

these certified personnel to render biological opinions themselves, rather than FWS or NOAA personnel. Only one of the Forest Service personnel interviewed for this research was involved with these new procedures and reported recommending against them to his district ranger because they are predicated on establishing a plan with set procedures for protecting habitat and developing such a plan constituted more work than project by project consultations under the previous procedures.

[163] FSH 1909.15.30.3 (2) (2004).

[164] FSH 1909.15.30.3 (2) (2007). Recall, as noted previously, that the federal agencies were enjoined from using the fuels CE in November, 2008 and the Forest Service Handbook was again updated in April, 2009 with the description of CE # 10 crossed out pending new rulemaking.

intensity of data collection and analysis necessary, paradoxically introduced a great deal

of uncertainty over what is actually required for compliance.[165] Managers still must

provide evidence of reasoned decisionmaking and this now could be construed as

ensuring the absence of cause and effect relationships between proposed actions and their

potential effects. Because this uncertainty and because these changes were so

controversial, the effective determinant of planning and analysis requirements essentially

came down to the courts and the threat of litigation. As one Assistant Forest Planner from

another Forest described it:

> …it really is related to litigation what level of analysis we need to provide
> that the courts feel is adequate and that bar's been changing….where [in
> the past] the courts gave a lot of deference to professional judgments of
> the specialists in the agency, now they're wanting to see more analysis
> supported by research…So there is quite a bit of time expended back and
> forth when we're working on more of the analysis of what's going to be
> adequate if someone chooses to litigate, which they are frequently doing
> on our fuels projects anymore…you know, our appellants are always
> saying, hey, you need best science, best science, where is it? (KJG28).

Several recent cases in the Ninth Circuit Court of Appeals involved projects in

Region One, all of which employed "timber sales as the tool" to accomplish fuels

reduction and forest health objectives.[166] Each of these projects explicitly stated that such

sales provided a means of funding the project. The *Lands Council V. Powel* decision of

---

[165] Also adding to this uncertainty was that fact that the new fuels CE was preceded by changes to the
Forest Service Decisionmaking Appeals Reform Act (ARA) of 1992 that required the agency to establish a
notice and comment process for projects implementing forest plans established under NFMA (1976). In
2002 the Forest Service enacted regulations limiting public comment and administrative appeal on
categorically excluded projects (36 CFR §215.4(a) and 36 CFR §215.12(f)). These regulations were
successfully challenged in Federal District Court in 2005 (Earth Island Institute v. Pengelly, 376 F.Supp. 2d
994 (E.D. Cal. 2005) and upheld in the Ninth Circuit Court of Appeals in 2007 (Earth Island Institute v.
Ruthenbeck, 459 F.3d 954 (9th Cir.2006) finding that "The exemption of categorically excluded Forest
Service actions from notice, comment, and administrative appeal is manifestly contrary to both the
language and the purpose of the ARA. Therefore, 36 C.F.R. §§ 215.12(f) and 36 C.F.R. 215.4(a) are
invalid.") This opened up categorical exclusions to a new level of scrutiny.
[166] Of all federal agencies, the Forest Service has had the most cases heard by the Ninth Circuit, losing nine
of the thirteen cases between 1995 and 2004 (Smith, 2006).

2005,[167] over a project on the Idaho Panhandle National Forest (IPNF), known as the

Iron Honey case (after the name of the project), is the most commonly referenced case by

managers.[168] Soon after *Iron Honey*, the Forest Service lost another case in the Ninth

Circuit on similar grounds — *Ecology Center V. Austin* (2005) on the Lolo National

Forest — and the court referenced the *Iron Honey* decision in its ruling. In both cases, the

agency's methodology and data were again found inadequate for similar reasons. One

reason revolved around the lack of site specific data used in analysis. Another reason

arose from the age of site specific data (15 years) that was used and the "spot sampling"

method employed to ensure its representativeness of current conditions. In the *Iron*

Honey ruling the court stated that "we are asked to trust the Forest Service's internal

conclusion" but found that "the Forest Service's basic scientific methodology, to be

reliable, required that the hypothesis and prediction…be verified with…on the ground

observation...Was the Forest Service 'dead on" or 'dead wrong?'"[169] In *Ecology Center*

---

[167] Filed August 13, 2004 and amended January 24, 2005

[168] Note that none of the court cases discussed here involved any of the three National Forests in this study. However the litigation these three Forest were involved in centered on similar issues.

[169] *Lands Council v. Powell* (379 F.3d 738, amended at 395 F.3d 1019)*,* p. 1042. The issue of site specific data had to do with the soils analysis conducted for the project. The Court found this analysis inadequate (and therefore a violation of NFMA as well as NEPA) because it relied on inference from plots data at other locations of the forest, conducted for a different project, together with aerial photographs to identify geological similarity between the plot locations and the actual treatment sites. This comparison was used to develop a model of soil conditions of the treatment site but the validity of the model's predictions were not verifying with data collected from the proposed treatment sites. The issue of old or "stale" data derives from the NFMA requirement that the Forest Service provide for the habitat necessary to maintain the viability of vertebrate species. NFMA allows the use of Management Indicator Species (MIS) in Forest Plans as a proxy for monitoring the effect of management activities on species viability more generally. A common method used by the agency for complying with this requirement when analyzing the effects of a project is to assume indicator species viability is maintained if their habitat is maintained. That is, analysis of an indicator species habitat is an indirect measure of its viability, a practice called "proxy on proxy." For the *Iron Honey* analysis the Forest relied on data from its Timber Stand Management Reporting System (TSMRS) database that was 15 years old, contained inaccurate canopy closure estimates as well as insufficient data on snags (an important habitat component but an attribute not typically assessed in stand exams conducted to populate TSMRS). The Forest employed spot surveys to infer projections, count snags in order to conduct its proxy on proxy analysis of current indicator species habitat. The court found the TSMRS data unreliable making the proxy on proxy method unable to satisfy NFMA requirements and, because the spot surveys assessed different variables, they do not make up for the inaccurate and insufficient data in TSMRS and thus do not "rehabilitate" the proxy on proxy method. Thus the court found

V. Austin, t he court found that "[a]n agency's choice of methodology is entitled to deference…However there are circumstances under which an agency's choice of methodology, and any decision predicated on that methodology, are arbitrary and capricious."[170]

Agency managers, unsurprisingly, bristle at what they perceive as the court overstepping the bounds of deference to agency expertise. According to one Assistant Forest Planner "NEPA says when you have information with certain scientific accuracy and your information is ripe for a decision, it says in there you don't have to resolve things, you have to address things…They're getting away from NEPA I think, the law, and they're getting into scientific protocol…" (BKB30) At the same time, however, despite the insistence on deference to agency expertise, it is acknowledged that lack of data is a significant problem that affects manager's ability to perform adequate analysis. "Data is very expensive to collect and we just don't have the budgets to go out and collect it on the ground anymore. It's just really frustrating for us" (BSH9). The threat of litigation arises largely from the constant pressure to include timber harvesting activities

that the IPNF did not comply with its own Forest Plan, and therefore with the National Forest Management Act (NFMA). The issue of inadequate data and hence the assumptions and limitations of model outputs was also raised over the IPNFs analysis of impacts to fish and water quality.

[170] *Ecology Center v. Austin,* 430 F.3d 1057 (9th Cir. 2005), p. 16039. The court further noted that "…allowing the Forest Service to rely on expert opinion without hard data either vitiates a plaintiff's ability to challenge an agency action or results in the courts second guessing an agency's scientific conclusions. As both of these results are unacceptable, we conclude that NEPA requires that the public receive the underlying environmental data from which a Forest Service expert derived her opinion" (p. 16046). This legal drama over deference to agency methods and data continued with *Lands Council v. McNair* (494 F.3d 771 (9th Cir. 2007)) when the Ninth Circuit overturned a district court's denial of injunction on another forest restoration and fire risk reduction project on the Idaho Panhandle National Forest. This case which relied on the reasoning employed in the *Iron Honey* and *Ecology Center V. Austin* decisions. However, the Ninth Circuit then convened an en banc panel of eleven judges to revisit the case (*Lands Council v. McNair,* 537 F.3d 981 (9th Cir. 2008)) and in July, 2008 overturned its previous ruling and affirmed the decision of the District Court. In the process the Court explicitly overruled its previous decisions regarding deference to agency methods and data made in *Iron Honey* and *Ecology Center*. See an overview at http://www.martenlaw.com/news/?20080723-deference-to-agency-action. Last accessed January, 2009.

to offset costs and meet multiple program targets. However, including timber sales increases the threat of litigation and potentially drives up the costs of analysis. These situations force difficult decisions over how much data collection and analysis is necessary to supplementing specialist's professional judgment in order to mitigate this threat. A Planner from another forest noted "…you may not have the time, money, or people to get that information, so you may focus on a different area or may drop an area because you have no data on it. You're not able to collect any. So that could change your focus of the project" (KJG28).

Attempts to reduce the uncertainty over compliance requirements brought about by the Healthy Forest Initiative appear to have had little effect. Six months after the *Iron Honey* decision the Council on Environmental Quality (CEQ, 205) issued a guidance memorandum for cumulative effects analysis that essentially sanctioned the methods and data collection used by the IPNF in the *Iron Honey* project.[171] The Ninth Circuit, however, ruled similar practices inadequate in two additional cases since the release of the CEQ memo.[172] Thus despite the support of the CEQ and agency leadership for deference to agency expertise in the use of streamlined analysis methods and data collection, there remains great uncertainty among local managers as to what constitutes adequate data and analysis. As another Assistant Forest Planner noted:

---

[171] CEQ (2005) *Guidance on the Consideration of Past Actions in Cumulative Effects Analysis*, issued by James Connaughton, Chairman of the CEQ, appointed by President Bush in 2001. Available at http://www.nepa.gov/nepa/regs/Guidance_on_CE.pdf Last accessed January, 2009. These guidelines leave it to the discretion of the responsible official to determine whether to analyze and describe past actions individually or in the aggregate as part of the environmental baseline.

[172] See Grothaus (2007). The court held that for a cumulative impact analysis in an EIS to be valid it must describe the effects of past actions that have a cumulative impact and that simply listing past actions without describing their effects is insufficient.

…the more complex we show the world is, the harder it is to explain that we understand well enough to reach a reasoned decision. This isn't rocket science. This is more complex than rocket science because its biological systems… [litigants have] gotten really good at, especially in our Ninth Circuit, at questioning everything…It puts us in a position of explaining complexity in an understandable way…but then your data becomes an issue, and they've gone 'hey your data wasn't good enough'…The *Lands Council* decision, the big one off the Panhandle, the *Iron Honey* case…It's not necessarily that the data wasn't good enough and you need more. I mean, that's the question you always have to ask…do you think you got to run out and get more data or do we explain our use of it better and maybe the court will think that's enough (BPZ25).

4.4.3 Key Factors: Summary

When managers describe the planning process and what most affects the development of a proposed action, their descriptions revolve around two sets of factors: 1) targets and funding and 2) compliance with laws, regulations and agency direction mediated by the threat of litigation and the cost of data collection and analysis. The elements that compose these two sets of factors are inextricably bound and fold into each other in complex ways. Fuels management program targets determine program funding, but meeting program targets requires balancing program costs by combining fuels reduction activities with other resource management program activities, to either off-set costs (e.g. with timber production or use of trust accounts – BD and KV – financed with timber production) or by pursuing easy acres (aligned with wildlife program targets and potentially private funds from the Rocky Mountain Elk Foundation).

The overall costs to the fire management program must be balanced between implementing projects, which help meet targets and ensure funding, and the costs of planning to keep the shelf stocked with projects to implement in coming years. Determining the costs of planning, however, are anything but straightforward.

Determining planning costs is characterized by uncertainty and equivocality over these compliance requirements. There are two basic and interrelated sources of this uncertainty: one is that these requirements are themselves ill defined and subject to litigation in the courts. The second source of uncertainty derives from the fact that compliance requirements depend largely on nature and complexity of a proposed action and its potential impacts since it is the nature and complexity of a project and its potential impacts that determines the necessary level of data collection and analysis requirements. However, the nature and complexity of a project and its potential impacts depends on the combination of different program activities and objectives included in a proposed action and these are what are being negotiated. They are not agreed upon and finalized until the proposed action is complete.

In a circular way, this uncertainty and equivocality over compliance requirements and the difficulty of determining planning costs is compounded by the high degree of discretion granted managers to determine the necessary level of data collection and analysis. On the one hand, this discretion is needed in order to piece together projects that balance program costs and accomplish targets within limited budgets. On the other hand, however, high profile court cases have constrained the exercise of this discretion regarding the sufficiency of data collection and analysis and thereby increasing the pressure for greater allocation of time and money to this endeavor. Estimates of these increased analysis costs must be factored into the overall program costs which in turn can influence the type, extent and location of treatments included in a project proposal and how many acres are accomplished.

These two sets of interrelated factors are the principle elements that shape the development of proposed actions. These factors are of key importance because they must be addressed and are at the forefront of manger's discussions when developing a proposed action. They are also are of key importance because the planning and decisionmaking process within which proposed actions are developed is in large part structured around addressing them. Put another way, these two sets of interrelated factors — targets and budgets, and compliance, the threat of litigation and the cost of analysis — form part of the structure within which project planning and decisionmaking takes place in the Forest Service. This is the subject of the next section.

4.5   Organizational Structure of Project Planning

Recall that the NEPA triangle depicts NFMA analysis beginning with the forest plan as it is supposed to be the foundation of forest management. This is not quite the case however, particularly for fuels management which, as discussed in chapter three, was largely ignored in the first round of forest planning (and why the *Federal Fire Policy* of 1995 and 2001 as well as its various Implementation Strategies (USDA and USDOI, 1998, 2003) and critical large fire cost reviews have called for the specification of fire and fuels direction in forest plan revisions).[173] No participant interviewed for this research described the forest plan as the starting point of project planning.

---

[173] The direction for fuels management in the Bitterroot National Forest, for example, consists solely of a "resource standard" which states that the "fuels treatment backlog will be eliminated by the end of the first decade. Priority for treatment will be given to high-risk stands with fuels exceeding 70 tons per acre." Final Environmental Impact Statement, Bitterroot National Forest Plan (1987), pg II-28. This direction initially referred to the backlog of activity fuels resulting from timber management since funding for fuels reduction came solely from the Brush Disposal (BD) trust fund account until the mid 1990s. It is now interpreted to refer to activity fuels as well with the advent of a separate fuels management account (WFHF).

While forest plans are often referred to as providing direction, this direction is understood more as "sideboards" (BSH9) within which opportunities for management activities are identified and to which project proposals must be made to conform. The USDA Office of the General Counsel describes forest plans as "zoning ordinances under which future decisions are made… Projects and activities are proposed, analyzed and carried out within the framework of the LRMP."[174] Forest plans have many general goals and allow for many kinds of activities to meet these goals, but these often conflict. One forest planner described the situation this way:

> You know, our plan came out in the 1980s so its 20 years old. And some of the philosophy and thinking [has] evolved and changed and maybe some of our standards don't quite mesh with the way we see the world today in terms of, well, one example that we're running into is that we have some [forest] types here that are more…open-grown fire type regimes. On the other hand, you have existing conditions where you have an undergrowth in there that is providing some component for wildlife security, etc…so there's an inherent conflict there in terms of, okay, what in this particular area, and it might not be the same across the forest, but area by area, which takes precedence? There's a tradeoff and there's winners and losers. Everything doesn't fit nicely together…in developing the proposed action you look at those resource tradeoffs (HDH17).

These resource tradeoffs are more than tradeoffs between alternative potential impacts upon the biophysical characteristics of the resources themselves (e.g. the tradeoff between the wildlife security provided by undergrowth and the fire hazard this undergrowth represents). These tradeoffs also include the potential managerial impacts to the different resource management programs - principally their ability to accomplish their program specific targets, thus ensuring future funding. The fact that there are winners and losers resulting from these tradeoffs is taken very seriously. As one forest planner put it "the fundamental attitude is 'what are you going to do for my program' I mean, there's

---

[174] *Overview of Forest Planning and Project Level Decisionmaking*, USDA (2002b), p. 3. Available at: http://www.fs.fed.us/emc/nfma/includes/overview.pdf. Last Accessed January, 2009.

some folks that really want to push the envelope" (BKB30). There is no established

procedure for distinguishing between impacts to the biophysical and administrative

dimensions of program objectives let alone for adjudicating tradeoffs between program

objectives. According to one forest AFMO noted:

> [W]e have not done a good job prioritizing objectives. Each member of
> the ID team fights for 100% of their [program] objectives…A lot comes
> down to the Line Officer in the end. Successful [projects] have a strong
> Line Officer to balance or decide [between] competing objectives. Then
> we start arguing over what we are analyzing, say, [the wildlife biologists
> using] worst case weather for thermal cover while fire [staff] use average
> fire year…(KDR 6).

In order to understand the process of developing a proposed action in the Forest

Service it is necessary to understand the basic organizational structure within which

NFMA analysis takes place and how the key factors of targets and budgets and the cost of

analysis necessary for statutory, regulatory and policy compliance and mitigating the

threat of litigation are inscribed within this structure. Kaufman (1960 and 2006) describes

the organizational structure of the Forest Service as a decentralized hierarchy. Each

national forest is organized somewhat differently. Each forest is divided into districts but

the number of districts and the number of specialists from each resource management

programs is different on each national forest. National forests are headed by a Forest

Supervisor who exercises authority over the whole forest while district rangers have

authority over their district but are under the forest supervisor. Forest supervisors and

district rangers (called line officers) each have a staff under them. The principle

personnel involved in project planning are planners and the specialists from the various

resource management programs, such as fuels management, timber management,

vegetation management or wildlife and watershed management, etc. These specialists and

planners form the interdisciplinary teams, called ID teams, required for project planning

and analysis by the National Forest Management Act (NFMA, 1976) and National

Environmental Policy Act (NEPA, 1970).[175] These ID teams are supervised by the

district ranger on whose district a proposed action is being developed.

Each National Forest has a Forest Leadership Team that meets several times a

year in the Supervisors Office.[176] Each forest staffs the Forest Leadership Team how they

want, but every FLT includes the line officers (the forest supervisor, the deputy forest

supervisor and district rangers) and various other staff, such as the forest planner, at the

discretion of the forest supervisor. The Forest Leadership Team serves many functions

---

[175] On the three Forests studied in this research, one had seven districts (the Kootenai) while one had four (the Bitterroot) and the other had three (the Helena). Fire and fuels management is unique among Forest Service resource programs. On the three forests studied for this research in having what may be called a full compliment of management and specialists on every district as a result of the "big fire hire" following the 2000 fires. Every Forest investigated for this research has a Forest Fire Management Officer (Forest FMO), who handles suppression preparedness and operations and is supervised by the Forest Supervisor, and an Assistant Forest Fire Management Officer (Forest AFMO) responsible for fuels management supervised by the Forest FMO. District level Fire management is organized similarly with an FMO for operations and an AFMO for fuels. Each district has several full time and many seasonal specialists and technicians. Two of the fourteen Districts in this study had one individual filling the role of both FMO and AFMO due to staff turnover. At the time of this research two of the Forests were considering consolidation of several positions as part of "rethinking the wisdom of the massive hiring of 2001 with current budget realities" (BRF14). However, as with other resource program specialists, the district fire management staff is supervised by the district ranger not the forest FMO or AFMO even though they are the heads of the forest fire management program. Thus, when questions arise regarding interpreting direction and project planning and analysis, the district Ranger has the final say not the Forest FMO. Each Forest is organized somewhat differently regarding other resource program area specialists due to funding and size. Not every district has a full complement of resource specialists and thus not every district can field a full ID team for project planning. Many specialists are shared among the districts, such as the ecologist or fire ecologist, botanist or heritage resource specialist while other programs, such as Vegetation Management, may have multiple specialists (e.g. silviculturists) assigned to "zones" encompassing two or more districts. The Kootenai National Forest, for example has nearly a full ID team of resource specialists for each of its five districts while the Bitterroot National Forest has two ID teams each covering two of the Forests four districts. These are called North Zone and South Zone ID teams. The Helena National Forest has three districts and what they call "an ID Team and a half" denoting that there are duplicates of some specialists but not enough for two "full teams." Even if specialists are shared among two or more districts, however, they are supervised by the district ranger on whose district project planning or implementation occurs.

[176] On the three forests studied for this research the Forest Leadership Team included the Supervisor's staff, such as the Forest Planner, Public Affairs and the lead for Ecosystem Management (who is the Forest Planner on two of the Forests studied) as well as representatives from the different program areas as needed (e.g. the FMO and often the AFMO), silviculture, watershed or recreation etc.).

but the two principle functions of interest here are 1) the development of the annual budget and, from this budget, 2) the development of the annual program of work.

The Annual Budget

The Forest Leadership Team will meet sometime in the fall to develop the proposed budget for the forest which will be submitted to the Regional Office (RO) and from there up to the Washington Office. The proposed budget is made up of the combination of what each resource management program estimates it can accomplish in the given year for both planning and implementation. The estimate of implementation accomplishments becomes the program's proposed target. For the fuels management program this is the purpose of shelf stock described previously. The estimate of implementation costs is based on the shelf stock of projects ready for implementation while planning costs are based on their estimates of what it will cost to keep this shelf stock of projects to implement in following years.

Funding for broad scale assessments, called Ecosystem Analysis at the Watershed Scale (EAWS), also plays an important role in a forest budget.[177] Funding for EAWS is similar to the funding for other Forest Service programs and activities. Each forest submits an estimate of how many EAWS it can complete along with an estimate of their cost. Funding requests for EAWS are also referred to as a target but they do not put pressure on management the way other program targets do since they are not associated

---

[177] The Federal guide for these assessments was developed in the early 1990s as part of the effort to institutionalize ecosystem management beyond Forest Ecosystem Management Assessment Team (FEMAT), and the large scale efforts associated with the Northwest Forest Plan or the Interior Columbia Basin Ecosystem Management Project (ICBEMP). The latest version 2.2 was revised in 1995. Available at http://www.fs.fed.us/r6/frewin/projects/watershed/waguide.pdf. Last Accessed January, 2010.

with any particular resource management program and thus their accomplishment is not tracked. Rather, EAWS are important to the project planning process because they provide a source of funding for data collection and analysis outside specific resource management program budgets. They are broad in scope, typically encompassing a 5th code HUC watershed. EAWS analyses are conducted prior to the development of a proposed action but are reserved for projects that will undergo analysis and documentation under an EIS since these are the most expensive where, according to one forest planner its worth spending the money" (BSH27). "All EISs" one district AFMO noted "start out with an EAWS" (KMM31) though occasionally they may be used for an especially complex EA. The resulting analysis is used later after NEPA scoping in the analysis of cumulative effects and provides the bulk of information on the "affected environment" chapter of an EA or EIS.

The Annual Program of Work

The development of the forest's annual budget and the associated resource management program targets and EAWS funding requests provide the leadership team with a rough estimate of what it must try to accomplish and how much money has to accomplish it. These are only rough estimates since the actual budget and program targets are not passed back down from the Regional Office until the spring. All funding is allocated to specific projects each a code through which its budget is tracked. In early winter the Leadership Team develops the annual program of work.[178] The program of work lays out how the forest's budget will be divided up among all new and ongoing

---

[178] The acronym used, however is PWP. "We call it PWP. PWP was a project work plan system, a computer system that we used to have, that's evolved into something else but our list of projects is called the program of work" (HDH17).

projects on the forest, in all phases of planning and implementation, as well as who is working on them. As one district AFMO described it "the program of work out of annual meetings details people and resources and funding for each project…It's a budgeting mechanism" (BLM3). It is through its control of the program of work that the Leadership Team controls each resource management program's overall budget and their activities. Additional Leadership Team meetings are often called throughout the year to address unexpected events that effect current project planning and implementation requiring adjustments to project budgets or management priorities.[179]

Projects originate, for the most part, from the districts and submitted to the Leadership team for consideration. If accepted and placed on the program of work and funded, responsibility for their development into a proposed action is passed back to the districts who must work within the specified budget and time constraints allotted. The Leadership Team's collective agreement on priorities and funding represents a kind of vetting in which these primary decisionmakers ensure agency policy and objectives are followed. However, as noted earlier, the districts are allowed substantial discretion to

---

[179] Some managers made a distinction between Leadership Team meetings and NEPA Team meetings. For these managers, Leadership team meetings denote prioritization while NEPA Teams meetings denote what I have referred to above simply as additional Leadership Team meetings that deal with these changed priorities. The distinction is made because they often involve only a subset of the entire Leadership Team, those mostly affected by the issue being addressed. These additional meetings often include a wider representation of the specialists, those affected by the issue but may not be members of or formal participants in Leadership Team meetings. Unforeseen events take many forms but the common reasons for additional meetings reported by managers include what is referred to as "data creep" where a recommendation is made, usually by the Regional Office, for additional data collection and analysis due to the actual loss of a court case in the region or simply recognition of a pattern of specific issues the agency is being challenged on in court. The most common issues prompting "data creep" were over the adequacy of old growth, soils or fish and stream sedimentation analysis. Another common reason for calling additional Leadership Team meetings are what managers referred to as "surprise" projects. These are project ideas brought to the Forest Supervisor's office, most often by private outside parties but occasionally by the Regional Office. These "surprise" projects are usually accompanied by additional funding such that they are always described as opportunities by leadership but often viewed as setback to those responsible for the projects that get dropped from the program of work.

shape management activity since proposals largely originate from the districts and, once

on the program of work, the project is developed into a proposed action at the district

level. One Forest Planner described the Leadership Team's development of the program

of work this way:

> …ideas for [fuels] projects come from the Fire Management Officers at
> the district. They, from their knowledge of their district come in with the
> areas that they think are important for us to treat. So there's not a real
> formalized process for that piece…we take the fire projects and put them
> on the appropriate year's list along with all the recreation projects, all the
> timber projects any other work that we have…We kind of prioritize based
> on expected budgets, what seems to give us the most on-the-ground
> benefit for the effort it's going to take…Generally for smaller projects we
> wouldn't be spending a lot of money on assessment…a pretty minor
> amount of work…if it's large, you know 'we think its time for us to do an
> EAWS of this area,' which will lead to a fairly large planning project a
> year from now…part of that is, you know, which NEPA tool we can use,
> whether it's a Cat Ex or whether it's an EIS…that's kind of how we
> prioritize the work. You know, sometimes things come up that changes the
> priorities …there's no set process, It'll be different probably for each
> Forest how they go about deciding priorities (BSH9).

Individual programs are responsible for meeting their specific program targets but

line officers are expected to meet integrated or unified targets. This is what underlies the

Leadership Team's efforts when developing the program of work. "On-the-ground

benefit," from the passage above, refers to a manager's sense of good land stewardship.

However, all land management activities depend on funding such that one of the primary

"benefits" achieved are target accomplishments that ensure future funding. For fuels

management, meeting targets and ensuring future funding requires maintaining shelf

stock of projects ready to implement. One way this shelf stock is maintained is by

spreading planning costs across projects of different costs and time frames. When

districts submit projects to the leadership team for consideration the proposal includes the

estimated level of NEPA analysis required. In effect, the requirements and proscriptions

for each of the three levels of NEPA function as guidelines that may be used to anticipate

planning and analysis costs when the Leadership Team endeavors to calculate the

"benefit for the effort it's going to take" and to compare the "economic viability" of

different projects in order to set priorities.

While internally selecting the level of NEPA as part of the process of developing

a proposed action, rather than after the public scoping, contradicts the spirit of NEPA,[180]

this practice is in fact inscribed in Forest Service direction for complying with NEPA's

scoping requirements. This early informal selection of the level of NEPA analysis helps

managers determine compliance and analysis requirements as part of their efforts to

efficiently develop proposed actions that are nearly ready for a decision. This also helps

with the estimate of project planning costs the effort to balance overall annual program

costs between planning (to maintain shelf stock) and implementation (to meet targets and

ensure future funding). To understand how this works requires a brief description of the

direction for NEPA compliance.

NEPA Compliance

The Forest Service Handbook (FSH) includes a diagram (Figure 4) called the

"Overview of Process" which "illustrates the National Environmental Policy Act (NEPA)

process and indicates the normal sequence of actions."[181]

---

[180] A longs standing critique of federal agency implementation of NEPA is that it represents a pro forma exercise with little meaning because the required analysis is conducted after an agency has internally committed to a project, a set of objectives and the activities to achieve these objectives. See for example Fairfax (1978); CEQ (1997); Karkkainen (2004).

[181] FSH 1909.15 Zero Code (2004). Note: this diagram does not appear in the 2008 update to this FSH.
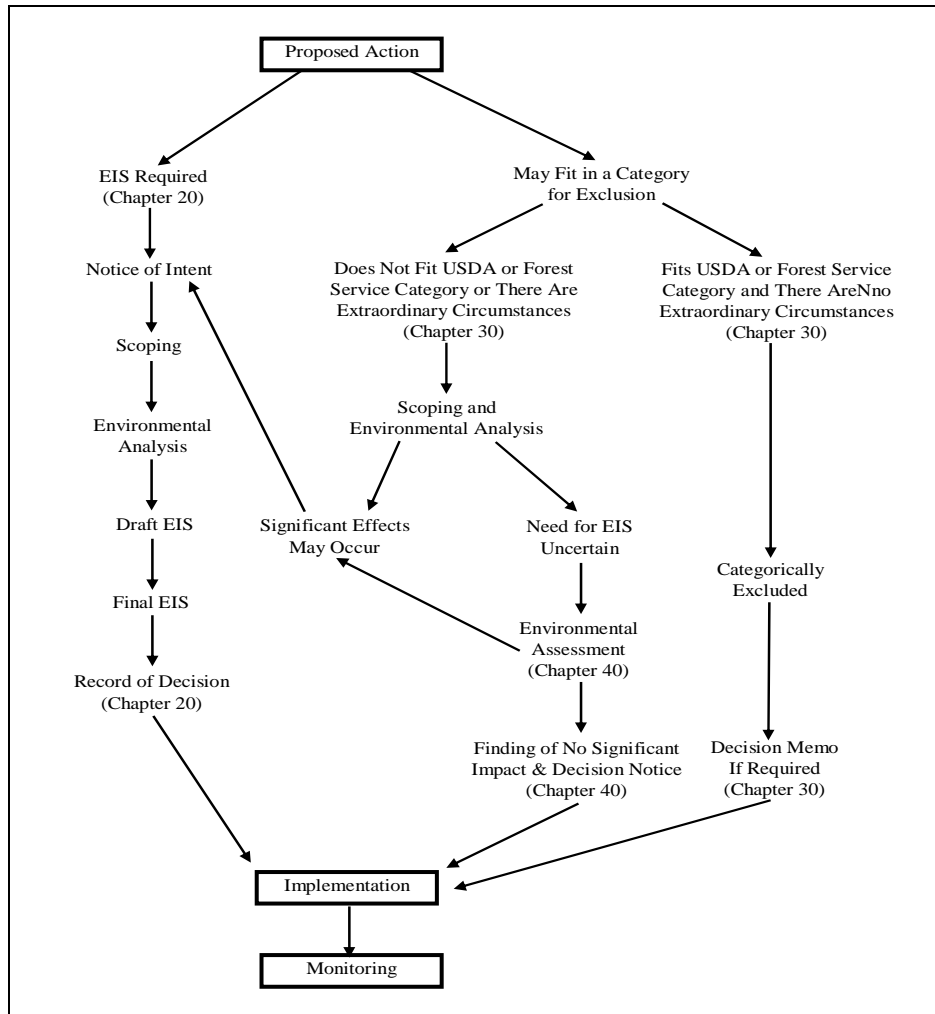
Figure 4 "Overview of Process" (Forest Service Handbook 1909.15 Zero Code, 2004).

The diagram (and most descriptions of CEQ NEPA regulations[182]) gives the

impression that the category of NEPA and the level of analysis conducted are selected

after a proposed action exists. This implies that the proposed action is developed without

considering the NEPA category or level of analysis required, that the proposed action is

driven primarily by environmental conditions outlined in the purpose and need statement.

However, this is not quite the case. The "Overview of Process" (Figure 4) does not, in

fact, represent the normal sequence of actions. The normal sequence of actions is much

less straightforward. Recall from the earlier discussion of NEPA that the formal

[182] See CEQ Regulations for Implementing NEPA at http://www.nepa.gov/nepa/regs/ceq/toc_ceq.htm

requirements of the law begin with the release of a proposed action document. While the decision as to the category and intensity of NEPA analysis is formally decided with the signing of a decision document after NEPA scoping of a proposed action, and the subsequent development and analysis of action alternative, proposed actions are in fact developed with a specific NEPA category and level of analysis in mind. The Forest Service employs a process to provisionally select the level of NEPA analysis as part of the process of developing a proposed action prior to conducting formal NEPA scoping, a process referred to as *informal notice*. Informal notice is carried out through the Forest Service's national database called the Schedule of Proposed Actions (SOPA). The purpose of the SOPA is "to give early informal notice of proposals so the public can become aware of FS activities and indicate their interest in specific proposals."[183] When projects are first entered into the SOPA, they specify the "expected type of analysis" pursuant to NEPA" (either CE, EA or EIS) and the projected release date of the proposed action, which then initiates the formal scoping required by the CEQ. The planning status at this early stage is listed in the SOPA as "developing proposal."[184]

In other words, while it is true that the category of NEPA (CE, EA or EIS) is *formally* decided in a decision document after public scoping of a proposed action, it is *informally* decided long before this point. Such informal assumptions are a common solution to circular reference problems whereby one parameter is assumed in order to determine the other followed by an iterative process of resolving the discrepancy between them. In the case of the Forest Service and the development of the program of work, the

---

[183] FSH 1909.15 Zero Code (06). Emphasis added.
[184] http://www.fs.fed.us/sopa/ "The responsible official shall ensure the SOPA is updated and notify the public of the availability of the SOPA" (36 CFR §220.4(d)).

decision to pursue a project as an EIS is made based on the calculation that it provides the

most on-the-ground benefit to warrant the time and cost. Such decisions are made early in

order to, for example, commit the limited funding and specialist time to conduct an

EAWS that always precedes large EIS projects.

This circular reference problem appears to arise from the tension between the

different, yet inextricably linked meanings of the verb *determine* and the practices

associated with these meanings – determination as process of choice and selection, on the

one hand, and determination as a process of investigation and discovery on the other – as

the verb is employed in the definition of scoping provided by the Council on

Environmental Quality (CEQ) as interpreted in the FSH. The CEQ defines scoping as a

"process for determining the scope of issues to be addressed and for identifying the

significant issues related to a proposed action."[185] The "objectives of scoping" according

to the FSH are to "Determine the nature and complexity of the proposed action"[186] yet in

the very next paragraph the FSH directs managers to "Conduct the scoping actions set

forth in this chapter commensurate with the nature and complexity of the proposed

action."[187] In other words, the activities of scoping are to be determined according to that

which the activities of scoping are supposed to reveal – the nature and complexity of the

proposed action. Moreover, it is the nature and complexity of a proposed action that is

supposed to be used to "Identify environmental issues related to the proposed action";

---

[185] 40 CFR §1501.7.
[186] FSH 1909.15.10.2 (2004). The other objectives of scoping listed are: "Determine the disciplines required to guide environmental analysis and documentation" and "Determine the type and level of public participation."
[187] FSH 1909.15.10.3 (2004).

"Determine how much analysis is necessary" and "Achieve effective use of time and money in conducting environmental analysis."[188]

Many managers in fact described NFMA analysis as a process of "internal scoping" (HDH17) following the description of NFMA analysis in the *NEPA/NFMA Forest Plan Implementation Training Course (1900-01)* (USDA Forest Service, 2006c) as a flexible means of narrowing the "scope of consideration" of a proposal, a flexibility that derives from the fact that there are "generally no laws or regulations to obey" prior to the release of a proposal.[189] It is nonetheless a process that involves as much choice and decision as it does investigation and discovery in determining the nature and complexity of a proposed action. The process of NFMA analysis is fluid and ill-defined owing to the purposeful lack of specific direction. But it is precisely this lack of direction that gives managers the necessary flexibility to engage this circular reference problem of determining the nature and complexity of a project.

Though NFMA analysis is flexible and ill-defined there is a distinct sequence to the process of developing a proposed action that results from the manner in which the two key factors are addressed within the Forest Service's organizational structure. This sequence derives from the important role played by the Forest Leadership Team's development of the program of work in organizing resource management specialists and funding from their individual programs for the assessment of current conditions and the development of a proposed action. This suggests that the process of developing a proposed action takes place in three more or less distinct phases:

---

[188] FSH 1909.15.10.2 (2004).

[189] Forest Plan Implementation Course 1900-1 Notebook and Class Exercise, p. 3-Unit 5 (10/30/2006 edition).

Phase One - The generation of initial project ideas and their refinement into a proposal for consideration by the Forest Leadership Team for inclusion on the annual program of work;

Phase Two - The Forest Leadership Team's development of the annual program of work and its selection and prioritization of which projects to pursue, their tentative level NEPA analysis and documentation required and the allocation of funding and resource specialists' time for determination of resource conditions and the development of a proposed action;

Phase Three - The subsequent determination and development of a formal proposed action document by the assigned team of resource specialist.

4.6   Summary

This chapter described the structure and process of project planning and decisionmaking takes place in the U.S Forest Service. Since the Fires of 2000, the initiation of the National Fire Plan and the massive increase in fuels management funding that resulted from these events, fuels managers have come to play a new more active role in the project planning process. Prior to 2000 fuels managers conducted treatments driven predominantly by the objectives of other resource management programs, primarily timber and vegetation management (for slash disposal and site preparation for tree planting) and wildlife management (for big game browsing habitat). While fuels managers had to write the prescription for such treatments, they were for the most part uninvolved in the larger more onerous planning process carried out by those managers whose program objectives drove the project. Since 2000, fuels managers now participate fully in this larger planning process, proposing projects specifically to meet their own program's objectives.

This larger planning process in the Forest Service is dynamic and complex, characterized by both overlapping and competing objectives between the various resource management programs. The varying degrees of overlap and competition arise from the fact that the various treatments available to meet the specific objectives of one program, affects the resources managed by programs and thus their ability to meet their objectives. This interconnection between program objectives and their pursuit through the various kinds of treatments must be adjudicated during project development and planning.

At its most basic, project planning in the Forest Service may be divided into two parts; the first is the process leading up to a proposed action and the second is the process that follows a proposed action. The first half of the project planning process is referred to as NFMA analysis. NFMA analysis encompasses all the procedures through which a formal proposed action document is developed. The completion of a proposed action document initiates the formal procedures required by the National Environmental Policy Act (NEPA). While the process of complying with NEPA is important and can influence the final character of a project, NFMA analysis is where the heart of a project is established. It is during NFMA analysis that a project's rationale for management action are established (its "purpose and need") as well as its objectives and proposed treatments to meet these objectives and address these needs. It is during NFMA analysis and the development of a proposed action, in other words, that the overlap and competition between the objectives of the various resource management programs is adjudicated. NFMA analysis is essentially a process of negotiation.

The purpose of NFMA analysis is to address these factors as thoroughly as possible in an effort to develop a proposed action that is as complete as possible and ready to move forward into the process of NEPA compliance. There are a myriad of factors that must be negotiated during NFMA analysis and the development of a proposed action. The most important are encompassed in two interrelated sets of key factors: 1) targets and funding and 2) compliance with law, regulation and agency policy, the threat of litigation and the cost of data collection and analysis determined to be necessary for compliance and to mitigate the threat of litigation. While NFMA analysis is intentionally ill-defined and lacking specific direction in order to provide flexibility to managers, there are certain aspects of the organizational structure of the Forest Service that leads to a distinct pattern to the otherwise fluid process of negotiation. This is the Forest Leadership Team's development of the annual program of work. The program of work has the effect of dividing the process of NFMA analysis into three phases: 1) the preparation of project proposals for presentation to the Leadership Team; 2) the Leadership Team's acceptance, prioritization and allocation of resources, principally funding and specialist's time, for the development and planning of the project; and 3) the determination of resource conditions and the development of a proposed action by the assigned interdisciplinary team. The negotiation process that takes place during these three phases of NFMA analysis is the subject of the following chapter.

CHAPTER FIVE

THE PRACTICE OF FUELS MANAGEMENT PROJECT PLANNING IN THE U.S. FOREST SERVICE

5.1   INTRODUCTION

This chapter describes the practice of developing fuels management project proposals. It is a practice dominated by a process of negotiation. In his classic study of the Forest Service Kaufman (1960 and 2006) describes the organizational structure of the agency as a decentralized hierarchy. According to Kaufman (1960 and 2006, p. 83) this structure represents the "heart and core" of the agency's administrative philosophy and that management activities are administered as much as possible at the district level because "resource management begins and belongs on the ground." As much authority and discretion as possible is therefore delegated to the districts which "constitute the backbone of the organization" (Kaufman, 1960 and 2006, p. 83). Higher level authorities, such as the regional forester vis-à-vis a forest supervisor, the forest supervisor vis-à-vis a district ranger and the district ranger vis-à-vis the resource management specialists on an interdisciplinary team190, are described as playing the role of compliance officers of management activity, rather than the originators and planners of management activity. District rangers, in other words, are accorded a great deal of discretion over how management activity is conducted and higher level authorities do not direct management action so much as ensure that it is in line with law, regulation and agency policies and

---

[190] The invention of interdisciplinary as a formal entity required in the planning process is new since Kaufman published his work but the relationship describes here extends to them as well.

goals. This combination of delegated authority and discretion granted to lower level managers that is nonetheless checked closely for compliance by higher level managers results in what current Forest Service officials describe as a "collaborative leadership management style" such that "progress depends on a collective acceptance of any new proposal" (GAO, 2003b, p. 15). This collaborative style is characterized by negotiation and it is through negotiation that collective acceptance is achieved. The process of developing project proposals is primarily a process of negotiation between resource management program specialists and their line officer over program objectives and the type and extent of treatment activities employed to meet these objectives that will be included in the final proposed action.

As described in the previous chapter, fuels managers are responsible to meeting hazardous fuels acreage targets within the budget allocation handed down from the Forest Service regional office. This is accomplished by maintaining "shelf stock" of ready to implement treatments composed of different levels of complexity and expense that can be carried out under a variety of seasonal conditions. Maintaining this "shelf stock" is in turn accomplished by developing projects composed of different combinations of treatment types and extent in conjunction, by necessity, with other resource management programs. It is the combination of different treatment types and extents that determine the nature and complexity of a project and it is the nature and complexity of the project that in turn determines the requirements for compliance with the many different laws, regulations and agency policies as well as the potential threat of litigation a particular project may face. These compliance requirements and this threat of litigation are considered in determining how much and what kind of data to collect as well as the

methods and extensiveness of analysis to perform. These issues may be characterized as two sets of key factors: 1) targets and funding and 2) compliance with law, regulation and agency policy, the threat of litigation and the cost of data collection and analysis determined necessary for compliance and to mitigate the threat of litigation.

All of these factors that affect the development of fuels management proposed actions are subject to negotiation. The term "negotiation" was in fact used by some managers in describing the project planning process. However, others terms more commonly used to describe interactions between specialists were "discussion" and "fighting." Negotiation, as used here denotes this spectrum of behaviors from cordial deliberation to highly contested struggles often resolved by a district ranger's fait accompli. The process of negotiation takes place in three phases of NFMA analysis:

> **Phase One** - The generation of initial project ideas and their refinement into a proposal for consideration by the Forest Leadership Team for inclusion on the annual program of work;

> **Phase Two** - The Forest Leadership Team's development of the annual program of work and its selection and prioritization of which projects to pursue, their tentative level NEPA analysis and documentation required and the allocation of funding and resource specialists' time for determination of resource conditions and the development of a proposed action;

> **Phase Three** - The subsequent determination and development of a formal proposed action document by the assigned team of resource specialist.

This chapter is composed of five sections: Section 5.1 provides a brief review of the concepts from Actor Network Theory used in this research to analyze and describe the process negotiation that occurs in the development of fuels management projects. Section 5.2 describes the first phase NFMA analysis: District-Level Negotiation. Section

5.3, the second phase of NFMA analysis: Forest Leadership Team Negotiation of the Program of Work, and section 5.4 the third phase of NFMA analysis: Determining Conditions and Developing Proposed Actions. Section 5.5 provides a discussion of the enigmatic role played by the determination of fire risk and the ecological role of fire in fuels management project planning. This is followed by a summary of the chapter, section 5.6,

5.2   Actor Network Theory

Before describing the process of negotiation during the three phases of NFMA analysis the basic concepts of negotiation employed in this research will first be reviewed. The theoretical framework employed in this research - Actor Network Theory (ANT) growing out of the work of Bruno Latour and Michael Callon – is essentially a theory of negotiation. It is a theory of the translation and transformation of the object of negotiation as increasing numbers of actors become involved in the process. As applied here, the object of negotiation is the project itself, its objectives and the combination of treatments proposed to meet these objectives. In the language of the Forest Service, projects begin as a management opportunity, an idea for a project refined and transformed into a proposal to the Forest Leadership Team and then transformed yet again into proposed actions. In this process of transformation the nature and complexity of a project is determined. ANT provides a set of heuristic concepts for examining this process of negotiated transformation.

Callon (1986) identifies four characteristic aspects of the processes of negotiation. These are problematization, interessement, enrollment and mobilization.

Problematization is the act of making a case for a course of action or an array of courses of action that more or less correspond with the perspectives, interests and objectives of those framing the problem in that way. The presented management opportunity thus reflects this correspondence. Callon (1998) employs Goffman's (1971) concept of framing and points out that much of the content and significance of a frame may be implicit and self evident to the protagonists initially involved if they share strong connections of some kind, especially disciplinary training or shared objectives, such that agreement or consensus on the nature of the frame may not be explicit and only loosely specified. In effect the proposed course of action may also be only loosely specified, the details also being implicitly understood. Making the frame of the problem and course of action more explicit becomes necessary, however, when actors whose participation is necessary for the course of action to proceed are brought in but who do not perceive or frame the problem in quite the same way due to different interests and objectives. These actors must be convinced somehow of participating, and this is done by making them interested in the course of action.

Callon's second aspect of negotiation is interessement. Interessement is roughly translated as "to make interested." It is the forming of alliances by aligning the various perspectives, interests and objectives of other actors with a proposed course of action. To the extent that these new actors' perspectives, interests and objectives are different such alignment will result in altering the course of action into something different. Enrollment occurs when buy-in is achieved; it "describes the group of multilateral negotiations, trials of strength, and tricks that accompany interessement and enable it to succeed" (Callon, 1986). Finally, mobilization is the process whereby those actors made interested in and

enrolled in supporting or adopting a particular course of action work together as allies in subsequent negotiations with additional actors to continue to move an effort forward. While these four moments of negotiation are conceived to be more or less sequential for any given set of actors, the dynamics of negotiation is determined by the addition of new actors and the degree alignment or divergence between their interests and objectives. Thus several of these moments may be in play at any time, but as a management opportunity is transformed into a proposed action, it becomes more stable. In the context of the three phases of NFMA analysis, negotiation during phase one is characterized more by problematization and interessement in order to get a project on the program of work. Once on the program of work, the basic outlines of a project, its problem frame, is established. Negotiations during phase three exhibit more of the characteristics of enrollment and mobilization. Because the project has been sanctioned by the leadership team, what remains to be negotiated during phase three of NFMA analysis is how to align the interests and objectives of the various resource programs involved.

5.3   NFMA Analysis Phase One: District-Level Negotiation

The first phase of project planning involves negotiations aimed at getting a project accepted by the Forest Leadership Team and placed on the program of work, and thus funded. The first phase of NFMA analysis is in many ways the most important in terms of problematization and defining the nature of the management opportunities that will be pursued. It is the least structured and formalized, however. Initial project ideas, for the most part, "sort of bubble up from the district level" (BPF36). While the formal decision as to the size and mix of activities is not made until a final decision document is signed

after public scoping, in practical terms this decision is provisionally made during this first phase of project planning. Estimating the level of analysis needed and the recommended NEPA category is provided as part of the presentation of the project idea to the Forest Leadership Team for inclusion on the program of work. As one forest planner described it "when we ask the districts for projects, the work on the planning side that they think needs to be done, they'll give us the assessment piece as well…" (BSH27). The estimated NEPA category helps determine the expense of planning and is a central consideration of whether a project will get on the program of work. These initial ideas for projects are very general, including only a rough estimate of type of activities and their extent associated with the different resource management programs.

The district ranger is the key actor in the negotiations over whether an opportunity becomes a project proposed brought before the Forest Leadership Team because, as many program area specialists described, the district ranger "basically is the person who either champions them at a forest wide level or decides 'no we're not going to work on that particular thing at this point' and it's also the district ranger who decides what depth of NEPA analysis is appropriate for the project, the proposed project" (BPF36). The initial glimmer of an idea for a project itself, however, comes primarily from program specialists. Specialists might take a project idea directly to the ranger as one district AFMO noted "For [these two CE] projects, we started getting calls from homeowners after the fires of 2000. So I kind of took it to the ranger and then the other specialists and said, 'hey, we're getting a lot of interest in this area. We need to do a project here' (KNH16). Alternatively, specialists may get together amongst themselves and then present an idea to the ranger. As another district AFMO described it "Right now on a lot

of these projects…we're looking from our individual disciplines, looking at what kind of projects would be beneficial to fire or sheep or silviculture or something and then we come back together and we try and talk to the rangers" (BJP29).

Though the decision is ultimately up to the district ranger as to whether a project will be proposed to the leadership team for inclusion on the program of work, typically this decision is reached through the "collaborative management style" noted by the GAO (2003b). This is achieved by aligning the interests and objectives of the district ranger and several key resource specialists. This is achieved through complex negotiation. The district rangers are responsible for meeting integrated targets but they are also given direction from Congress and the Washington Office (via the annual Program Direction) to emphasize certain types of activities. As one district AFMO noted "the rangers have their own ideas because they're being given direction to march to. Either [they] need to produce timber or need to produce hazardous fuels acres in the urban interface…" (BJP29). Individual resource management programs are responsible for meeting their own program's target and they do so by proposing the type and extent of activities its specialists deem most appropriate for an area from their disciplinary and professional perspective. These initial problematization or framing of a potential project is referred to as a management opportunity. As one district AFMO put it "we always call them opportunity areas, basically, whether its wildlife opportunity, vegetation management, fire and fuels, timber, you know, opportunities for a project." (KNH16).

Getting other resource specialists interested and enrolling them to support a project proposal for submission to the leadership team is quite difficult. At this stage of

NFMA analysis, since the project is not yet on the program of work, the time and effort

expended by resource managers is paid for by their program's general operating budget

(Force Account) rather than a project code (P-Code) and thus added pressure to promote

individual program objectives. Because of this added pressure of not being funded by a

P-Code, these negotiations have been described as "backroom dealing between

specialists," over competing resource management programs objectives: "ladder fuels

don't have value but timber [management] has quotas to meet, the veg shop's always

pressuring to manage for historic age class, and hazardous fuels is hiding cover so [we

have to] leave some thick fuels for hiding cover to appease wildlife [managers], even if

the area was historically open…" (HCK18 & HGJ19). Even when it is agreed the project

idea is a good one backroom negotiations are often unsuccessful if the objectives of

enough specialists necessary to move a project forward cannot be aligned. One Fuels

specialist describes the reaction to an idea presented by fuels and vegetation management

this way:

> We ran into a wildlife issue where the forest plan standard for hiding
> cover is based on canopy closure…so we read the forest plan very
> thoroughly and came back with, 'well, it says that's subject to hydrologic
> or other resource constraints. Fuels management is a resource. Fire is a
> resource. We, as fire and fuels managers, are telling you that we cannot
> protect this resource, this hiding cover as you're calling it, from a stand
> replacing event'…Same with the timber shop. It says in the forest plan
> we're supposed to be managing for old growth. How do you manage for
> old growth [age class] in ponderosa pine? You cut out the little stuff. You
> reintroduce fire. You don't go and take the big trees off; you take the little
> trees out from underneath but that's not always going to give you a
> [merchantable] product…'Yeah, its probably a good project> Yeah,
> you're right at the fire return interval that you should go after this stuff.
> But we don't like it'…we let it go…It never made the program of work
> (HRM13).

There is a general pattern to successfully negotiated projects that make it on the program of work. For fuels management this essentially means focusing on small projects, usually Categorical Exclusions. Small Categorical Exclusion projects, as described previously, help to maintain shelf stock by spreading out analysis costs and time between small, cheaper and faster to plan CE projects and large, expensive and time consuming EISs. Fuels managers identifying project opportunities to employ the Categorical Exclusion must avoid extraordinary circumstance (such as threatened and endangered species habitat) while at the same time enrolling at least one or two other resource management programs by incorporating their objectives. One district AFMO called their tactic maintaining shelf stock as "a shotgun approach" (LLW22). Another (from a different forest) described it this way:

> …we're just choosing to take the tack of 'let's keep it small, let's figure out extraordinary circumstances'…We're avoiding this, we're avoiding that, so that we don't have any extraordinary circumstances…the lead team ultimately makes the decisions what the priorities are…so we're proposing thousands of little spread out projects…What's going to get us the biggest bang for our buck? Cheap acres and lots of them! Underburning for [wildlife browsing] habitat. And timber volume because that's what's getting funded right now…. (BJP29)

The concern with multiple small Categorical Exclusion projects is that these cannot be too close together. One forest ecologist noted, for example, that "…you can't do CE, CE, CE and have connected activities and say that none of them are connected because there's a limit, an undefined limit, where you violate the known effects…" (BTO35). Only a certain number of small projects in a given area over a certain time period would pass legal muster. This effectively limits future project placement. To balance program costs and keep the shelf stocked with projects, fuels managers for the

most part must piggyback on larger projects, driven by other priorities and identify

opportunities for treatment acres within project planning area. As one district AFMO put

it:

> The only time fuels is a driver is in the WUI…and small scale…There's
> got to be either some real, real high, high, high priority that allows it to
> happen, or there's going to be some economic feasibility to it; i.e., timber
> sold, that allows the rest of the stuff to get done…On this forest…large
> projects from fire fuels saying "hey, we need to treat this area" just never
> becomes a big enough priority… if there isn't some other driver...
> (KNH16).

Large projects that will be pursued as an EA or EIS always include multiple

program objectives. A Forest Planner described it this way: "What we've tended to do is

look for a lot of opportunities, you know, ranging from fuels management, some

vegetation treatments, road improvement, watershed etc. We've tended, on our larger

projects, to lump a lot of those activities together into a big NEPA project…you look for

opportunities to get the work accomplished, of course, within the funding" (KJG28).

In order for large projects proposed by fuels management to make it on the

program of work, they must mobilize the support of external actors in order to merit the

commitment of the necessary funding and specialist's time for an assessment, such as an

EAWS. Mobilization of external actors essentially leads to the enrollment of the district

ranger to champion the project to by the Forest Leadership Team by appealing to their

responsibility to the policy goals of the National Fire Plan and its emphasis on

collaboration, in addition to their other programmatic responsibilities for integrated

accomplishments. As one district AFMO described a successful combination of interests:

> We took it a little farther into our forest, and [the Community Fire
> Protection Committee] took it a little farther down onto private and…kind

of came up with some project ideas of where a lot of our homes are located, our wildland urban interface, and proposed a couple projects and [the ranger] took a step back and said, well, 'there's a lot of potential projects in here …product removal to open up the canopy…some strictly burn units…historic grasslands with a lot of Doug fir encroachment coming in reducing [wildlife] forage…We were able to get an assessment funded throughout, an Environmental Assessment Watershed Scale, an EAWS…probably an EIS next year depending on priorities…The community's doing their side so that helps push things…" (HDN11).

This first phase of NFMA analysis is characterized primarily by negotiation aimed at aligning enough interested program specialists, and perhaps external actors, to enroll and mobilize the district ranger to champion the project before the Forest Leadership Team for consideration. The Leadership Team's establishment of the program of work and its periodic adjustments to the program of work, constitutes a different kind of negotiation process than that between specialists and their district ranger. These can have important consequences for the development of fuels management projects.

5.4 NFMA Analysis Phase Two: Forest Leadership Team Negotiation of the Program of Work

The Forest Leadership Team generally accepts the proposals as presented by each district ranger, including the level of assessment and analysis, and, if added to the program of work, the project is passed back to the districts for assessment and development. The difference is that the negotiations during the first phase of NFMA analysis are over combining management opportunities to create individual project proposals whereas the negotiations of the Forest Leadership Team are over the combination of all projects that will take place on the forest. The effect on individual projects is, in a way, in direct as the focus is not on the mix of objectives included in an

individual project. The Leadership Teams' prioritization and allocation of funding and specialist time to each project sets parameters within which the project will be developed However, these parameters can have a strong impact on the amount of funding and specialists time put into assessment, data collection and analysis necessary for compliance with law, regulation and policy and mitigating the threat of litigation.

The Leadership Team engages in a similar effort to that of the fuels managers' attempt to maintain shelf stock by having a variety of projects in various stages of planning and varying levels of NEPA complexity but there is no catchy name for this effort at the Leadership Team level. As one forest FMO described it, the Leadership Team strives to "spread out NFMA or NEPA planning allocations to keep the pump primed for funding coming down from the RO" (HBR15). Just as with individual program managers' efforts, there is no set process or criteria for this is done. One forest planner stated simply that "we have all these projects…it's apples and oranges, but you just have to sort of make some decisions about which one's you're going to handle…" (BSH27) Rangers are referred to as champions of their projects because individual project proposals must compete for funding and high priority status against other project proposals. District rangers, as is typical in any bureaucratic organization, have an incentive to maintain and protect their capacity to perform and achieve the expectations they are evaluated against (e.g. integrated targets and the emphasized items outlined in annual program direction). Fuels management, unlike most other resource programs in the Forest Service, has a substantial staff and overhead on each district.[191] Thus, between

---

[191] This fluctuates over the year, more than doubling in size during the summer fire season, using separate funding for preparedness but these seasonals, supervised by permanent staff, accomplish substantial fuels work when not preparing for or fighting fires. One forest AFMO noted that they had been "discussing the

the district ranger and fire management, there is tremendous institutional incentive to

maintain the program on their district. This in turn leads to a great deal of horse trading to

spread projects across each district. In other words, just as individual specialists fight for

the interests of their program when negotiating over the combination of project

objectives, district rangers and fire management officers fight for interests of their

district. And, just as with individual programs, the management objectives of a district

include both biophysical and administrative dimensions. A forest fire ecologist described

this situation this way:

> You get money for projects…Everyone needs a piece of the pie to fund
> their programs…you can't fluctuate permanent employees from year to
> year. You have to have a certain amount of dollars – project money – to
> fund all these people that work for you on a permanent basis and so you
> got to get funding for some projects and you got to have some that are
> high priority. Politics comes into play on what projects actually get chosen
> to develop (BTO35).

The politics involved in spreading around projects and funding is made more

complicated by the fact that an important source of project ideas and funding in the

Forest Service comes from outside the agency. The most common mentioned by fuels

managers were from industry (such as mining companies seeking permits or power/utility

companies seeking transmission line installation or repair work) or non-governmental

conservation organization such as the Rocky Mountain Elk Foundation or Trout

Unlimited (pursuing habitat restoration projects). [192] All these project proposals along

with their associated funding are "added to the hopper" (BLM3) of projects considered

---

wisdom of the big fire hire" (BRF14) of 2001 for a couple years that established the large number of
overhead positions, such as an FMO and AFMO, on each district contributing to this impetus to turf
protection.

[192] Acreage targets accomplished with such external funding are reported in the FACTS database as
"contributed accomplishments."

by the Leadership team. External actors and the funding they bring with them can heavily influence the Forest Leadership Team's prioritization process. One district AFMO noted:

> [t]he big projects that I'm familiar with, that I've been here from the beginning, have come from some sort of outside influence on why we need to go look at that area or why this is a priority project…All the most recent ones on this list were kind of the politics and outside influence…[Industry Name], for example, is actually funding some of our specialists on [EIS project X]. So, of course, that influence of someone else offering to funding it makes it kind of the bigger priority (KNH16).

The organizational necessity of keeping the pumps primed with projects by spreading out planning commitments that incorporate these "outside influences" creates both opportunities and tremendous difficulties. One district AFMO noted that "an advantage of an EIS coming in from the SO is that I get to propose large natural burn units within that watershed…" (KMM31). According to managers, industry will often fund NEPA analysis to help expedite the project while conservation groups tend to fund implementation only. However, the agency must still fund substantial assessment and planning work, such as the EAWS assessments that precede each EIS. The presentation of these outside ideas for projects and their associated funding are often the reason that additional Leadership Team meetings are held to adjust project prioritization and the allocation of funding and specialists' time. This creates tensions between line officers responsible for maintaining their programs and achieving integrated accomplishments and individual program specialists responsible for developing projects and meeting individual program targets. Such changes are often passed down almost out of the blue to the districts. For fuels managers, this means dropping the projects they are working on and finding acres in the new project area. "Surprise projects from management," one district AFMO notes, "causes a lot of consternation. You never know what projects you

are going to get when you walk out of these meetings" (BLM3). Another district AFMO

described it in stronger terms, explaining the effects of changing Leadership Team

priorities on project planning:

> I mean, our NEPA prioritization, we have a quarterly NEPA meeting to
> talk about the current prioritization of projects [and] it seems like its
> always changing…some of these new projects that sneak in the back door,
> some funding attached to it so we have to make it a priority instead of
> staying the course…means some of the smaller projects are getting
> derailed because they're not a high priority…it's like the process is failing
> because when you got 20, 25 tie priorities and only a limited number of
> resource specialists to do assessments or data collection for planning, but
> also implementation…I mean, our shortage of specialists…silviculturer's
> hung up. Our poor plant people are hung up. Our soils people always get
> hung up…(BJP29).

5.5   NFMA Analysis Phase Three: Determining Conditions and Developing Proposed Actions

Once projects get on the program of work, the third phase of NFMA analysis

begins. This effort consists of a more formal assessment of conditions and refining the

mix of management objectives that will be pursued, including what kind of treatments

and their boundaries, such as which areas will be proposed for prescribed burning pre-

commercial or commercial thinning. Project development proceeds slightly differently

for small Categorical Exclusion (CE) projects than for larger projects pursued under an

Environmental Assessment (EA) or an Environmental Impact Statement (EIS). The

difference is due primarily to the differing assessment requirements for determining

NEPA compliance. In the case of projects identified for development as a CE, this

assessment is considered part of the process of developing the proposed action itself. The

project is listed in the Schedule of Proposed Actions (SOPA) as "developing proposal."

Assessments for CEs consist primarily of specialists making sure no extraordinary

circumstances exist in the project area. For larger projects perused as EA or EIS a more formal assessment, such as an Environmental Analysis at the Watershed Scale (EAWS), is conducted before work on a proposed action itself is undertaken. These large scale assessments are also often listed in the SOPA as "conducting assessment."

The assessment process for larger projects such as EAWS does not itself include negotiations over the mix and extent of program activities and objectives. Rather, such assessments produce information that is used in such negotiations later. The assessment process itself often involves little interaction among specialists. "Typically resource specialists do this analysis separately at different times" noted one district AFMO, "due to on-the-ground issues, i.e. biologist when plants are flowering, hydrologists at peak run-off, fuels when there's no fires burning, etc."(BLM3). There are tensions over the conduct of these assessments, however, but this is primarily between line officers and specialists over the amount of time and money to be spent. As the AFMO noted, "management folks often want to shorten this [left] leg of the [NEPA] triangle" (BLM3). One district rangers, for example, told his Assistant Fire Management Officer that "the EAWS is just something you write up using existing data. We don't have any money to fund you to go do field work, to go do plots, to go do assessments, nothing. Use existing data, you do it from your office chair and you just get it done and get it on paper we're gong to move on" (BTO35). Once an EAWS or some other less intensive assessment process is completed, the project is then listed in the SOPA and work begins on developing the proposed action.

Once Assessments are complete, development of the proposed action begins. It is a process of determining the nature and complexity of a proposed action so there is something concrete to scope when formal NEPA commences. One forest AFMO described this later stage of NFMA analysis as a "kind of a fine tuning of the complexity of the project and what the potential impacts are" (HRC20). It is a process of determination in both sense of the term – implying both discovery and selection - in an iterative progression of proposals and counterproposals between resource specialists as they negotiate over the type and size of treatments corresponding to their program objectives. These negotiations can be intense. "That's where those discussions really start," noted one forest planner. "Okay, here are our broad priorities for this area but we only have this much money, time, and manpower to get it done. What's our highest priority? Where do we get the most benefit out of doing this with the resources that we have right now?" (KJG28) Or, as one district AFMO put it more pointedly, "there's a lot of fighting within the agency before we even come out with something for the public to look at. Then it starts all over" (KNH16).

The negotiation process appears remarkably similar between small projects prioritized as CEs and larger projects developed as EAs or EISs. The process is fluid, led by each program area specialist pursuing their program's objectives. Fuels managers attempt to enroll other resource specialists negotiating over specific areas for treatment and/or varying the intensity of these treatments in an effort to enroll other resource specialists by meeting their interests and program objectives. The principle difference between large and small projects is that most Categorical Exclusions are constrained by size limits. The Fuels reduction Categorical Exclusion is limitated to 1,000 acres of

mechanical treatment and 4,500 acres of prescribed burning.[193] This requires negotiation

over how to meet multiple objectives within a small area. As one district AFMO

described it:

> …[we're at] the very beginning to look at these areas, whittle it down to
> get to within that CE limit because the ranger's management direction is to
> not to do the larger scale analysis…Even though there might be other
> biological or ecological reasons to look at a larger scale…there's a bunch
> of fire restoration stuff up here…nice old growth ponderosa with a lot of
> fir coming up under it that if you had a fire now, you'd probably lose that
> old growth pine…But as soon as we start getting at that scale, all these
> other treatments, you've exceeded the CE authority so you'd have to do at
> least an EA…(KNH16).

Projects conducted with CE authority are prioritized and placed on the program of

work based on the objectives of the resource program that initially proposed the idea.

This appears to frame the negotiation over project objectives and treatment mixes in only

a very general way. For example, the objectives established on the program of work for

some projects may remain the same but the layout and prescription may be "taken over"

(HRM13) by another program. In such cases the program specialists, while not mobilized

to act as spokesman for the project in an effort gain further support (as Callon 1986

defines the term) they nonetheless may remain enrolled by dint of being ordered to by

their line officer. Two fuels specialists viewed a project one project as "a misuse of

CatEx 10 which started out as mostly burning but now its mostly thinning where they can

remove product and its no longer laid out to take advantage of natural [fire spread]

---

[193] These size limits are different for different CEs. CE #6, however, for "stand and/or wildlife habitat improvement activities" does not have a size limit yet may "include but are not limited to" activities such as "thinning or brush control to improve growth or to reduce fire hazard" and "prescribed burning to reduce natural fuels build-up and improve plant vigor". It is not used when timber is sold. CE # 12 for "Harvest of live trees" is not to exceed 70 acres but may not include even-aged regeneration harvesting (clear-cutting) and can include no more than half a mile of temporary road construction. CE # 14 for "Commercial and non-commercial sanitation harvest of trees to control insect or disease" may not exceed 250 acres and can include no more than half a mile of temporary road construction. (FSH 1909.15.31.2 (2004))

barriers…" (HCK18 & HGJ19) In other cases, project objectives are kept "simple" and

the objectives are successfully returned to what was originally identified in the program

of work. "On [CE project Y]" one district FMO noted, "we got the product removal

aspect back out to keep it simple because we need to move forward and avoid [public]

controversy" (BSH7).

The negotiation of project objectives and the mix of program activities is intense

for larger projects as well but the lack of size restrictions allows specialists more

flexibility to arranging different program activities over a broader area. For example, one

district AFMO noted, that two treatment units initially identified as opportunities for

fuels reduction within the EAWS analysis boundary would "probably go to timber…we

did one field trip up [to project X], and from what was initially identified to what I see on

the ground is significantly different so we're going to go back out and do some more field

work and redraw boundaries" (BTK9). It is comparatively easier, in other words, to meet

each program area's objectives with more room to combine management opportunities

together. As one district AFMO described it:

> On a fire side, we'll kind of look at the whole area that we can treat…if
> it's a soils thing…areas that soils doesn't want us to go into, we might pull
> that back out. Same thing with wildlife hiding cover or thermal cover for
> elk, or we're into nesting areas for birds. We'll pull those units out or…
> mitigate some of those concerns by doing less thinning or lower severity
> burning…we'll get back around the table and kind of hash out all the
> concerns and issues everyone has (HDN11).

Larger projects provide more room to maneuver to mix and match program

objectives across the landscape but these negotiations are also marked by conflict

between resource managers fighting for their interests. What makes the negotiation over

program objectives intense on larger projects are the constraints posed by the shifting

priorities of the Leadership Team and the associated changes to funding on specific

projects. This often makes addressing the threat of litigation and determining legal and

regulatory compliance requirements extremely difficult. Larger projects, especially EISs,

are closely scrutinized in this region and compliance requirements in themselves are

subject to a great deal of uncertainty, as described previously, over the issue of deference

to specialists' professional judgment in recent court decisions rejecting the methods and

data employed in direct, indirect and cumulative effects analysis. Before these effects can

be analyzed, however, the mix of proposed treatments, as well as an inventory of past

treatments, must be determined. This effort is directly impacted by shifting priorities and

budget allocations in the program of work. As one AFMO described the situation on her

district:

> probably half of the specialists or better, are only funded 50% now for
> [Projects X, Y and Z]. Don't know where the money's going to come
> from…that shifts folks to work on a smaller subset of those
> projects…that's an impact to our planning projects in terms of how much
> data we collect and what's important…maybe even have to pull out some
> [treatment] units (BKB30).

Projects at this stage of development rarely fail to go forward but they often get

delayed. The negotiation process is over which treatment units, supporting which

resource management program's objectives, will be reduced in size or intensity or simply

pulled due to the cost of data collection and analysis. The end result of this long and

arduous negotiation processes is that resource specialists and the line officers supervising

them mobilize around a clearly defined proposed action. This proposed action will

outline the agreed-upon mix of program activities, their location, type and extent such as

acres of prescribed burning, commercial or pre-commercial thinning. In the process, the

initial glimmer of an idea for a project introduced during the first phase of NFMA

analysis, the initial problematization or framing of the management opportunity, will

have undergone substantial transformation by the time it is developed into a proposed

action in the third phase of NFMA analysis. The overall goal of NFMA analysis, to

repeat the forest planner quoted earlier, "is that by the time you get to a proposed action,

you have something that is pretty well defined and laid out that if you were to make the

decision today that you could implement that and be in compliance with laws and

regulations and Forest Plan standards" (HDH17).

But what of reducing fire risk or restoring the ecological role of fire and forest

health, the ostensible goals and objectives of the *Federal Fire Policy*, the National Fire

Plan, and the Healthy Forest Initiative? The absence of policy and agency direction

regarding the assessment and determination of fire risk or fire ecology and how such

information should inform project planning, means that these issues are not the subject of

negotiation to develop a proposed action. Simply put, there is nothing definitive to be in

compliance with. This does not mean that fuels managers are not concerned about fire

risk or restoring the ecological role of fire. It does mean, however, that factors affecting

fire behavior and ecology and conceptions of fire risk and restoration are woven into the

more overt and administratively prescribed concerns over targets and budgets and the

things that directly affect the accomplishment of acreage targets within budget –

compliance with law regulation and policy, the threat of litigation and the cost of analysis

– the two key factors of project development. The following section discusses the

enigmatic role played by the determination of fire behavior and ecology and perceptions

of fire risk reduction and restoring the ecological role of fire in the development fuels management project proposals.

5.6   The Enigmatic Role of Fire Risk and the Ecological Role of Fire in Fuels Management Project Planning

The previous sections described the general process of developing a proposed action through the negotiations over targets and budgets and costs and the compliance requirements between specialists and line officers during the three phases of NFMA analysis. Rhetorically, and according to official policy, reducing fire risk and restoring the ecological role of fire should be at the heart of fuels management project planning. And indeed they are. But when asked about the factors that influence project planning, managers rarely mentioned these two issues. The discussion focuses instead on the two sets of factors described previously – targets and budgets and compliance and the threat of litigation. Negotiating over these two sets of factors during the three phases of developing a proposed action overshadow and dominate the process of analyzing and specifying fire risk and the ecological role of fire. A fuels manager's perception of treatment needs is just one element among many that are on the table during negotiations.

The goals to reduce fire risk and restore the ecological role of fire are the omnipresent background noise of fuels management project planning. Managers are always concerned about these goals but their practical application in the project planning process is obscure. Other resource specialists and line officers do not challenge fuels managers' knowledge of fire behavior so this knowledge is not part of the negotiation process. Likewise Fuels managers do not question wildlife biologists whether underbrush

is wildlife hiding cover or not. More importantly, what fire managers know about fire behavior and ecology and how they conceive of risk and restoration is not documented until late in the planning process as part of writing the proposed action itself.

The methods by which fire behavior and the ecological role of fire are characterized and analyzed are varied. These differences are not simply due to the different analytical requirement of the three NEPA categories (CE, EA and EIS). Rather, there are large differences in the analysis methods employed for each project, ranging from professional judgment to extensive sampling and spatial modeling using various techniques and computer software. Even between two CEs conducted on the same district and especially between larger projects conducted as EISs have multiple methods of analysis and subsequent representations of the ecological role of fire. As one district Assistant Fire Management Officer (AFMO) described it:

> …each project's different…it varies, definitely, from forest to forest, even from district to district here on how we analyze things, you know, what exactly goes into the specialist report…A lot of it varies by each project, you know, like a project I do is going to be a little different than even when [other AFMOs] do one… (KNH16).

The depth and detail of analysis and the rigor of the methods used increases as the process of refining a proposed action progresses. As discussed previously, the forest leadership team's decision to place a project on the program of work is based largely on the experience and judgment of specialists working for the districts. Simply put, more formal methods of analysis to determine fire behavior and ecology take place after many of the key decisions have been made about the mix of objectives included in a project along with the general location and type treatments to achieve these objectives. "The

literature suggests analysis comes first," one district AFMO noted, "but in reality the idea

of something at risk comes first then analysis is done. Modeling, GIS. Analysis is more

for confirming suspicion or validation" (BLM3). As another AFMO described it:

> We don't have forest-wide fuels data at all, or a layer for GIS, on the
> whole forest. It's developed on the smaller scale for each project…[We]
> walk through most every stand that is going to have some sort of treatment
> associated with it…all those opportunities that are identified, we go walk
> through there and come up with what fuel model it is or whatever it may
> be, their way or choice in deciding how to describe it (KNH16).

It is challenging to capture and quantify professional experience and judgment.

The idiosyncratic selection of more formal methods of data collection and analysis late in

the planning process does not provide an accurate picture of the content of professional

judgment. After all, as discussed above, fuels managers must sometimes provide analysis

and documentation rationalizing projects they do not believe should count as fuels

management. Because the results of more formal analysis are largely used to validate

professional judgment, those analyses are treated more as a form of documentation of the

choices made rather than documentation of how analysis informed those choices. Thus it

is impossible to determine, in any precise or meaningful way, what a manager's

knowledge of fire behavior and ecology, risk and restoration consists of and how this

knowledge informed their role in project negotiations.[194]

This obscured role played by professional judgment and later analysis is

revealing. On the three forests examined for this research, fuels management and its

---

[194] NEPA documentation for 26 projects between 2001 through 2007 was reviewed for this research (ten small projects conducted under CE authority, nine EAs and seven EISs). Seven additional project documents completed in the late 1990s were also reviewed. The project files of one CE and one EIS on each of the three forests was also reviewed but copies were not made or analyzed in depth.

expanded target and budget line item has simply been added to and subsumed into the Forest Service's extant project planning process and extant set of resource management programs and objectives where each project is negotiate anew under unique administrative constraints established in the ever shifting program of work using whatever data and analysis methods are ready to hand. There is no formal or consistent process for defining or characterizing beneficial or detrimental fire behavior and effects in a watershed or treatment unit, let alone the relationship between multiple treated units across time and space within a watershed. There is no formal process for identifying, collecting and managing consistent data needed for such characterization. There is no formal process or set of criteria for prioritizing areas of higher and lower risk, addressing the associated trade-offs between treating one area over another, or for addressing the trade-offs between treating risks to social or economic values from ecologically beneficial fire – all of which are called for in the *Federal Fire Policy* and the *10-Year Comprehensive Strategy* of the National Fire Plan.

The existing project planning process is dominated by the idiosyncratic project-by-project mixing and matching of different resource management program objectives, their associated treatments and funding sources in order to achieve integrated target accomplishment. While the outcome of this process obscures how fire risk and the ecological role of fire are defined and determined and how results of this determination are employed in the negotiation over project objectives, there are several general patterns that emerged from this research. These patterns shed some light on the sources of tension and confusion arising from the high degree of discretion granted local managers and this discretions corollary lack of definitions in legislation and agency direction on basic

concepts and policy goals such as fire risk and sustainability. These patterns also shed

some light on why it is impossible to determine how the policy goals of fire risk

reduction and the restoration of the ecological role of fire are incorporated into fuels

management project planning. These patterns derive from the fact within fire

management there is a general distinction made between reducing fire hazard and

restoring or maintaining the ecological role of fire. Neither side of this distinction is

clearly defined, however, but rooted in professional knowledge and policy rhetoric. One

fire ecologist noted:

> …fire ecology is not equatable to risk and a lot of people in fire
> management are very risk oriented…They're thinking fire behavior,
> they're thinking people and that's where a lot of confusion starts because
> people start throwing terms around about risk and terms about ecological
> risk and ecological sustainability and WUI and pretty soon we're not
> talking about the same thing anymore (BTO35).

Fuels managers focus primarily on the reduction of fire hazard or risk. (The terms

are used synonymously along with threat and danger.) Managing for the ecological role

of fire is a distant second, to the point that its role in fuels management project planning

and decisionmaking is essentially unintelligible. This appears due not so much to its

perceived lack of importance as it does from the professional background and skill set of

the majority of fuels managers. The lone fire ecologist on each forest plays a supporting

role to the fuels management program on each district. Most fuels managers have a

background in firefighting. This background places a premium on the use of professional

judgment for the determination fire behavior but provides little foundation in fire

ecology. Reducing fire risk is therefore approached as reducing the fire behavior

characteristics familiar to firefighters – flame length, fire intensity and potential crown

fire initiation and spread. Fuels managers use their professional judgment to determine hazard and risk while also relying on this professional orientation to interpret ill-defined, inconsistent and often conflicting agency direction. Their interpretation recognizes the primacy of achieving acreage targets within budget. Their interpretation also recognizes the lack of institutional support for conducting assessments of the ecological role of fire as sanctioning the use of their professional judgment for such determinations. Despite this professional orientation towards risk as determined through professional judgment, however, fuels managers almost universally expressed the need for greater effort and support for information collection to move beyond the project by project approach (though none referred to fire policy while doing so) and especially condemn the failure to monitor treatment effects and effectiveness. The following describes the interrelationship of these issues as they pertain to fuels management project planning and decisionmaking.

Policy Direction

Policy direction regarding restoring the ecological role of fire is presented in terms of fire regime condition class (FRCC). This direction reflects the ambiguity between fire risk and ecology quoted above, and the misrepresentation of FRCC inscribed in the categorical exclusion (CE) for fuels reduction, the Healthy Forest Restoration Act (HFRA) and the Forest Service ACtivity Tracking System (FACTS) accomplishment reporting database. Fuels managers almost universally expressed the need for greater effort and support for information collection to move beyond the project-by-project approach to fuels management and especially condemn the failure the agency to support monitor treatment effects and effectiveness.

Recall that the process of project planning in the Forest Service is characterized by three phases of NFMA analysis in which general ideas for projects are proposed, the type and intensity of various kinds of treatments are negotiated and finally settled on. Only during the later stages of NFMA analysis, when the general mix of program objectives and treatment types (if not their precise boundaries and extent) have already been tentatively agreed upon, are more formal methods for characterizing and analyzing fire risk and ecology employed. As one district AFMO put it: "We got thousands of acres to look at you know…we don't have the time and people to go out and do that [fire behavior and GIS] analysis until we get way down the NEPA [triangle] road" (BTK9). The decisions and determinations made during the negotiation process prior to the conduct of these more formal methods of characterization and analysis are based on what is usually referred to as professional judgment or experience. In the Forest Service professional judgment is considered a method of analysis.[195]

The extent to which more formal methods of analysis are employed to supplement and refine the professional judgment used in project planning is ultimately up to the line officer in charge of the project usually the district ranger. They usually make this decision with input from the resource specialists (and sometimes the forest leadership team) during the later stages of project planning. The operative direction for conducting analysis is that found in the Forest Service Handbook (FSH) which, as described

---

[195] The GAO (2005, 2007) also referred to professional judgment as an analysis method and described it as the most common method used in the Forest Service Northern Region, for the determination and prioritization of fire risk.

previously, states that the "[d]evelopment of criteria or standards *may* be necessary to guide the analysis process." [196] The first two bullets in the list are:

1) Identify and select data sources, analysis methods, and set standards of accuracy and

2) Determine the depth or detail of the analysis.

This direction in the FSH is followed by the admonition that "[w]hen formulating analysis and evaluation criteria or standards, be sure to consider Forest Service objectives identified in legislation, policies, and plans…" This admonition requires a great deal of interpretation as the "objectives identified in legislation, policies, and plans" are extremely vague and do not address the inherent incongruities between them. The most important direction guiding fuels management appears to be that linked to the accomplishment of acreage targets, which, as described previously, is a criteria in manager's annual evaluations and directly tied to future program funding. A representative example is found in the fiscal year 2007 Program Direction. Hazardous fuel reduction is defined in this direction as the manipulation of vegetation "so that the intensity, severity, or effects of wildfire are reduced. These reductions should be measurable or predictable using fire behavior prediction models or fire effects models" (USDA Forest Service, 2007a, p 14-24). This direction states that this is the assumed objective of projects carried out with the hazardous fuels budget line item (WFHF). This direction also provides a very basic description of the fire regime condition class concept, paraphrasing the definitions in the HFRA, which is how they are employed in the FACTS accomplishment reporting database. The extent of the direction regarding project planning in these areas reads: "Program managers should maximize opportunities to

---

[196] FSH 1909.15.12.31 (USDA Forest Service, 2004b). Emphasis added.

implement projects in priority areas including WUI and Condition Classes 2 or 3 lands in

Fire Regimes 1, 2, and 3 that will reduce hazardous fuels and/or contribute incrementally

to a landscape-scale improvement in condition class" (USDA Forest Service, 2007a, p

14-18).

Potential incongruities not addressed in this or any other agency direction are

numerous but one example stands out and may serve as a general case – fire severity.

Reducing severity is part of the assumed objective of hazardous fuels reduction and it is

one of the factors in the determination of FRCC. For example, fire regime 1, 2 and 3,

listed above, are characterized predominantly by low-severity, high or stand replacement

severity and mixed severity respectively. The determination of fire severity in FRCC is

measured in terms of percentage of overstory mortality resulting from fire. However, this

measure of fire severity is directly related to the spatial scale over which it is measured as

well as the delineation between classes (e.g. 70% or 80% mortality as the breakpoint

between mixed and high severity categories). In other words, a small patch or stand of

trees killed in a fire within a larger area of surviving trees may be said to be high severity

when measured at the patch or stand-scale, while measurement of a broader area with

predominantly live trees after a fire would produce a lower severity result. The

disciplines of disturbance and landscape ecology call attention to the importance of

selecting the spatial scale of measurement appropriate to the phenomena in question.[197]

Simply put, severity is meaningless (or rather full of meaning since it can mean anything)

unless it is accompanied by some reference to scale and measurement framework more

---

[197] The FRCC Guidebook provides guidelines as a starting point. These generally increase in size as the frequency of fire decreases such that it is recommended that assessment of fire regime 1 in flat terrain encompass 50-2,000 acres while fire regime 5 characteristic of infrequent stand replacing fire encompass 5,000 to 1,000,000 acres in flat or rolling terrain. Steep and broken terrain requires smaller areas since this tends to check fire spread.

generally. Comparisons for purposes of prioritization or monitoring cannot be made unless scale and measurement assumptions are provided.

Professional Judgment

Guidance such as the fiscal year 2007 Program Direction (USDA Forest Service, 2007a) implies that fire behavior models should be used for determining reduced fire severity but it does not require it. Similarly, while the description of FRCC also implies the use of the formal method developed for its assessment - the FRCC Guidebook - this also is not required. There are a wide variety of methods and models to choose from and considerable debate on the merits of each. The relationship between professional judgment and more formal methods of characterizing and analyzing fire behavior or ecology is highly complex. No reliable, consistent analysis methods exist independent of professional experience in observing fire behavior, traditionally gained through firefighting, or, in the case of fire ecology, through field experience in ecological classification. However, this is the primary reason for adopting formal procedures and documenting assumptions.[198] It is therefore significant that consistency and transparency is not required for whatever method is employed on issues such as the spatial scales at which fire severity is determined, since it figures so prominently in even the vaguest direction provided for fuels management.[199]

There are several interrelated consequences of this focus on reducing fire behavior characteristics based primarily on professional judgment without any guidance

---

[198] Stratton (2006) in *Guidance on Spatial Wildland Fire Analysis: Models, Tools, and Techniques* put out by the Forest Service's Rocky Mountain Research Station Fire Sciences Lab notes that "modeling is an art as well as a science and one's field experience enables the art of the modeler." P. 1.

[199] The *Healthy Forest Initiative and Healthy Forest Restoration Act Interim Field Guide* (USDA and USDIO, 2004) also recommends but does not require FRCC Guidebook assessments when conducting Healthy Forest Initiative projects.

or standards. One important consequence is that professional judgment is considered a form of analysis in and of itself and that the use of more formal methods such as computer modeling is viewed largely as an exercise in validating or proving accuracy of their professional judgment, a documentation exercise in response to the threat of litigation rather than a tool of investigation. As one district AFMO put it:

> Old fire dogs, like most FMOs are, they don't even know what the new [fire behavior computer] models are…The level, I wouldn't even say the level of analysis, the analysis was always there, but how you prove it, I guess, has gotten a lot more complicated. You know, models are still models…They're very, very limited in what they tell you. And it's a lot of work to understand and learn how to run them just to tell you what you knew beforehand, you know…But we might use them just to try and prove a point because as we've seen, professional judgment alone doesn't get us out of litigation. It tends to get us in litigation if you don't have some way of proving it (KNH16).

The other consequence of professional orientation of fire managers upon reducing fire behavior characteristics and effects perpetuates some notable biases that effect the perception of fire risk and the identification of projects. One important bias, recognized even by many fire managers themselves, is a stand-level perspective. As one forest AFMO described it: "The experience of fire folks is stand level…we see fire across the landscape but we think of treatments as stands" (KDR6). This predisposition towards professional judgment based on reducing stand-level fire severity, and skepticism over models leads to erroneous ecological perceptions, particularly regarding the purpose of FRCC. One district AFMO, for example noted:

> I don't care what some model tells you. It comes down to knowing when to apply fire to the landscape, when not to, what's going to stop the fire…that's corporate knowledge from the generations that went before us…especially here on [this forest], I mean, fire use started [in this region]. We know that fire's good for the landscape. We know it's good in ponderosa pine but not so much for Lodgepole or Doug fir because we

have a lot more mortality, higher severity…now [we're told] 'show me that through that model.'…How does [FRCC] apply to us down at the ground level?...It's not the site specific thing that we're dealing with on a project-unit by project-unit basis because that's where we're getting beat to death in courts…FRCCs more of a broad landscape, 500,000-acre look…(BJP29).

These biases towards stand-level reduction of fire behavior characteristics and viewing modeling as primarily a means of proving the validity of professional judgment sometimes leads to friction between some fuels managers and the forest fire ecologist and the silviculturists, precisely over the biases inherent fuel managers professional background. Simply put, drawing from the above quote, where fire is good for ponderosa pine, for example, is not necessarily clear from a perspective based purely on reducing fire severity and effects. The assumption that fire is not so good for Lodgepole pine due to high mortality defies generally understood fire ecology principles since the serotinous cones of Lodgepole require fire to open and release their seeds and forests are characterized by high severity fires. While the general difference between stand and landscape perspectives is recognized, the forest fire ecologist's and the silviculturist's concerns over the implications of these biases for project design is typically negotiated on a project by project basis. The purpose and utility of broad scale assessments is largely lost in the bureaucratic refusal to encroach on manager's ability to achieve targets and balance program costs.

…my understanding is that if the primary purpose of a project is fuels, WFHF…you better do FRCC…So we asked the Regional Office for clarification on the role of FRCC assessments for [accomplishment reporting in] FACTS and got conflicting answers. So some said it wasn't a big deal, just gloss over it …I guess the question about intuitiveness…We think we know what the condition class is out there, we think we know what we're looking at but…some of the fuels staff roll their eyes and go 'Give me a break! Why does it matter? Let's just treat areas where we

know we need to reduce the potential flame length, the potential crown fire'…That's what they know and that's what they are really good at. But when we start thinking big picture, broad landscapes, that's just a little beyond them…A lot of times everyone's jumping on this bandwagon about the classic ponderosa pine stand, 'they used to drive wagons through it.' 'It was all grass and widely spaced and open' and blah blah blah. The silviculturalists and I sit in the back of the room and go 'Yeah, but! Yeah, but! Yeah but! There were always other developmental stages in these stands. It was never wall to wall old growth Ponderosa…all low severity' (BTO35).

Determining FRCC

In practice, FRCC assessments using what one fuels specialist called the "bona fide method" (HGJ19) are simply not conducted for small projects carried out as a Categorical Exclusion. The point of the Healthy Forest Initiative and the agencies' development of the fuels CE regulation, after all, was to reduce analytical requirements. For small projects, in other words, FRCC is determined through professional judgment.[200] FRCC assessments were conducted as part of several EAWS assessments. These assessments were conducted in a variety of ways, involving various degrees of rigor in data collection according to the formal FRCC Guidebook methods or using existing data and putting it into the FRCC format – all of which is acceptable according to the formal method.[201]

---

[200] Only one project conducted under Categorical Exclusion decision authority reviewed for this research had an actual FRCC Guidebook assessment associated with it and this was because the project was delayed by the forest leadership team in order to collect additional data on old growth following the *Iron Honey* decision in the Ninth Circuit. During this delay a project with an adjoining boundary being pursued as an EIS completed its EAWS and this analysis included an FRCC Guidebook assessment. Portions of this FRCC assessment information was then included in the small CE project's revised NEPA documentation. The treatment itself, however, remained the same and was not altered by the findings of this analysis. On another forest, two CE projects on different districts planned within a year of each other in fact had verbatim description of FRCC in the project area suggesting one had been copied from the other.

[201] FRCC relies on a vegetation classification called Biophysical settings that divides the developmental stages into five classes: A, post replacement; B mid-seral closed; C mid-seral open; D late-seral 2 closed and; E late seral 1 closed.

Recall that the results of EAWS assessments provide the bulk of the information included in the Affected Environment chapter of subsequent Environmental Impact Statements (EIS). Both EAWS assessments and the Affected Environment chapter of EISs are divided into sections according to resource program such as "fire and fuels," "vegetation" and "wildlife," etc.. Each section is prepared by specialists from the corresponding resource management programs. Of particular interest here are the sections on vegetation and fire. Comparing these two sections demonstrates the challenge of determining how the perception or analysis of the ecological role of fire informs management decisionmaking and treatment design.

All seven EIS documents reviewed for this research used the terminology from the FRCC Guidebook to describe the projects analysis area in the fire and fuels section of the Affected Environment chapter. Only three used the FRCC Guidebook methods to derive the resulting FRCC classification. Only one of the three EISs, however, used the resulting assessment information for the description of the ecological role of fire in both the vegetation and fire and fuels sections of the EIS Affected Environment chapter. The six other EIS documents, including the two for which "bone fide" FRCC Guidebook assessments were conducted, employed different ecological classification systems to describe the ecological role of fire in the vegetation section.

The two most common vegetation classifications used in the vegetation sections of the EISs were Habitat Types and Vegetation Response Units (VRU). These are based classifications of dominant or potentially dominant vegetation (known as potential vegetation groups or PVG). Both Habitat Types and VRU classifications have eleven fire

regime groups. This is not an insignificant difference. FRCC is based classification called Biophysical Settings (BpS) and includes a broader set of indicators. BpSs were designed explicitly to overcome errors in determining fire regimes based on PVG classifications. According to Hann (2004, p. 30), the principle developer of the FRCC Guidebook, "local terrain, climate, fire weather, ignition source and juxtaposition (patch mosaic) of more or less flammable vegetation types, appear to be more important causal factors for determining the fire regime than PVG." In other words, a simple transposition of the eleven fire groups from the Habitat Type or VRU classification systems into the five of FRCC is not accurate or reliable. Crosswalks have been created but it is more involved than simply overlaying one on top of the other.

The description of the proposed treatments in these six EIS documents and how the treatments would improve forest conditions and restore the ecological role of fire were tied to the description of Habitat Types or VRUs in the vegetation section rather than the FRCC description in the fire and fuels section. Only the one EIS that included the FRCC description in both the vegetation and fire and fuels section linked the description of proposed treatments and its intended effects to the characteristics of FRCC. In other words, as the fire ecologist above noted, FRCC is treated primarily as a reporting requirement that is not viewed as needing to reflect any relationship to management action. One district AFMO noted that "FRCC is in the CE and the National Fire Plan but our SO [forest supervisor's office] won't support doing assessments. Someone will catch on that we're not really doing FRCC" (LLW22).

Monitoring

Despite fuels managers' confidence in their professional judgment and the perception that analysis is primarily a means of validating what they already know, managers also recognized that this was a response to the pressure of meeting acreage targets and did not necessarily constitute good or efficient land management planning. The project-by-project approach to information collection and analysis was widely seen as inadequate. This was expressed predominantly in terms of the desire for better monitoring. Several managers pointed out with envy that the "Park Service is really good about doing data collection [with] their Fire Monitoring Handbook, a lot of intensive monitoring, not like the Forest Service where we don't even have a protocol" (BJP29). Or as another district AFMO put it "There's constantly wishes to have better monitoring, I mean, it would make us a better land management agency…you know, in a perfect world, all the stuff you learned in college about how to actually come up with more precise numbers and what really is out there and see what effects you are having…but with the constant downsizing…and budget pressure…" (KNH16). While some managers were rather sympathetic to the institutional challenges of the agency, as if monitoring were a nice extra but not really necessary, others were rather more adamant that the lack of support for monitoring represented a larger organizational disconnect between broader agency initiatives and priorities and those of local managers at the district level where land management actually impacts the land. As one district AFMO noted, referencing the Environmental Management System (EMS) process, established with the 2005 forest

planning rule that was supposed to guide adaptive management and organizational

learning:[202]

> …monitoring is a good example of lack of support. Even for old growth, a
> highlighted issue…Seems like they get the wood out…so where's the
> funding?... Probably the best direction for monitoring is EMS…but our
> EMS rep for the forest comes down to [the district office] and babbles and,
> says 'hey, you guys know what EMS is all about now. Sign here to say
> that you've been to the training'…they're checking boxes! It's not like
> they're giving you monitoring protocols and funding to go with it…My
> frustration is, it's like how do you know you've met your initial objectives
> if you don't follow up on your plan instead of just, okay, we're done here,
> let's go to [Project X] (KMM31).

Manager's frustration with the lack of organizational support for monitoring

became even more vehement in some cases when discussing information collected as

inputs to project planning, information that would be necessary for monitoring to

evaluate post treatment change. One fuels specialist described the Forest Service's

approach to planning as entirely reactionary, responding only to court challenges, stating

that:

> I don't think our agency is capable of proactive action…I think they
> realize, the specialists and leadership team, that we've got to collect data
> or we'll never go anywhere in court because what we've got in our timber
> stand database[203] is garbage and what we have from satellite imagery is
> garbage[204]… but, at the same time, there doesn't seem to be an interest in
> working on basic information…if it's not tied to a project they're not
> interested in looking (HRM13).

---

[202] Since the 2008 planning rule has been enjoined and a new planning rule development process, begun the
status of EMS has become uncertain. See for example the EMS discussion website at
http://forestpolicy.typepad.com/ems/.
[203] This refers to the Timber Sale Management Reporting System (TSMRS), the same one identified in the
Iron Honey litigation.
[204] This refers to SILC 3. Newer remotely sensed data combined with simulation models resulting in newer
broad scale vegetation classifications was just being released to which this specialist noted "I've got a lot of
hopes for VMAP. A lot of people here have a lot of hopes for VMAP…LANDFIRE too…but inherently
they're still going to need to be ground truthed too…The assumptions in their classification rules don't
always hold up on the ground and things change. And they're not fine enough scale for project work."

These general themes expressed by many local managers over the need for basic information to inform planning, the lack of institutional support for information collection and monitoring and the general disconnect between agency initiatives, direction and funding with the realities of actual project planning was summed up nicely by one assistant forest planner by pointing out the contradictions in one of the Forest Service's longstanding rhetorical tropes about efficient management:

> …we've got the federal government going corporate quote-unquote, a big push for the agency the last 15 years, and yet having all the land base that we have and not having a detailed inventory of what we're trying to sell so to speak. You know, a store usually has an inventory of its goods. We don't have that. We're just in, not a complete vacuum, there's some conceptual things we can say because we know that nobody challenging us is going to have any better information, but if we're trying to take concepts, like FRCC and some wildlife habitat issues, we need some detailed information, some consistent information across a large enough area to represent the issue…When lynx was listed205, there was a lot of consternation…Leadership said 'hey, Lynx habitat, that's now a purpose and need for forest management' and now we have a purpose and need for getting fire back on the landscape…but it's left for the folks down at the ground level to take what information they have to kind of try and figure it out for each project and ensure that its effective (BKB30).

Fuels manager's frustration with the lack of institutional support for information collection and analysis to inform project planning and monitoring of the effects of management activity combined with the exigencies of the project planning process, particularly the Leadership Teams prioritization process, and the overwhelming influence of targets and budgets, compliance with law regulation and policy and reaction to litigation lead many to describe fuels management as "totally ad-hoc" (BJP29) that it

---

205 The US Fish and Wildlife Service listed the Canada lynx (*Lynx canadensis*) as threatened under the Endangered Species Act (ESA) in March, 2000.

amounts to "a shotgun approach to fuels management" (LLW22). "We might as well

throw darts at the district map", noted one district AFMO, and continued:

> In fact one time we did with a chunk of money that came in late spring,
> right as we started transitioning to preparedness [for fire season]. What
> difference does it make? Most areas need some sort of treatment and it
> will get changed in NFMA anyway. We practice random acts of risk
> reduction (LBS23).

The inefficiency and dysfunction of the project planning process is widely

recognized by managers at the forest level as well. As on forest fire ecologist described the:

> I can't put my finger on it exactly. I mean we spend a lot of money on this
> forest in planning and yet we pull off these rinky-dink projects. Sometimes
> I just think, you know, 'how did we get here?' We go to meeting after
> meeting after meeting, we have quarterly NEPA meetings where we
> reschedule and we sit there with our calendars open 'how many days do
> you have available, we need you on [project X], we need you on [project
> Y], these are our priorities.'…We had a meeting last week…and some
> people walked away from that meeting going 'I've had that conversation
> every year for the last 12 years on this forest.' That's how the whole thing
> starts. You have to have the specialists agree and move the project forward
> and move to implementation. It's always done on a stand level. It always
> has been done on a stand level… In reality I don't know if it would ever
> make a difference if we came up with a strategy or a priority map…we
> can't even come up with a five-year [fuels reduction] plan and that doesn't
> have to do with landscape planning but with keeping our shelves stocked
> with projects so that we can pull something off when the weather is right
> [for prescribed burning]. It's hard enough just to have projects on the shelf
> let alone a landscape strategy…Cause you got to get funded. You got to
> get projects lined up every year…You got to meet your target every year
> so you got to fund your people every year. I think the view is, right now,
> that if we were to spend time coming up with a landscape strategy it would
> be just totally pie in the sky (BTO35).

5.7   Summary

With the focus on wildland fire fuels following the fires of 2000, fuels

management is finally a significant part of land management. This has brought about the

developing projects that included fire management objectives, what used to be referred to in the 1970s as "fire considerations," as an explicit purpose and need. Nearly thirty years have passed since researchers and high-level agency fire and aviation management leadership began to discuss the importance of such participation. The new role of fuels managers in project planning is an advancement from the past when fuels managers were essentially "janitors, the clean up guys" for other resource management programs. However, fuels management has been absorbed into the Forest Service's extent project planning decision making structure and process, which does not allow fuels programs to pursue the role outlined for it in the *Federal Fire Policy* or the National Fire Plan of working collaboratively to develop an integrated landscape-scale fuels management program or strategy.

The Forest Service project planning and decisionmaking structure and process is focused primarily on keeping the "shelf stocked" with project ready to implement. This focus derives from the need to accomplish acreage targets with the minimum analysis necessary to meet legal and regulatory requirements and mitigate the associated threat of litigation. Simply put, meeting acreage targets ensures future funding to meet future acreage targets.

The *Federal Fire Policy*, the various strategies of the National Fire Plan as well as recent legislation, such as the Healthy Forest Restoration Act, all focus rhetorically on reducing the risk posed by wildfire and forest and ecosystem health through fuels management and restoring the ecological role of fire. Concern for fire risk and the ecological role of fire is paramount, though more so for fire risk, among fuels managers

at the local level. But this concern exists largely in the background as part of fuels managers professional judgment and experience. This background knowledge of what constitutes risk and the ecological role is almost taken for granted as managers negotiate to develop projects to meet targets. There are no specifications or standard set of criteria for what constitutes fire risk or the ecological role of fire and no specified procedures for determining them. Manager's professional judgment is paramount.

While their own professional judgment is never questioned, most managers recognized that collecting information on fuels prior to selecting individual projects and monitoring the effects of projects post treatment would greatly improve their programs. However, fuels managers feel there is little support for gathering information that is not explicitly required for proving the professional judgment in order to legitimate a decision on a clearly defined project. Information and analysis, in other words, is treated by the larger institution, primarily represented by the Forest Leadership Team, as compliance requirement not a necessity of effective fuels management. Fuels managers in turn recognize that planning and developing projects within this planning and decisionmaking structure results in "random acts of risk reduction" and "totally ad-hoc" fuels management.

CHAPTER SIX
DISCUSSION

This research suggests that the organizational structure and administrative philosophy of decentralized hierarchy described by Kaufman (1960 and 2006) remains intact today, along with the concomitant level of decisionmaking discretion and authority granted each lower level manager that this structure is intended to promote. It is reflected in and reproduced by the three stages of NFMA analysis during which proposed actions are developed. Indeed, it appears that the general concept of the NEPA triangle and the overall content of the Forest Service's *NEPA/NFMA Forest Plan Implementation Training Course (1900-01)* (USDA Forest Service, 2006c) from which it comes, represents an effort by the agency to graft the myriad legislative and regulatory requirements onto the agency's historical organizational structure and delegated discretion and decisionmaking authority. It is, however, an organizational structure and project planning process that is increasingly viewed as dysfunctional and floundering under the weight of its poorly defined and contested multiple use mandate (Biber, 2009) compounded by an increasingly rigid and inflexible set of statutes and regulatory procedures (Nie, 2004).

Recall from chapter four that the proposed action includes the fundamental nature and underlying assumptions of a project, its purpose and need, objectives and suite of treatments employed to meet these needs and objectives. These defining elements of a proposed project are decided before compliance requirements are actually encountered in an effort to determine what these compliance requirements actually are. This is done in

an effort to employ the vast discretion and flexibility provided during NFMA analysis where there are no requirements. But with the patchwork of legislative and regulatory requirements that have been layered upon it, the Forest Service has become, as Nie (2004) put it "a case study in inefficient discretion."

Indeed, fuels management project planning results in what many managers describe as a "totally ad-hoc" (BJP29) fuels program, or what others call "a shotgun approach to fuels treatment" (LLW46). "We practice random acts of risk reduction" (LBS23) noted another. Local level fuels managers, in other words, recognize that the actual practice of fuels management project planning does not accord with the broad goals of the *Federal Wildland Fire Policy*, or the National Fire Plan and yet, as one fire ecologist put "…if we were to spend time coming up with a landscape strategy it would be just totally pie in the sky" (BTO35).

Perhaps this perception that landscape strategies and priorities informed by broad-scale assessments are incompatible with the reality of local level fuels management project planning requires a reconceptualization of what constitutes efficient and functional project planning. Judging the efficiency and effective functioning of an administrative structure and process, after all, depends on the actual goals and objectives being pursued through this structure and motivating this process. What is really driving the practice of fuels management is the immense effort to simply to keep the shelf stocked with projects in order to meet annual targets. As described in chapter three, the agency currently has no clear set of overall goals or objectives towards which the implementation of this shelf stock contributes. The political conflict over the

interpretation of sustainability that lead to the withdrawal of the 2000 forest planning led

the agency to explain its goal of achieving sustainability in the Strategic Plan for 2004-

2008 required by the Government Results Performance Act (USDA Forest Service,

2004c) in the most non-committal language possible - "sustainability is a journey that

may have a range of acceptable outcomes, as well as a range of potential courses to

achieve those outcomes" (USDA Forest Service, 2004c, p. 25).[206] In other words, all

projects meet the agency's goal of sustainability.

Perhaps the Forest Service project planning and decisionmaking process, though

it results in ad-hoc fuels management, is actually rather well adapted to the larger

political context within which the Forest Service operates. Perhaps if efficiency is

measured against what Latour (1996) calls "system goals" aimed at ensuring the

dominant political and administrative order, efficiency might be judged differently. In

many ways the apparent dysfunction and conflict ridden nature of the relationship

between fire and fuels management and Forest Service land management more generally,

what one internal review[207] titled described as "functionalism," mirrors the apparent

dysfunctional and conflict ridden nature of public land management policy making and

budget allocation at the broader national level. Both produce a patch-work quilt of

disconnected outcomes and ad-hoc uncoordinated actions.

---

[206] Recall also that the *Cohesive Strategy* (USDA Forest Service, 2000b) recommended that when the GPRA Strategic Plan is updated it should include programmatic requirements to design and implement systematic methods for landscape-scale assessments of the history, status, and trajectory of ecosystem conditions for fuels management.
[207] *An Agency Strategy for Fire Management* (USDA Forest Service, 2000a).

It is at the congressional level, however, where the Forest Service's "preformed decisions," those "special kinds of directions" called program targets (Kaufman (1960, 2006) originate. Many of the most important and effectual forest management decisions are made through the Congressional budgetary process, according to Nie (2003). Of all Washington's processes, according to Colburn (2008), the budget process is the most opaque yet it is where most of the real decisions on fire and fuels management policy are being made. A particularly onerous aspect of what Nie (2008, p. 188) calls "appropriations politics" are the decisions made in key congressional resource and appropriations committees. "Congress uses the power of the purse to get what it wants, and this happens outside the planning process" (Nie, 2008, p. 185). It is often in committee reports where earmarks or instructions for such things as timber quotas or what types of treatments are to be emphasized with specific resource program budget line items are specified (such as emphasizing the use of mechanical treatments for fuels reduction).[208]

The GAO has consistently criticizing the Forest Service's use of acres treated as an accomplishment metric since the late 1990s because it provides no information relevant to fire behavior or ecology, regardless of the definition of fire risk and the ecological role of fire one might employ to measure risk reduction and ecological restoration. Thus even with the new accomplishment reporting database, FACTS, the Forest Service still cannot determine how much is actually spent on different kinds of treatments in different areas; which funding sources actually paid for the treatments or

---

[208] Biber (2009) notes that these key committees have been disproportionately made up of members from timber producing states or districts. He notes further that such committee reports cannot be effectively debated or amended by Congress as a whole since it is the text of the appropriations bills themselves not these committee reports that are voted on.

what the results were - other than gross acres treated. The Congressional Research

Service (CRS, 2009), for example, reported recently that in analyzing the Forest

Service's primary funding sources used for fuels reduction it was unable to determine

how much from each account was used nor what the results were. The CRS (2009, p. 1)

continues:

> …the reporting on hazardous fuel treatment funding for the various types
> of fuel reduction activities and on accomplishments are insufficient for
> Congress to assess progress…information on funding (from annual
> appropriations and mandatory accounts) used for thinning and other
> activities that are substantially intended for wildfire protection, and
> reporting on results, are inadequate to compare the benefits and costs of
> these activities and funds.

Many researchers have noted that the Forest Service has a history of failing to

collect such information, either biophysical or budgetary, especially information which

might raise questions about its current management activities and funding priorities.

Yaffee (1994, p. 17), described the agency's role in the conflicts surrounding old-growth

timber sales in spotted owl habitat in the late 1980s and early 1990s and noted that many

Forest Service officials had a "fundamental desire not to know more" because additional

information "could only conflict with current management direction." Critics of the

agency's implementation of the National Environmental Policy Act (NEPA) have noted

findings similar to those discovered in this research, described in chapter 4, that

information on environmental conditions is collected only after the agency has more or

less committed to an action or set of actions (CEQ, 2002; Karkkainen, 2004). Forest

Service leadership and Congressional appropriations committees have failed to support

monitoring (Camancho, 2007; Nie, 2008), particularly the development and use of

specific, well defined criteria and indicators for evaluating the effects of specific

management action (GAO, 2004b). As described in chapter 4, useful information and

quantitative data is incomplete and out of date, a principle reason the agency has lost so

many court cases, such as *Iron Honey.* Rather than address the situation the CEQ issued a

memo legitimating the data and analysis methods the court found fault with. There is a

complete lack of direction as to what information ought to be collected to inform project

development, little support for what managers themselves deem important and no support

for post-treatment monitoring.

The findings of the Forest Service's internal review titled *An Agency Strategy for*

Fire Management (USDA Forest Service, 2000a, as discussed in chapter three) are as

valid now as when they were released in January, 2000 – before the fires later that

summer and the subsequent initiation of the National Fire Plan and the massive increase

in fuels management funding:

> The standard approach of conducting a review, finding problem areas,
> developing recommendations, and implementing action plans does not
> seem to solve repetitive and recurrent issues. The approach to solving
> these continuing, repetitive issues has always been the same and the
> results are also always the same…[The] issues raised repeatedly in
> program reviews seem to transcend fire management such that they
> require an agency solution, rather than a simple program fix (USDA
> Forest Service, 2000, p. 4).

It seems clear that the problem is larger than just the Forest Service itself,

however, but also involves Congress, the administration and perhaps even the courts.[209]

Colburn (2008, p. 252) points out that in the Forest Service "the actual prioritization of

fuels treatment projects has gone so far underground that real accountability is becoming

---

[209] See Colburn (2006), footnote 208, pointing out that the courts have rejected challenges to Forest Service
minimal monitoring requirements or refused to enforce even significant monitoring requirements in forest
plans and regulations.

impossible…if there is any coherence to the priority of appropriations and project

selection, it is submerged in oceans of patronage and politics-as-usual."[210] Simply put,

the inability to account for what appropriations are actually spent on and what the effects

of fuels treatments are, is due to accounting metrics and systems (acres treated reported in

the Forest ACtivity Tracking System - FACTS) that are not linked to treatment outcomes

along with the refusal to support systematic data collection, analysis and monitoring of

such outcomes. These problems have been repeatedly pointed out by the GAO, agency

auditors and numerous fire management reviews and large fire cost reviews to the

relevant decision makers in Washington DC for decades. Leadership in Congress, the

White House and the Senior Executive Service of the Forest Service, however, seem

unable or unwilling to do anything about it because actually addressing these issues

would end their appropriations logrolling party.

James Baldwin (1963) argues in *The Fire Next Time* that America far too often

operates in a mode of self-perpetuating delusions and that the 'American dream'

encourages us to lead unexamined lives.[211] Such is the role of the Forest Service's

organizational structure and leadership, its fire and fuels management policy and practice

– an unexamined life. Increasing fire hazard and the disruption of fire's ecological role on

the landscape are commonly described as the unintended consequences of past land

management policies and practices. Decades of fire suppression policy is cited these days

---

[210] The opacity has become even thicker in the last few years with the invention of "phonemarking" where members of Congress or their staff contact administrative agency heads directly, making it even more difficult to account for spending preferences and direction of members of Congress. See Washington Post story of May 24, 2007 at http://www.washingtonpost.com/wp-dyn/content/article/2007/05/23/AR2007052301782.html Last accessed January, 2010. It is unknown whether this technique has been employed for hazardous fuels funding or more general Forest Service budget direction.

[211] This poetic linkage comes from Colburn (2008).

as the principle cause, though back in the 1990's, when ecosystem management was still in vogue and the *Federal Fire Policy* was formulated, timber management and livestock grazing were also widely cited causes of this disruption. Fuels management, broadly defined, is now being applied across the country as the antidote for these unintended consequences. Yet suppression remains the dominant response to fire starts and timber management and grazing continue.

Fire is such a complex phenomenon that there remains a great deal of uncertainty over the effects and effectiveness of fuels treatments upon fire behavior and ecology at multiple spatial and temporal scales (van Wagtendonk, 1996; Pollet and Omi, 2002; Graham et al., 2004; Stephens and Moghaddas, 2005). Fuels management is, in effect, a grand experiment with great potential for future unintended consequences. Yet all managers need to do to claim treatments towards target accomplishment is declare fuels management an objective and show a change in fire behavior through a computer simulation. It is, for the most part however, going unexamined to the lament of local fuels managers themselves.

6.1 Recommendations and Future Research

The legislation governing land management, such as the National Environmental Policy ACT (NEPA, 1970), the Endangered Species Act of 1973 (ESA, 1973), the National Forest Management Act (NFMA, 1976) and the Healthy Forest Restoration Act of 2003 (HFRA, 2003), as well as the various policies and plans guiding fire and fuels management more specifically, such as the *Federal Fire Policy* and its various implementation guidance (USDA and USDOI, 2001, 2009) and the various documents of

the National Fire Plan, are broad in scope and yet also often difficult to reconcile. They do not provide clear guidance to the local or field level on how they are to be reconciled and implemented to connect the outcomes of individual projects at the local or field level to these broad goals (Finney and Cohen, 2003; Barbour et al., 2005). Yet, as Finney and Cohen (2003, p. 360) note, the field level is where:

> specific fuel treatment units are identified and landscape planning is performed. This is the critical level that determines the success or failure of fuel management, where the "rubber meets the road" and the fire meets the fuels…the success of an entire national policy hinges on the success of fuel treatments accomplishing the field-level benefits promised and expected.

Fire is such a complex phenomenon that there remains significant uncertainty over the effects and effectiveness of fuels treatments upon fire behavior and ecology under various conditions at various spatial and temporal scales (van Wagtendonk, 1996; Pollet and Omi, 2002; Baker and Ehle, 2003; Graham et al., 2004; Stephens and Moghaddas, 2005; Barbour et al., 2005). Fuels management is, in effect, a grand experiment with great potential for future unintended consequences, even if carefully planned. Many wildland fires are almost archetypal landscape processes, far larger than individual treatments (Finney and Cohen, 2003). Thus, even the intended consequences of reducing risk and restoring forest ecosystems requires planning *for* cumulative effects of multiple treatments across the landscape rather than the common practice of planning and effects analysis geared towards *mitigating* cumulative impacts.

Policy conflicts over forest planning rules and the development of a cohesive fuels management strategy to implement the three tiered planning called for in the *Federal Fire Policy* (e.g. forest plan, fire management plan and project or incident

response plan) have remained in stuck in a state of fibrillation for over ten years. Thus there is no clear guidance translating broad legislation and policy into operationally relevant guidance to the field-level for managing landscape processes. This research suggests that in the absence of clear goals and objectives, operationalized at the field level, where individual projects are planned and implemented, the de-facto operational objective of fuels management has defaulted to achieving annual acreage targets and the allocation of resources for assessment and effects analysis geared towards supporting this objective. The end results are random acts of risk reduction and restoration with each project being a one-off achievement. With the concomitant absence of monitoring requirements, protocols and dedicated funding, evaluation of the effectiveness of these projects in meeting their stated goals is rare and inconsistent. Thus their contribution to the larger policy goals of risk reduction and restoration is largely speculative and anecdotal.

So what is to be done to link the broad policy goals of reducing the risks posed by wildfire and restoring the ecological role of fire with the actual practice project planning? It is naïve to believe the scientific uncertainty and political conflicts over the nature and measurement of risk reduction and forest restoration will abate any time soon. Yet it appears that agency leadership is waiting for a degree of consensus among researchers and managers to emerge on set of physical attributes and their proper measurement before developing national guidance on assessing risk and forest health and replacing the acres treated accomplishment metric. Congress demands accomplishment metrics, through the passage of Government Performance Results Act (GPRA, 1993) and audits by the GAO and OMB, for example, yet continues its historic failure to fund monitoring

(Camancho, 2007; Nie, 2008). These observations aside, this research suggests two actions Forest Service leadership could take that would likely have a large positive impact on project planning at the local level to bring it in line with policy goals outlined in the *Federal Fire Policy* and the 10-Year Comprehensive Policy of the National Fire Plan.

1. Eliminate acreage targets or de-couple them from fuels management program funding at the national forest level.

2. Create monitoring Budget Line Item or specify a proportion of the fuels budget allocated to each national forest be spent on monitoring the effectiveness of individual projects, or a representative sample of individual projects, in achieving their stated objectives and how they contribute to large program goals.

In and of themselves adopting these recommendations would not solve the problem of defining risk and restoration or what criteria aught to be used to prioritize and design individual projects to have the desired impacts upon fire behavior and ecological function across the landscape. Nor do they solve the related problem of the lack of monitor guidelines given the lack of definitions of fire risk and ecological restoration. These recommendations must be understood in the current context of the latest initiatives affecting fire and land management in the near future: a new round of forest planning rule revisions and the new efforts to develop a cohesive strategy called for in the Federal Land Assistance, Management and Enhancement Act (FLAME Act, 2009[212]). While these efforts have just begun and their outcomes uncertain, each includes proposals to establish procedures for defining attributes and assessing conditions multiple scales intended to inform management action. There is thus reason for measured optimism that these difficult issues will receive attention in the near future.

---

[212] Title V, Section 503 of the Department of the Interior, Environment, and Related Agencies Appropriations Act FY 2010.

These broad initiatives, being national in scope, do not address how local level project planning is to contribute to the larger goals of landscape management being described. According to the information available at present neither the current proposed approach for forest planning or the cohesive strategy address the specific issue of alternative accomplishment metrics to replace the current acres treated metric. The pernicious effects acreage targets have on the assessment and planning of individual projects is not addressed. This research suggests that despite what direction may emerge from these initiatives for the assessment and effects monitoring for risk reduction and restoration, if local program funding is dependent on meeting annual acreage targets and resources for monitoring is not isolated from this accomplishment, any new policies and guidelines landscape management that do emerge will necessarily compete with this overriding program objective. These recommendations are intended to relieve local managers from this pressure and allow for assessment and monitoring processes being proposed in the forest planning rule and cohesive strategy to actually inform project planning – the organizational level where the rubber meets the road, where policy encounters the biophysical environment. The following is a very brief overview of these current initiatives.

Forest Planning Rule Revision

On December 17, 2009, Tom Vilsack, the new Secretary of Agriculture, announced the commencement of a new round of efforts to develop forest planning regulations. The Final environmental impact statement is expected to be completed in October, 2011 and the record of decision in November 2011.[213] The development of the

---

[213] 74 Fed. Reg. 67165 (December 18, 2010).

planning rule is being undertaken through a series of panels and roundtable discussions

with each round being summarized and the planning rule team detailing its responses and

current proposed approach made available on the Forest Service's planning rule

website.[214] The currently proposed emphasis of the planning rule are (USDA Forest

Service, 2010a):

> 1) Maintaining healthy, resilient ecosystems, and
>
> 2) Using ecological restoration as a resource management tool to achieve desired conditions where ecosystems have been damaged or degraded.

Forest plans are to include desired conditions, objectives, standards and guidelines

for achieving these goals. The current proposed approach of the planning rule team

includes three phases to be carried out in a continuous loop of: assessments, plan

revisions or amendments and monitoring (USDA Forest Service, 2010b). Assessments

will be conducted at the unit level (national forests) and at larger landscape-levels as

appropriate and determined by the responsible official. These assessments are to include

a focus on resilience, risk and uncertainties with input from multiple stakeholders in a

collaborative process "well before a proposed action" (USDA Forest Service, 2010b, p

3). It is implied that this collaborative approach will be used to identify the questions and

ecological attributes or indicators employed in the assessment and tied to the definitions

of the plans desired conditions. Findings of assessments lead to forest plan revisions or

amendments. Monitoring, like assessment, is to be conducted at appropriate scales, such

as the unit or broader landscape-scales, in order to determine progress towards achieving

the desired condition set forth in the forest plan. Each national forest is responsible for

---

[214] http://fs.usda.gov/planningrule

developing a monitoring program in collaboration with partners and agency and external

scientists specifying the questions, objectives and associated indicators or metrics that

will be used for determining progress towards plan goals and desired conditions. Forest

level monitoring must be coordinated with the monitoring at larger landscape-scales

coordinated by the regional forester. Both assessment and monitoring are to evaluate risk

to and uncertainty over management activity related to the various plan components

identified in the stated desired conditions.

Developing a New Cohesive Strategy

Though the development of the new forest planning rule is a separate process

from that of the cohesive strategy, which is interagency in scope, there are many areas of

conceptual overlap. With the passage of the FLAME act in October, 2009 the USDA and

USDOI are required to develop a "cohesive wildfire management strategy, consistent

with the recommendations described in recent reports of the Government Accountability

Office" (Title V, Section 503 of the Department of the Interior, Environment, and Related

Agencies Appropriations Act FY 2010) as well as seven other "elements" specified in the

legislation.[215] The development of the cohesive strategy is being overseen by the

Wildland Fire Leadership Council (WFLC) and its report to Congress outlining the

cohesive strategy is scheduled to be completed in November, 2010 (WFLC, 2010a). The

new cohesive strategy has three broad goals:

---

[215](1) the identification of the most cost-effective means for allocating fire management budget resources;
(2) the reinvestment in non-fire programs by the Secretary of the Interior and the Secretary of Agriculture;
(3) employing the appropriate management response to wildfires;
(4) assessing the level of risk to communities;
(5) the allocation of hazardous fuels reduction funds based on the priority of hazardous fuels reduction projects;
(6) assessing the impacts of climate change on the frequency

1) Restore and maintain landscapes to be resilient to disturbances in accordance with management objectives;

2) fire adapted communities that can assess the level of risk they face and mitigate the risk and consequences of wildfire and;

3) all jurisdictions participate in implementing safe, effective and efficient risk-based fire management decision

The WFLC has selected a specific report of the GAO (GAO, 2007) from which to draw the recommendations referred to in the FLAME act (WFLC, 2010b). The core of these recommendations, arguably, is the second encapsulated in their second recommendation to "develop and implement a common approach to risk assessment, to provide for a broad, national assessment of hazard, risk, and values, as in the Forest Service's [national] allocation model, as well as more refined regional and local assessments" (GAO, 2007 p. 66).[216] The current framework for the development and implementation of the cohesive strategy is a phased approach where phase one is the initial report to Congress outlining the process and timelines due in November, 2010, phase two encompasses regional identification of values and the assessments of risk to these values according to the process outlined in phase one while phase three is described as a roll-up of regional strategies into a national strategy that establishes priorities, mitigates risk to communities and landscapes and monitors effectiveness (WFLC, 2010a).

---

[216] The other four recommendations from the GAO (2007, p. 66) are:
1) "…develop a common, systematic funding allocation process [that] should be applied at all levels within the agencies… the Forest Service's model for allocating funds shows promise as the foundation of a systematic process."
3) "Devote resources to developing a measure of, and subsequently collecting data on, fuel reduction effectiveness, so that the agencies can usefully estimate the extent and duration of risk reduction from potential fuel treatments."
4) "Use information on risk and fuel treatment effectiveness, once available, in concert with information on the cost of treatments, to assess the cost-effectiveness of various potential fuel reduction treatments.
5) "Finally, the Secretaries of Agriculture and of the Interior should provide guidance that clearly distinguishes the relative importance of the various factors used in allocating funds and selecting projects…This guidance should also distinguish the relative priority of different values at risk…"

The definition of the regional boundaries for phase two have not yet been identified or made public and while the landscape method being developed is to be adaptable to local-scales, this has also not been defined and it is not clear at present how assessments at the local level will be incorporated into the strategy (WFLC, 2010a).

The WFLC has appointed a science team to develop a common approach to risk assessment scalable to the national, regional and local levels as called for by the GAO (WFLC, 2010a). This team has been developing a procedure for such a scalable risk assessment framework and conducted a national evaluation (Calkin et al., 2010; Calkin et al., 2010)[217]. Risk is defined similarly in the current forest planning documents and in the current proposal by the science panel developing the risk assessment framework for the cohesive strategy and may be summarized as the probability of a change event and the degree of change likely to result from this event upon a natural resource. While this general definition is not elaborated upon in the current documents on the forest planning rule revision, it is clearly elaborated in the fire risk assessment procedure employed by the cohesive strategy science panel.[218] Wildfire risk assessment, according to this definition entails determining the probability of fire at different intensity levels (using flame length as a surrogate) and estimating the potential for positive and negative effects upon natural resources (or values) at these different intensity levels, what are called "response functions" in Ager et al. (2010). Once such an assessment is complete, the resources can be prioritized based on the likely hood of positive and negative effects of

---

[217] An overview of this effort as well as these two documents referenced above is available at the Western Wildland Environmental Threat Assessment Center (WWETAC) website at http://www.fs.fed.us/wwetac/projects/calkin.html.

[218] Risk is defined as "a combination of the likelihood that a negative outcome will occur and the severity of the subsequent negative components" (USDA Forest Service, 2010a).

the predicted fire intensity. Ager et al. (2010) and Calkin et al. (2010) have suggested

using some form of multi-criteria analysis to assign values to non-monetized natural

resources, evaluate trade-offs and assign priorities for risk reduction and restoration

treatments. Whether this suggestion has been taken up by the WFLC for the cohesive

strategy framework is currently unknown.

The Importance of Eliminating Acreage Targets and Funding Monitoring for the Success of Forest Planning and the Cohesive Strategy

Fundamental to resource assessment as described in the forest planning

documents and the approach to fire risk assessment being developed by cohesive strategy

science panel is clearly delimiting the spatio-temporal scales over which assessments will

be conducted and defining the resource values and their attributes assessed at these scales

(USDA Forest Service, 2010a; Calkin et al., 2010a). For the fire risk assessment, this

includes the spatio-temporal scales at which the probability of fires of different intensities

are summarized, the clear definition of the natural resources and their attributes that

wildfire will encounter at these differing fire intensities and clear definition of the effects

of these different fire intensity levels upon these resources (e.g. response functions). The

spatio-temporal scale at which fire probability and intensity are estimated must be

commensurate with the spatio-temporal scale employed in the definition of the resources

and their attributes affected by fire.

The forest planning rule framework in its current form clearly specifies, as

required by the National Forest Management Act (NFMA), that the national forest are the

organizational level at which assessment, planning and monitoring is to take place (in

addition to the as yet defined landscape-level). It is vague, however, on the details of the

process within which the definition of resources and attributes comprising the desired future conditions, assessment and monitoring of forest plans will be determined and how individual projects will be linked them. The cohesive strategy in its current form does not specify what the definition of regional and local levels are for the purposes of risk assessment and prioritization. And though the process for identifying, defining and prioritizing resource values is also unclear, as with the current forest planning rule, the concept of wildfire risk as the probability of impacts of various wildfire intensities upon resources provides a clear conception of the types of information is needed and hence the outlines of the processes that should be undertaken to derive them – collaboratively developed definitions of resource values and the likely impacts of different fire intensities upon these values at the selected levels. With wildfire a quintessential landscape process and agent of ecological change, the definition of regional and local scales and the institutional process employed for defining and prioritizing resource values and their attributes for the cohesive strategy risk assessments should be integrated and coordinated with the assessment and monitoring scales and the institutional process employed for determining and defining desired conditions in national forest plans and regional assessments and monitoring proposed for the forest planning rule.

Local level managers and resource specialists should be relieved of the institutional pressure to meet annual targets in order to allow them to participate in such an integrated and coordinated process. As noted above, the project level is where the resource management assessment and planning physically impacts the environment, "where the rubber meets the road" (Finney and Cohen, 2003). This suggests that the local level should be defined as that level where actual ground disturbing management

activities are planned and implemented – the district offices as well as the national forest headquarters. This also suggests that the local managers engaged in planning and implementation at this organizational level should be involved in the process of determining the definitions of resources and their attributes as well as the development of response functions at the local level. It is these local managers that will have work with stakeholders in the collaborative management envisioned in the current forest planning rule revision (e.g. desired conditions and risks to these conditions on national forests) and the cohesive strategy (e.g. Restoring landscapes and Community Wildfire Protection Planning to promote resilient fire-adapted communities).

Though both the cohesive strategy and forest planning rule revision documents currently available discuss, in general terms, the promise of defining social and ecological values and selecting their attributes, assessing current conditions and developing monitoring protocols and processes for evaluating the effectiveness of management actions in achieving the desired conditions outlined in cohesive strategy and forest plan goals and objectives, there is no mention of these criteria, once developed, will also be employed as inputs to the project planning process or replacing the acres treated accomplishment metric. Even if local level managers and resource specialists are not involved in the development of assessment criteria and standards, if these do not replace the acres-treated accomplishment metric this research suggests it is unlikely that project planning will proceed differently from its current focus on meeting annual targets. These new assessment and monitoring criteria may end up being uncoupled from the actual process of planning individual projects, the cumulative effect of which determines the success of both the future cohesive strategy and forest plans.

Actor-Network Framework and Future Research

The policy discourse over land management in general and fire and fuels management in particular, has apparently adopted the concept of "landscape-scale" or "landscape-level" in place of the earlier concept of management at the "ecosystem-scale" or ecosystem management, the discourse under which the 1995 and 2001 *Federal Fire Policy* were developed. While currently fashionable, it is not at all clear how management focused at the landscape-scale, or level since they are often used interchangeable, is different from the previous focus on ecosystem management (NIE, 2010). Ecosystems and landscapes are notoriously ill-defined and subject to a great deal of uncertainty, both epistemic and linguistic uncertainty (Elith et al., 2002; Regan et al., 2002) with, for example, epistemic issues pertaining to knowledge of scalar relationships as well as the stochasticity inherent in the entities and processes studied and linguistic mixed up with and often undifferentiated from linguistic uncertainties of, for example, culturally primed and discipline specific concepts and definitions of the entities and processes studied such as ecosystem health, valued resources water quality and fire severity. Allen (1998) suggested the notions of landscape level and scale should in fact be avoided due to the confusion surrounding these concepts back when these concepts were still used to try and define the domain of ecosystem management. Simply put, a landscape is not a scale and the concept of level, applied to landscapes, has caused too much confusion between physical relationships that are scalar and those that derive from definitions (Allen, 1998). The attribution of "thingness" comes from the observer and is a matter of definitions and language, according to Allen (1998) and while this attribution is helpful, perhaps even necessary, to observation and the development of observation

protocols, there is nothing necessary about the relationship between definitions of things and the material world. Observed relationships that are scalar are thus a matter of real material relationships but the observation protocol and the choice of scales employed in observation are also a matter of choice of the observer (Allen, 1998).

Little attention has been given to the influence of ecological scale and its nuances and varied concepts on policy formulation and decisionmaking, (Rykiel, 1998) notes, but this relationship involves a gap between scientific judgments and political value judgments that must be bridged through making explicit the uses of scale concepts. This is particularly important with regard to epistemic and linguistic uncertainty (Elith et al., 2002; Regan et al., 2002) and the assumptions often left implicit even in formal ecological models (Burgman et al., 2005) let alone such "ecotheocratic" concepts such as ecosystem or forest health that mix up ecology as a science from ecology as a belief or value system (Kapustka, 2008).

In both risk assessment, as defined by the Environmental Protection Agency (EPA, 1998) and the various forms of multi-criteria decision analysis proposed by Ager et al. (2010) and Calkin et al. (2010) for the determination and prioritization of resource values at risk for the cohesive strategy, such as the Analytical Hierarchy Process[219] (Saaty, 2000 Saaty and Vargus, 2001) begin with a problem formulation phase. It is during this problem formulation phase, ideally, that stakeholders of an issue or problem and their conceptions and definitions of values (the assigned "thingness" of various

---

[219] The Forest Service allocation model referred to by the GAO (2007) in their recommendations for a cohesive strategy is called Hazardous Fuels Prioritization System (HFPAS) and employs a form of multi-criteria analysis. See USDA Forest Service FY 2011 proposed budget at http://www.fs.fed.us/publications/budget-2011/fy-2011-usfs-budget-justification.pdf. Last accessed August, 2010.

natural resource values) are identified, including the uncertainties involved (both epistemic and linguistic) and the attributes of these resource values are selected for assessment and monitoring. The importance of clearly articulating the problem to be addressed and defining the resource value to be assessed in order to engender mutual understanding of between stakeholders and decisionmakers alike is critical, particularly for defining and selecting the attributes to be assessed and monitored. Such "things" as risk or resiliency are not assessed and monitored directly but evaluated through the use of the selected attributes of the thing that serve as surrogates for the thing itself.[220] The selection of attributes is fraught with difficulty in both risk assessment (Niemi and McDonald, 2004) and multi-criteria analysis (Keeney and Gregory, 2005) and must be undertaken with care.

In both risk assessment (Simberloff, 2005; Duvall and Wyatt, 2009) and in multi-criteria analysis (Franco and Montibeller, 2009), however, there is often much less attention paid to this first phase of problem formulation. There are myriad reasons this is often the case, ranging from regulatory and organizational factors, such as budget and time constraints, that manifest themselves in risk assessments being viewed as requirements fulfilled after the decision has already been made rather than a useful process to inform decisionmaking (Kapustks, 2008) and in multi-criteria analysis, owing to its origins in engineering and operations research as the search for subjective preferences among already well understood and defined objective problems (White, 2009; Franco and Montibeller, 2009).

---

[220] In the risk assessment these are called assessment endpoints (EPA, 1998) while in multi-criteria analysis these are simply called attributes (Keeney and Gregory, 2005).

As all these aspects of problem formulation are matters of negotiation, deliberative or otherwise, including the establishment of the regulatory and organizational setting of negotiations themselves, the nature of the resource values being assessed as well as the identification of the actors involved and their competencies, Actor Network Theory (ANT) offers a flexible approach to understanding these dynamic processes and the myriad factors involved, whether individual, organizational and political or technical and scientific. Due to its principle of symmetry and agnosticisms towards the identity of actors and the nature of the problem and its setting, ANT, like the problem formulation phase in risk assessment and multi-criteria analysis, tries make explicit the factors involved in determining the choices made. By focusing on the process of negotiation and the translations that result, rather than the subjects and objects of negotiation involved in negotiation ANT can be fruitfully employed from the outside, so to speak, to study how risk assessment and monitoring programs and procedures are developed and implemented, including the potential role of multi-criteria analysis, as well employed from the inside as part of the process of developing and implementing such programs and procedures themselves. Of particular relevance would be the application of ANT to the problem of scale and its various conceptions intermingling epistemic and linguistic uncertainty, especially in collaborative management settings. Such an application would be particularly relevant to the process contemplated in the new cohesive strategy of defining resource values at risk, selecting attributes that represent these values and evaluating their response to predicted fire severities and the selection and definition of the different scales at which these effects are evaluated, tradeoff

analysis conducted and priorities established. Such could be the topic of future research

into fire and fuels management policy and practice.

CHAPTER SEVEN

CONCLUSION

This dissertation explored the following three questions; 1) What is fuels management policy and what was its history that led to its current form?; 2) How are fuels management projects actually developed into project proposals?; and 3) What are the key factors that affect this development of fuels management project proposals? These questions are explored in two ways; the first broad based focusing on fire and fuels policy and its history and the second examining the practice of fuels management project development via a more fine grained empirical approach. This chapter is composed of three sections. 6.1 provides a discussion of the study limitations encountered in this research. Section 6.2 provides a brief summary of chapter three on the policy and historical development of fire and fuels management. This is followed by a section 6.3 providing a summary of the material covered in chapters four and five on the practice of fuels management project development and planning in the U.S. Forest Service.

7.1   Study Limitations

The potential limitations of this research are similar to those of all historical and qualitative studies – that of interpretation. This problem takes slightly different forms for the two main parts of this research, that on policy and that on practice. For the analysis of policy, every effort was made to collect and analyze all the relevant policy documents as well as a diverse set of supporting documents and scholarly analysis and commentaries on fire policy. Many specific conclusions drawn are shared by other researchers and duly

cited. Many others, however, were my own. In these cases every effort was made to build the case for such judgment with available evidence. Nonetheless, other perspectives are possible, a great deal of material was surely missed that could lead to alternative interpretations on specific details or upon overall conclusions.

The limitations posed by interpretation upon the empirical investigation of fuels management practice are common to qualitative research in general, especially that employing a case study approach. This problem revolves around the issue of the representativeness of the data collected and the sites from which it was collected. In this research, substantial effort was made in an attempt to overcome this problem by employing three different national forests with varying organizational structures and capacities (as discussed in chapter 2 methods and theoretical approach) and at least two districts from each forest. While the analysis of the resulting data from these three different forests revealed similar patterns lending support for the conclusions drawn, using qualitative methods that rely on in-depth interviews on three different sites also introduced another limitation that was not anticipated in the research design. This limitation arises from the relevance of non-fire management personnel in the development and planning of projects. Once data collection commenced and initial analysis conducted it became clear that a richer understanding would be gained by including a comparably representative sample of individuals from the many other resource management programs. Several such individuals were included but they cannot be said to constitute a comparably representative sample to the preponderance of fire and fuels managers interviewed. This was not practical. As a result, this research is influenced by the fact that the majority of accounts of project planning are those of fire managers

which, as this research revealed, are much less isolated from the programmatic interests and objectives of other resource management programs than they once were. In short, the standard problem of finding a balance between breadth and depth was more complicated than anticipated.

7.2   Summary of Results: Fire and Fuels Policy

Since the early 1970s, when the Forest Service began experimenting with alternatives to its policy of total fire control in Montana and Idaho, fire managers and researchers have been calling for the integration of fire management into overall land management. It was recognized that fire impacts all of the resources the agency statutorily charged with managing, principally by the Multiple Use Sustained Yield (MUSY, 1960). With the name change of the agency's Division of Fire Control to the Division of Fire Management the agency recognized that fire cannot be fully controlled in order to pursue multiple use management but that the interaction of wildfire with these resources and their use must be managed in a more integrated and comprehensive fashion. The principle means by which these early researchers and managers proposed integrating fire management with land management was through expanding fuels management, guided by what was then referred to as "fire knowledge," to allow more efficient fire suppression and prescribed natural fire for resource benefit where wildfire was not wanted. Fire knowledge, a mixture of professional experience and an expanding research on fire behavior, fire history and fire ecology, in other words, was proposed as vital inputs to decisionmaking on the setting of broad scale land management objectives and planning to meet these objectives. Fire researchers and managers in the Forest

Service had high hopes for such integration in the development of the first round of Land and Resource Management Plans (forest plans) under the National Forest Management Act (NFMA, 1976). This integration, however, did not occur. Fire suppression remained the predominant response to all but a few widlfires in some wilderness areas. Fuels management was relegated to supporting other resource management activities, primarily timber management (but also burning for wildlife habitat) and was not employed as a means of influencing fire across the landscape.

Successive severe fire seasons, such as 1988, 1994 and 2000, have led to successive revisions of the *Federal Fire Policy* (1990, 1995 and 2001), each more strongly than the last calling for roughly the same thing – the development of what is now referred to as landscape-level fire and fuels strategy, one that takes into account the fact that wildfire ignores jurisdictional boundaries. Such a strategy should be informed by multi-scale assessments of fire behavior and ecology and implemented through collaboratively developed fire and fuels management plans at these multiple scales. Forest Plans are the legislative foundation of Forest Service land management into which the principals and goals of the *Federal Fire Policy* are supposed to be integrated. However, overall land management policy and planning in the Forest Service remains locked in seemingly endless political conflict. Planning regulations for revising forest plans have been proposed and withdrawn due to this political conflict in 1995, 2000, 2005 and 2008.

Each successive *Federal Fire Policy* revision and the many reviews of its implementation have led to tinkering at the margins of administrative guidance, such as

the many revisions issued for prescribed fire and wildland fire use planning and implementation or the many changes in various chapters of the Forest Service Handbook. Such guidance reflects the political deadlock over forest management by providing copious procedural requirements with no guidance on the actual goals and objectives of fire and fuels management or adjudicating conflicting policies, goals and implementation procedures. Thus, while there is a formal *Federal Fire Policy* it does not in fact guide actual fuels management activity in any meaningful sense. Its primary goals and recommendations remain unfulfilled. There is no integrated landscape-scale fire and fuels strategy or management plans at the local level. There is no systematic data collection or formal risk based assessment process to inform treatment prioritization and design in order to allow increased use of fire for resource benefit to both reduce hazardous fuels and restore or maintain ecological processes. There is, in other words, no comprehensive policy guiding the actual practice of fuels management, and according to many, "there are few indications that such a policy is in development" (Franklin and Agee, 2003; Stephens and Ruth, 2005).

Congress, rather than stepping forth and dealing directly with controversial land management policy issues, reproduces this conflict by exerting pressure on federal land management decisionmaking. It has instituted numerous changes to procedural and analytical requirements over the years without clarifying policy or consistently funding its legislative mandates. Many of these procedural changes are often designed to thwart other legislative mandates agencies are required to comply with (Nie, 2004). The administrative branch does this as well. It does this through its control of the Council of Environmental Quality (CEQ) overseeing National Environmental Policy Act (NEPA)

compliance. Many of the legislative and administrative changes to forest and fuels management were introduced under President Bush's Healthy Forest Initiative, principally the Categorical Exclusion from analysis under NEPA for fuels reduction and the Healthy Forest Restoration Act (HFRA, 2003) or the CEQ memo on cumulative effects analysis, issued following the Forest Service's defeat in the Ninth Circuit in the Iron Honey case (*Lands Council V. Powel,* 2005).[221] The implementation of various provisions of the Healthy Forest Initiative have in many ways run counter to the principles and objectives of the *Federal Fire Policy*, the centerpiece of the National Fire Plan (the *10-Year Comprehensive Strategy* developed under the auspices of the Western Governors Association) and in many instances the stated goals of the Healthy Forest Initiative itself.

7.3 Summary of Results: The Practice of Fuels Management

Fuels management in the Forest Service has transitioned from playing simply a supporting role to other resource management programs or, as one fuels specialist described it, being the "janitors" for the timber program, responsible primarily for burning logging slash left behind from timber sales. Since the fires of 2000 and the substantial increase in funding allocated by Congress that initiated the National Fire Plan, fuels managers now propose projects and participate on the interdisciplinary teams (ID teams) of resource management specialists in the process of developing proposed actions and ensuring compliance with NEPA and the myriad other statutory, regulatory and agency requirements. This new more active role for fuels management, however, has

---

[221] Also known as *Iron Honey.* The CEQ memo refers to *Guidance on the Consideration of Past Actions in Cumulative Effects Analysis* (June 24, 2005). See chapter two.

been inserted into the extant organizational structure and project planning process of Forest Service natural resource management.

The planning process in the Forest Service is dynamic and complex, characterized by both overlapping and competing objectives between the various resource management programs. The varying degrees of overlap and competition arise from the fact that the various treatments available to meet the specific objectives of one program, affects the resources managed by programs and thus their ability to meet their objectives. This interconnection between program objectives and their pursuit through the various kinds of treatments must be adjudicated during project development and planning. Lacking clear direction from Congress or forest plans, major value conflicts and prioritization are replayed continuously with each project.

Project planning in the Forest Service is composed of two basic components; the first component is the process leading up to a proposed action, where there are no regulations to comply with or guidelines to go by. The second component is the process that follows a proposed action characterized by a host of legal and regulatory requirements. The first half of the project planning process is referred to as NFMA analysis while the second is referred to as NEPA analysis a division that originates in the Forest Service's *NEPA/NFMA Forest Plan Implementation Training Course (1900-01)*. NFMA analysis encompasses all the procedures through which a formal proposed action document is developed. The completion of a proposed action document initiates the formal procedures required by the National Environmental Policy Act (NEPA). While the process of complying with NEPA is important and can influence the final form of a

project, NFMA analysis is where the heart of a project is established. It is during NFMA

analysis that a project's rationale for management action are established (its "purpose and

need") as well as its objectives and proposed treatments to meet these objectives and

address these needs. It is during NFMA analysis and the development of a proposed

action, in other words, that the overlap and competition between the objectives of the

various resource management programs is adjudicated. NFMA analysis is essentially a

process of negotiation between the specialists from the various resource management

programs and their district rangers over the program objectives pursued in a proposed

action and the extent to which the treatments employed effect the objectives of other

programs. The intent of NFMA analysis is the efficient development of a proposed action

that is as close to compliant and ready for NEPA analysis as possible. There are a myriad

of factors that must be negotiated during NFMA analysis and the development of a

proposed action. The most important are encompassed in two interrelated sets of key

factors:

1. targets and funding and

2. compliance with law, regulation and agency policy, the threat of litigation and the
   cost of data collection and analysis determined to be necessary for compliance
   and to mitigate the threat of litigation.

The overriding objective of Fuels management is maintaining what is described

by many managers as "shelf stock" of projects ready to implement. It is through

implementation of projects that have made their way through the NEPA process and

signed by the district ranger or forest supervisor that fuels management acreage targets

are met. Program funding is allocated based on this acreage target. Key factor one, in

other words, is of primary concern. In order to maintain this shelf stock of projects ready

to implement, fuels managers must invest in project development and planning. The cost of planning, however, is largely determined by the suite of issues encompassed in factor two above regarding compliance. This set of factors affects the cost of planning which in turn affects the nature of the project, its mix of program objectives and the type and extent of treatments proposed. Many resource management programs are engaged in similar efforts with similar concerns and they must all negotiate on the mix of objectives and treatment employed to meet their various program targets.

NFMA analysis is intentionally ill-defined and lacking specific direction. This is intended to provide flexibility to managers but makes it a very nebulous and fluid process. There are, however, certain characteristics of the organizational structure of the Forest Service that leads to a distinct pattern to the otherwise fluid process of negotiation. This is the Forest Leadership Team's development of the annual program of work. Individual resource management programs do not control the funding allocated to them to meet their respective targets. This funding is controlled by the Forest Leadership who is responsible for meeting "integrated accomplishments," among all resource programs, often favoring certain activities over others based on direction passed down from Congress detailed in the annual program of work that accompanies each year's appropriations. The program of work has the effect of dividing the process of NFMA analysis into three phases:

1. the preparation of project proposals for presentation to the Leadership Team;

2. the Leadership Team's acceptance, prioritization and allocation of resources, principally funding and specialist's time, for the development and planning of the project; and

3. the determination of resource conditions and the development of a proposed action by the assigned interdisciplinary team. The negotiation process that takes place during these three phases of NFMA analysis is the subject of the following chapter.

The first phase of project planning involves negotiation among specialist aimed at getting a project accepted by the Forest Leadership Team and placed on the program of work, and thus funded for further development. These initial ideas for fuels management projects generally originate from the specialists on the districts. The first phase of NFMA analysis is in many ways the most important. While the formal decision as to the size and mix of activities is not made until a final decision document is signed after public scoping, in practical terms this decision is provisionally made during this first phase of project planning. Estimating the level of analysis needed and the recommended NEPA category is provided as part of the presentation of the project idea to the Forest Leadership Team for inclusion on the program of work.

The Forest Leadership Team generally accepts the proposals as presented by each district ranger, including the level of assessment and analysis, and, if added to the program of work, the project is passed back to the districts for assessment and development. The negotiations of the Forest Leadership Team are over the combination of all projects that will take place on the forest rather than the combinations of objectives and treatments comprising an individual project. The effect on individual projects is, in a way, indirect as the focus is not on the mix of objectives included in an individual project. The Leadership Teams' prioritization and allocation of funding and specialist time to each project sets parameters within which the project will be developed. However, these parameters can have a strong impact on the amount of funding and

specialists time put into assessment, data collection and analysis necessary for

compliance with law, regulation and policy and mitigating the threat of litigation.

Once projects get on the program of work, the third phase of NFMA analysis

begins. This effort consists of a more formal assessment of conditions and refining the

mix of management objectives that will be pursued, including what kind of treatments

and their boundaries, such as which areas will be proposed for prescribed burning pre-

commercial or commercial thinning. The negotiation process is over which treatment

units, supporting which resource management program's objectives, will be reduced in

size or intensity or simply pulled due to the cost of data collection and analysis.

The negotiation over the mix of program objectives and treatments for fuels

management projects is based largely on the professional judgment of the fuels manager

engaged in project development. Formal data collection and analysis efforts are

conducted late in phase three of NFMA analysis once the mix of objectives and types of

treatments have been more or less established. The result is that such efforts are treated as

confirmation rather than investigation. This effort is principally motivated by the threat of

litigation because of a number court cases found fault with the data and analysis methods

employed for fuels management projects but agency direction does not require or provide

direction for such activities but rather leaves it up to the discretion of the line officer

signing the decision document to decide what level of effort is appropriate. Curiously,

while managers decry what they view as the courts overstepping their traditional

deference to agency judgment as to what level of analysis and data collection is necessary

they also overwhelmingly denounce what they view as the complete lack of support for

monitoring of projects to assess their effects on other resources as well as their

effectiveness in altering fire behavior as predicted.

The overall effect of fuels management project planning and decisionmaking

within this organizational structure and budget allocation process characterized by

project-by-project negotiation during these three phases of NFMA analysis, based largely

on the professional judgment of the fuels managers involved, is described "ad-hoc." "We

practice random acts of risk reduction" (LBS23) noted one district Assistant Fire

Management Officer. This practice is widely recognized as failing to meet the policy

goals of the *Federal Wildland Fire Policy* or the *10-Year Comprehensive Strategy* of the

National Fire Plan, which emphasize the need for collaborative, landscape-scale fuels

management based on strategic prioritization of risk reduction and ecological restoration.

In order to move beyond ad-hoc fuels management and implement the *Federal*

Fire Policy through coordinating fuel treatments across the landscape and integrating

them with the goals of restoring ecological resiliency, this research suggests that the acres

treated metric must be eliminated or at lest the fuels management programs annual

operating budget must be de-coupled from this accomplishment metric. Elimination of

the acres-treated accomplishment target should not wait until an alternative metric is

developed. Rather, because on-the-ground fuel treatment is where the policy goals of

wildfire risk reduction and restoring the ecological role of fire are made manifest, and

there is as yet no scientific or political consensus on what an alternative metric should be,

project level fuels management planning should be part of the process of developing this

alternative metric. This leads to the second recommendation that results form this

research, the funding and requiring monitoring. As with accomplishment metrics, what to monitor and how are subject to debate. But treatments are being implemented and for the most part their effects are going unexamined. This research suggests that local managers strongly desire the opportunity to monitor the effects of their projects and they realize that monitoring requires pre-treatment inventory and assessment, regardless of the protocol adopted. Rather than wait for organizational consensus on a monitoring protocol managers should be provided the organizational support to conduct pre-treatment assessment and post-treatment monitoring with the requirement that these endeavors be documented and built into a process explicitly organized for the purpose of building a monitoring program and developing a protocol for the specific fire ecology of the peculiar to the individual forest, testing various approaches and procedures and developing mutual understanding and consensus among resource specialists. Only in the absence of the pressure to achieve annual acreage targets would such an endeavor be feasible.

Accomplishment metrics and effects monitoring are, however, tied to opaque and byzantine process of budgetary politics between Congress and the Senior Executive Service of the Forest Service. It is unclear what is at stake and what the factors are but there are few reasons to expect this situation to change anytime soon. As new efforts gets underway to develop another cohesive strategy and new forest planning regulations, however, presents the opportunity to investigate and perhaps influence the continuing efforts to integrate fuels management into land management planning and decisionmaking, particularly the application of Actor Network Theory to the problem of

attribute selection and their response to predictions of fire severity in wildfire risk

assessments.

LITERATURE CITED

Earth Island Institute v. USFS, 351 F.3d 1291 (9th Cir. 2003).

Ecology Center v. Austin, 430 F.3d 1057 (9th Cir. 2005).

Izaak Walton League v. Butz, 522 F.2d 945 (4th Cir. 1975)

Lands Council v. Powell. 379 F.3d 738 (9th Cir. 2004), amended at 395 F.3d 1019 (9th Cir. 2005).

Lands Council v. McNair, 494 F.3d 771 (9th Cir. 2007).

Lands Council v. McNair, 537 F.3d 981 (9th Cir. 2008) (en banc).

Sierra Club v. Bosworth, 510 F.3d 1016-1027 (9th Cir. 2007).

Agee, J. K. (1993). *Fire Ecology of Pacific Northwest Forests*. Washington D.C.: Island Press.

Allen, T. F. H. (1998). The Landscape "Level" is Dead: Persuading the Family to Take it Off the Respirator. In D. L. Peterson & T. V. Parker (Eds.), *Ecological Scale: Theory and Applications* (pp. 35-54): Columbia University Press.

Anderson, M. H. (1999). Reshaping National Forest Policy. *Issues in Science and Technology Online, 16*(1).

Arno, S. F. (1996). The Seminal Importance of Fire in Ecosystem Management: Impetus for this Publication. In C. C. Hardy & S. F. Arno (Eds.), *The Use of Fire in Forest Restoration. Gen. Tech. Rep. INT-GTR-341* (pp. 3-5): USDA Forest Service Intermountain Research Station.

Arno, S. F., & Allison-Bunnell, S. (2002). *Flames in Our Forest: Disaster Or Renewal?* Washington DC: Island Press.

Arno, S. F., & Brown, J. K. (1989). Managing Fire in our Forests: Time for a New Initiative. *Journal of Forestry, 87*(12), 44-46.

Arno, S. F., & Sneck, K. M. (1977). *A Method for Determining Fire History in Coniferous Forests in the Mountain West, Gen. Tech. Rep. INT-GTR-42*. U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station Retrieved from http://www.fs.fed.us/rm/pubs_int/int_gtr042.pdf.

Babbit, B., & Glickman, D. (2000). *Managing the Impact of Wildfires on Communities and the Environment: A Report to the President in Response to the Fires of 2000.* Retrieved from http://www.fs.fed.us/emc/hfi/president.pdf.

Baker, W. L., & Ehle, D. S. (2003). *Uncertainty in Fire History and Restoration of Ponderosa Pine Forests in the Western United States, RMRS-P29.* Paper presented at the Fire, fuel treatments, and ecological restoration, Fort Collins, CO.

Baldwin, J. (1963). *The Fire Next Time.* New York: The Dial Press.

Bancroft, L., Nichols, T., Parsons, D., Graber, D., Evison, B., & van Wagtendonk, J. (1985). Evolution of the Natural Fire Management Program at Sequoia and Kings Canyon National Parks. In S. E. K. Lotan, B. M.; Fischer, W. C.; Mutch, R. W. (Ed.), *Proceedings, Symposium and Workshop on Wilderness Fire. Gen. Tech. Rep. INT-182* (pp. 174-1180). Missoula, MT: USDA Forest Service Intermountain Forest and Range Experiment Station.

Barbour, J. R., Hemstrom, M., Ager, A., & Hayes, J. L. (2005). Effects of Spatial Scale on the Perception and Assessment of Risk of Natural Disturbance in Forested Ecosystems: Examples from Northeastern Oregon. *Forest Ecology and Management, 211*(1-2), 210-225.

Barney, R. (1975). Fire Management: A Definition. *Journal of Forestry, 75*(8).

Barrows, J. (1974). The Challenges of Forest Fire Management. *Western Wildlands, 1*(3), 3-5.

Bell, E. F., Cleaves, D. A., Husari, S., Schuster, E. G., & Truesdale, D. (1995). *Fire Economics Assessment Report, Submitted to Fire and Aviation Management.* USDA Forest Service.

Biber, E. (2009). Too Many Things To Do: How to Deal With the Dysfunctions of Multiple-Goal Agencies. *Harvard Environmental Law Review, 33*(1), 1-63.

Bolle, A. (1970). *A University View of Forest Service: A Select Committee of the University of Montana Presents its Report on the Bitterroot National Forest.* Congressional Record.

Brookings Institution. (2008). *Assessing Progress Towards an Integrated Risk and Cost Fire Management Strategy.* Retrieved from http://gis.fs.fed.us/fire/publications/ilwc-panel/report-2007.pdf.

Burgman, M. A., Lindenmayer, D. B., & Elith, J. (2005). Managing Landscapes For Conservation Under Uncertainty. *Ecology, 86*(8), 2007-2017.

Butler, B. W., Bartlette, R. A., Bradshaw, L. S., Cohen, J. D., Andrews, P. L., Putnam, T., et al. (1998). *Fire Behavior Associated with the 1994 South Canyon Fire on Storm King Mountain, Colorado. Research Paper, RMRS-RP-9*. USDA Forest Service Rocky Mountain Research Station, Fort Collins, CO Retrieved from http://www.fs.fed.us/rm/pubs/rmrs_rp009.pdf Last accessed May, 2009.

Calkin, D. E., Ager, A., & Gilbertson-Day, J., eds. (2010 a). *Wildfire Risk and Hazard: Procedures for the First Approximation, RMRS-GTR-235*. USDA Forest Service Rocky Mountain Research Station, Fort Collins, CO Retrieved from www.fs.fed.us/rm/pubs/rmrs_gtr235.pdf.

Calkin, D. E., Ager, A., Gilbertson-Day, J., Scott, J., Quigley, T., Thompson, M., et al. (2010 b). *National Wildfire Risk and Hazard - Draft Report: Summary of the First Approximation for the Continental United States*. Retrieved from http://www.fs.fed.us/wwetac/wflc/CONUS_Risk_Assessment_Final.pdf.

Callon, M. (1986). Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St. Brieuc Bay. In J. Law (Ed.), *Power, Action and Belief* (pp. 196-233). London: Routledge and Kegan Paul Ltd.

Callon, M. (1987). Society in the Making: The Study of Technology as a Tool for Sociological Analysis. In W. E. H. Bijker, T. P.; Pinch, T. J. (Ed.), *The Social Construction of Technological Systems*. Cambridge: MIT Press.

Callon, M. (1991). Techno-Economic Networks and Irreversibility. In J. Law (Ed.), *A Sociology of Monsters: Essays on Power, Technology and Domination* (pp. 132–161). London: Routledge.

Callon, M. (1998). An Essay on Framing and Overflowing: Economic Externalities Revisited by Sociology. In M. Callon (Ed.), *The Laws of the Markets* (pp. 244-269). Oxford: Blackwells.

Callon, M., & Law, J. (1995). Agency and the Hybrid Collectif. *South Atlantic Quarterly, 94*(2), 481-507.

Callon, M., & Law, J. (1997). After the Individual in Society: Lesson on Collectivity from Science, Technology and Society. *Canadian Journal of Sociology, 22*(2), 165-182.

Callon, M., Law, J., & Rip, A. (1986). *Mapping the Dynamics of Science and Technology: Sociology of Science in the Real World*. London: MacMillan Press.

Camacho, A. E. (2007). Can Regulation Evolve? Lessons from a Study in Maladaptive Management. *UCLA Law Review, 55*(2), 293-358.

Carle, D. (2002). *Burning Questions: America's Fight with Nature's Fire*. Westport, CT: Praeger Publishers.

National Interagency Fire Center (NIFC). (2000). *Cerro Grande Prescribed Fire Investigation Report*. Retrieved from http://www.nps.gov/cerrogrande/Report.pdf.

CERES. (1996). *Sierra Nevada Ecosystem Project Final Report to Congress*. University of California Retrieved from http://ceres.ca.gov/snep/pubs/.

Chilson, P. (1998, April 27). An Era Ends: Old Industries Face Reality, *High Country News*.

Christensen, N. L., Agee, J. K., Brussard, P. F., Hughes, J., Knight, D. H., Minshall, G. W., et al. (1989). Interpreting the Yellowstone Fires of 1988. *BioScience, 39*(10), 678.

Ciborra, C. U. (2000). *From Control to Drift: The Dynamics of Corporate Information Infrastructures*. Oxford: Oxford University Press.

Ciborra, C. U. (2002). *The Labyrinths of Information*. Oxford: Oxfod University Press.

Cleaves, D. A., Haines, T. K., & Martinez, J. (1999). *Prescribed Burning Costs: Trends and Influences in the National Forest System. Gen. Tech. Rep. PSW-GTR-173*. USDA Forest Service, Pacific Southwest Research Station Retrieved from http://www.fs.fed.us/psw/publications/documents/psw_gtr173/psw_gtr173_06_cleaves.pdf.

Cleaves, D. A., Martinez, J., & Haines, t. K. (2000). Influence on Prescribed Burning Activity and Cost in the National Forest System. Gen. Tech. Rep. SRS-37.

CNN.com. (August 22, 2002). Bush Unveils 'Healthy Forests' Plan.

A Cohesive Strategy is Needed to Address Catastrophic Wildfire Threats, Hearing of the Subcommittee on Forest and Forest Health of the Committee on Resources, House of Representatives, One Hundred Sixth Congress, First session Sess. (1999).
Colburn, J. (2008). The Fire Next Time: Land Use Planning in the Wildland/Urban Interface. *Journal of Land, Resources and Environmental Law, 28*(2), 223-256.

Congressional Research Service. (1994). *Below-Cost Timber Sales: An Overview 95-15 ENR*. Retrieved from http://ncseonline.org/nle/crsreports/forests/for-1.cfm.

Congressional Research Service. (1995). *Forest Fires and Forest Health, 95-511 ENR*. Retrieved from http://ncseonline.org/nle/crsreports/forests/for-5.cfm.

Congressional Research Service. (1996). *Forest Fires and Forest Health, 96-569 ENR*. Retrieved from http://ncseonline.org/NLE/CRSreports/Forests/for-17.cfm?&CFID=12099146&CFTOKEN=60937532.

Congressional Research Service. (2000 a). *Forest Fires and Forest Management - Memorandum, September 20, 2000*. Retrieved from http://www.fusee.org/docs/FFPR/crs_fires_forest_mngt_copy.pdf.

Congressional Research Service. (2000 b). *Forest Service FY2001 Budget Issues, Including Proposals for Land Sales and Trust Funds, RS20496*. Retrieved from http://www.ncseonline.org/nle/crsreports/forests/for-29.cfm.

Congressional Research Service. (2000 c). *Forest Service Receipt-Sharing Payments: Proposals for Change, RS20178*. Retrieved from http://ncseonline.org/NLE/CRSreports/forests/for-22.cfm.

Congressional Research Service. (2000 d). *Forest Service Accountability in Administering Its Trust Funds, RS20486*. Retrieved from http://file.wikileaks.org/file/crs/RS20486.pdf.

Congressional Research Service. (2004). Below-Cost Timber Sales: An Overview, RL32485.

Congressional Research Service. (2006). Forest Fire/Wildfire Protection, RL30755. Washington D. C.

Congressional Research Service. (2007). *Wildfire Funding, RL33990*. Retrieved from http://www.policyarchive.org/handle/10207/bitstreams/19552.pdf.

Congressional Research Service. (2009). *Wildfire Fuels and Fuel Reduction, R40811*. Retrieved from http://ncseonline.org/NLE/CRSreports/09Sept/R40811.pdf.

Council on Environmental Quality. (1997). *The National Environmental Policy Act: A Study of Its Effectiveness After Twenty Five Years*. Retrieved from http://ceq.hss.doe.gov/nepa/nepa25fn.pdf.

Council on Environmental Quality. (2002). *The NEPA Task Force Report to the Council on Environmental Policy: Modernizing NEPA Implementation*. Retrieved from http://ceq.hss.doe.gov/ntf/report/totaldoc.html#executive.

Council on Environmental Quality. (2005). *Guidance on the Consideration of Past Actions in Cumulative Effects Analysis*. Washington, D.C. Retrieved from http://ceq.hss.doe.gov/nepa/regs/Guidance_on_CE.pdf.

Council on Environmental Quality. (2009). *Regulations for Implementing NEPA, Part 1502, Sec.15 - Affected Environment.*: Retrieved from http://ceq.hss.doe.gov/nepa/regs/ceq/1502.htm#1502.15.

Council., W. F. L. (2004). *Large Fire Suppression Costs: Strategies for Cost Containment*. Retrieved from http://www.forestsandrangelands.gov/reports/documents/2004/costmanagement.pdf.

Crabtree, A. (2000). Talking Work: Language-Games, Organizations and Computer Supported Cooperative Work. *Computer Supported Cooperative Work (CSCW), 9*(2), 215-237.

Daniels, O. (1979). *Land Management Planning: Where Fire Management and Resources Meet.* Paper presented at the Symposium on Fire Control in the 80s, October 30-NOvember 1, Missoula, MT.

Daniels, O. (1989, May 18-21, 1989). *A Forest Supervisor's Perspective on the Prescribed Natural Fire.* Paper presented at the 17th Tall Timbers Fire Ecology Conference, High Intensity Fire in the Wildlands, Tallahassee, FL, Tall Timbers Research Station.

Dilsaver, L. (Ed.). (1994). *America's National Park System: The Critical Documents*: Rowman & Littlefield Publishers.

Dodaro, G. (2010). *Maximizing DOD's Potential to Face New Fiscal Challenges and Strengthen Interagency Partnerships, GAO-10-359CG.* Retrieved from http://www.gao.gov/cghome/d10359cg.pdf.

Dombeck, M. P., Williams, J. E., & Wood, C. A. (2003). Wildfire Policy and Public Lands: Integrating Scientific Understanding with Social Concerns Across Landscapes. *Conservation Biology, 18*(4), 883-889.

Duvall, M. N., & Wyatt, A. M. (2009). Developments in EPA Risk Assessment: Beveridge and Diamond PC.

Elith, J., Burgman, M. A., & Regan, H. M. (2002). Mapping Epistemic Uncertainties and Vague Concepts in Predictions of Species Distribution. *Ecological Modelling, 157*(2-3), 313-329.

Executive Office of the President. (2002). *HFI Factsheet.* Retrieved from http://georgewbush-whitehouse.archives.gov/ceq/hfi_12-02_wh_fact_sheet.pdf.

Fairfax, S. K. (1978). A Disaster in the Environmental Movement: The National Environmental Policy Act has Wasted Environmentalists' Resources on Processing Papers. *SCIENCE, 199*, 743-744.

Feinstein, D. (2002). *Statement of U. s. Senator Dianne Feinstein, The Need for Bipartisan Consensus on Protecting America's Forests, Proceedings and Debate of the 107th Congress, 2nd Session, September 19.*: Retrieved from http://feinstein.senate.gov/03Speeches/Protecting%20America%27s%20Forests.htm.

Finney, M. A., & Cohen, J. D. (2003). *Expectation and Evaluation of Fuel Management Objectives, RMRS-P29.* Paper presented at the Fire, fuel treatments, and ecological restoration, Fort Collins, CO.

Forester, J. (1989). *Planning in the Face of Power*. Berkeley and Los Angeles, California: University of California Press.

Foresters, I. S. o. A. (2001). *Newsletter: New Forest Service Planning Regulations*. Retrieved from http://www.usu.edu/saf/ns01-21.pdf

Franco, A. L., & Montibeller, G. (2009). Problem Structuring for Multi-Criteria Decision Analysis Interventions, Working Paper No LSEOR 09-115 (pp. 25). London: Operational Research Group, Department of Management London School of Economics and Political Science.

Franklin, J., F, Romme, W., Baker, W., Floyd-Hanna, L., & Herring, J. (2002). *Dear President Bush and Members of Congress*. Retrieved from http://www.departments.bucknell.edu/geography/The_Biogeographer/documents/3-1_fire_letter.pdf

Franklin, J. F. (1998). The Natural, the Clearcut, and the Future. *Northwest Science, 72*(S2), 134-138.

Franklin, J. F., & Agee, J. K. (2003). Forging a Science-Based National Forest Fire Policy. *Issues in Science and Technology, 20*, 59-66.

Gale, R. (1977). Evaluation of Fire Management Activities on the National Forests *USDA Forest service Policy and Analysis Staff Report* (pp. 127). Washington D.C.: USDA Forest Service.

Garfinkel, H., & Sacks, H. (1969). On Formal Structures of Practical Action. In E. T. J. C. McKinney (Ed.), *Theoretical Sociology: Perspectives and Developments* (pp. 160-193). New York: Apple-Century-Crofts.

Geertz, C. (1973). Thick Description: Toward an Interpretive Theory of Culture *The Interpretation of Cultures: Selected Essays* (pp. 3-30). New York: Basic Books.

Geisinger, J. (1999). Nonscience from the Committee of Scientists. *Journal of Forestry, 97*(5), 24-25.

General Accounting Office. (1988). *Forest Service: Evaluation of "End-Results" Budgeting Test, GAO/AFMD-88-45*. Retrieved from http://archive.gao.gov/d34t11/135707.pdf.

General Accounting Office. (1990). *Federal Fire Management: Limited Progress Made in Restarting the Prescribed Fire Program, GAO/RECED-91-42*.

General Accounting Office. (1994). *Ecosystem Management: Additional Actions Needed to Adequately Test a Promising Approach, GAO/RCED-94-111*. Retrieved from http://archive.gao.gov/t2pbat2/152537.pdf.

General Accounting Office. (1997 a). *Forest Service Decision-Making: A Framework for Improving Performance, GAO/RCED-97-71*. Retrieved from http://www.gao.gov/archive/1997/rc97071.pdf.

General Accounting Office. (1997 b). *Forest Service: Unauthorized Use of the National Forest Fund, GAO/RCED-97-216*. Retrieved from www.gao.gov/archive/1997/rc97216.pdf.

General Accounting Office. (1998 a). *Forest Service: Better Procedures and Oversight Needed to Address Indirect Expenditures, GAO/RCED-98-258*. Retrieved from http://www.gao.gov/archive/1998/rc98258.pdf.

General Accounting Office. (1998 b). *Forest Service: Lack of Financial and Performance Accountability has Resulted in Inefficiency and Waste, GAO/T-RCED/AIMD-98-135*. Retrieved from http://www.gao.gov/archive/1998/r198135t.pdf.

General Accounting Office. (1999 a). *Western National Forests: A Cohesive Strategy is Needed to Address Catastrophic Wildfire Threats, GAO/RCED-99-65*.

General Accounting Office. (1999 b). *Forest Service Priorities: Evolving Mission Favors Resource Protection Over Production, GAO/RCED-99-166*.

General Accounting Office. (2000). *Fire Management Lessons Learned from the Cerro Grande (Los Alamos) Fire, GAO/RCED-00-257*. Retrieved from http://www.gao.gov/archive/2000/rc00257t.pdf.

General Accounting Office. (2002). *Wildland Fire Management: Reducing the Threat of Wildland Fires Requires Sustained and Coordinated Effort, GAO-02-843T*. Retrieved from http://www.gao.gov/new.items/d02843t.pdf.

General Accounting Office. (2003 a). *Geospatial Information: Technologies Hold Promise for Wildland Fire Management, but Challenges Remain, GAO-03-1047*. Retrieved from http://www.gao.gov/new.items/d031047.pdf.

General Accounting Office. (2003 b). Forest Service: Little Progress on Performance Accountability Likely Unless Management Addresses Key Challenges, GAO-03-503.

General Accounting Office. (2003 c). *Wildland Fire Management: Additional Actions Required to Better Identify and Prioritize Lands Needing Fuels Reduction, GAO-03-805*. Retrieved from http://www.gao.gov/new.items/d03805.pdf.

Goffman, E. (1971). *Frame Analysis: An Essay on the Organization of Experience*. Chicago: Northeastern University Press.

Government Accountability Office. (2004 a). *Wildland Fires: Forest Service and BLM Need Better Information and a Systematic Approach for Assessing the Risks of Environmental Effects, GAO-04-705*. Retrieved from http://www.gao.gov/new.items/d04705.pdf.

Government Accountability Office. (2004 b). *Environmental Indicators: Better Coordination Is Needed to Develop Environmental Indicator Sets That Inform Decisions, GAO-05-52*. Retrieved from http://www.gao.gov/new.items/d0552.pdf.

Government Accountability Office. (2005 a). *Forest Service: Better Data Are Needed to Identify and Prioritize Reforestation and Timber Stand Improvement Needs, GAO-05-374*. Retrieved from http://www.gao.gov/new.items/d05374.pdf.

Government Accountability Office. (2005 b). *Wildland Fire Management: Important Progress Has Been Made, but Challenges Remain to Completing a Cohesive Strategy, GAO-05-147*. Retrieved from http://www.gao.gov/new.items/d05147.pdf.

Government Accountability Office. (2006). *Cohesive Wildland Fire Strategy, GAO-06-671R*. Retrieved from http://www.gao.gov/new.items/d06671r.pdf.

Government Accountability Office. (2007). *Wildland Fire Management: Better Information and a Systematic Process Could Improve Agencies' Approach to Allocating Fuel Reduction Funds and Selecting Projects, GAO-07-1168*. Retrieved from http://www.gao.gov/new.items/d071168.pdf.

Government Accountability Office. (2008). *Wildland Fire Management: Federal Agencies Lack Key Long-and Short-Term Management Strategies for Using Program Funds Effectively, GAO-08-433T*. Retrieved from http://www.gao.gov/new.items/d08433t.pdf.

Government Accountability Office. (2009 a). *Wildland Fire Management: Federal Agencies Have Taken Important Steps Forward, but Additional, Strategic Action Is Needed to Capitalize on Those Steps, GAO-09-877*. Retrieved from http://www.gao.gov/new.items/d09877.pdf.

Government Accountability Office. (2009 b). *Forest Service: Emerging Issues Highlight the Need to Address Persistent Management Challenges, GAO-09-443T*. Retrieved from http://www.gao.gov/new.items/d09443t.pdf.

Graber, D. M. (1985). Coevolution of National Park Service Fire Policy and the Role of National Parks. In S. E. K. Lotan, B. M.; Fischer, W. C.; Mutch, R. W. (Ed.), *Proceedings, Symposium and Workshop on Wilderness Fire GTR-INT-182* (pp. 345-349). Missoula, MT: USDA Forest Service Intermountain Forest and Range Experiment Station.

Graham, R. T., McCaffrey, S., & Jain, T. B. (2004). Science Basis for Changing Forest Structure to Modify Wildfire Behavior and Severity, Gen. Tech. Rep. RMRS-120. 43.

Greeley, W. B. (1920 and 2000.). "Paiute Forestry" or the Fallacy of Light Burning. *Fire Management Today, 60*(4), 21-26.

Grothaus, J. C. (2007). Questionable Authority: A Recent CEQ Guidance Memorandum. *Environmental Law, 37*(3), 885-908.

Hann, W., Beighley, M., Teensma, P. D., Sexton, T., & Hilbruner, M. (2003). *A Cohesive Strategy for Protecting People and Sustaining Natural Resources: Predicting Outcomes for Program Options.* Paper presented at the Fire, Fuel Treatments, and Ecological Restoration, Fort Collins, CO.

Hann, W. J. (2004). *Mapping Fire Regime Condition Class: A Method for Watershed and Project Scale Analysis.* Paper presented at the 22nd Tall Timbers Fire Ecology Conference: Fire in Temperate, Boreal, and Montane Ecosystems., Tall Timber Research Station, Tallahassee, FL.

Hann, W. J., & Bunnell, D. L. (2001). Fire and Land Management Planning and Implementation Across Multiple Scales. *International Journal of Wildland Fire, 10*(4), 389-403.

Hann, W. J., Jones, J. L., Karl, M. G., Hessburg, P. F., Keane, R. E., Long, D. G., et al. (1997). landscape Dynamics of the Basin. In T. M. A. Quigley, S. (Ed.), *An Assessment of Ecosystem Components in the Inerior Columbia Basin Volume II PNW-GTR-405*: USDA Forest Service Pacific Northwest Research Station.

Hann, W. J., & Strohm, D. J. (2003). *Fire Regime Condition Class and Associated Data for Fire and Fuels Planning: Methods and Applications, RMRS-P-29.* Paper presented at the Fire, Fuel Treatments, and Ecological Restoration, Fort Collins, CO.

Hardy, C., Schmidt, K. M., Menakis, J. P., & Sampson, N. R. (2001). Spatial Data for National Fire Planning and Fuel Management. *International Journal of Wildland Fire, 10*, 353-372.

Hartsough, B. R., Abrams, S., Barbour, R. J., Drews, E. S., McIver, J. D., Moghaddas, J. J., et al. (2008). The Economics of Alternative Fuel Reduction Treatments in Western United States Dry forests: Financial and Policy Implications from the National Fire and Fire Surrogate Study. *Forest Policy and Economics, 10*(6), 344.

Hartzell, T., & Leaverton, B. (2002). *Fuel Treatment Program Development and Collaboration Process.* Retrieved from http://www.forestsandrangelands.gov/resources/documents/10-22-en.pdf.

Heinselman, M. L. (1973). Fire in the Virgin Forests of the Boundary Waters Canoe Area, Minnesota. *Quaternary Research, 3*(3), 329-382.

Heinselman, M. L. (1978). Fire in Wilderness Ecosystems. In J. C. S. Hendee, George H.; Lucas, Robert C. (Ed.), *Wilderness Management Misc. Pub. No.1365* (pp. 249-278): U.S. Department of Agriculture, Forest Service.

Heinselman, M. L. (1981). Fire Intensity and Frequency as Factors in the Distribution and Structure of Northern Ecosystems. In H. A. B. Mooney, J. M.; Christiansen, N. L.; Logan, J. E.; Reiners, W. A. (Ed.), *Fire Regimes and Ecosystem Properties GTR-WO-26* (pp. 7-57): USDA Forest Service Washington Office.

Hill, B. (1999, June 29). Testimony before the Subcommittee on Forests and Forest Health of the Committee on Resources, House of Representatives, 106th Congress, 1st session. A Cohesive Strategy is Needed to Address Catastrophic Wildfire Threats.

Hirt, P. (1994). *A Conspiracy of Optimism: Management of the National Forests Since World War Two*. Lincoln and London: University of Nebraska Press.

Independent Review Board, State of Florida, D. o. F., U.S. Department of the Interior, B. o. L. M., U.S. Department of Agriculture, F. S., & White Mountain Apache Tribe. (2000). *Cerro Grande Prescribed Fire Independent Review Board Report*. Retrieved from http://www.nps.gov/cerrogrande/IndependentReviewTeam_Final.pdf.

Jehl, D. (2001, March 28, 2001). Forest Service Chief Quits, And Asks Bush to Hold Firm, *The New York Times*. Retrieved from http://www.nytimes.com/2001/03/28/us/forest-service-chief-quits-and-asks-bush-to-hold-firm.html

Joy, C. (1999, June 29). *Testimony before the Subcommittee on Forests and Forest Health of the Committee on Resources, House of Representatives, 106th Congress, 1st session. A Cohesive Strategy is Needed to Address Catastrophic Wildfire Threats*. Retrieved from http://commdocs.house.gov/committees/resources/hii59491.000/hii59491_0f.htm.

Kapustka, L. (2009). Limitations of the Current Practices Used to Perform Ecological Risk Assessment. *Integrated Environmental Assessment and Management, 4*(3), 290–298.

Karkkainen, B. C. (2004). Whither NEPA? *Environmental Law Journal, 12*, 333-363.

Kaufman, H. (1960). *The Forest Ranger: A Study in Administrative Behavior* (special reprint edition, 2006 ed.). Washington D.C.: Resources for the Future.

Kaufmann, M. R., & Regan, C. M. (1995). Ecosystem Management, Forest Health, and Silviculture. In E. L. G. (Ed.), *Forest Health Through Silviculture: Proceedings of the 1995 National Silviculture Workshop RM-GTR-267* (pp. 46-52): USDA Forest Service Rocky Mountain Forest and Range Experiment Station.

Keeney, R. L., & Gregory, R. S. (2005). Selecting Attributes to Measure Achievement of Objectives. *Operations Research, 53*(1), 1-11.

Keiter, R. (2006). The Law of Fire: Reshaping Public Land Policy in an Era of Ecology and Litigation. *Environmental Law, 36*, 301-384.

Kilgore, B. M. (1981). *Fire in Ecosystem Distribution and Structure: Western Forests and Shrublands.* Paper presented at the Fire Regimes and Ecosystem Properties: Proceedings; 1978 December 11-15; Honolulu, HI. Gen. Tech. Rep. WO-26, Washington, DC.

Kilgore, B. M. (2007). Origin and History of Wildland Fire Use in the U.S. National Park System. *The George Wright Forum, 24*(3), 92 - 122.

Kitzhaber, J. (1997). *Governor Responds to Congressman Bob Smith's Forest Health Bill*. Retrieved from http://arcweb.sos.state.or.us/governors/Kitzhaber/web_pages/governor/press/p971008.htm.

Knorr-Cetina, k., & Cicourel, A. V. (Eds.). (1981). *Advances in Social Theory and Methodology: Toward an Integration of Micro- and Macro- Sociologies*. Boston, Mass: Routledge and Kegan Paul Ltd.

Kolb, T. E., Wagner, M. R., & Covington, W. W. (1994). Concepts of Ecosystem Health: Utilitarian and Ecosystem Perspectives. *Journal of Forestry, 92*(7).

Koontz, T. (2007). Federal and State Public Forest Administration in the New Millennium: Revisiting Herbert Kaufman's The Forest Ranger. *Public Administration Review, 67*(1), 152-164.

Laband, D. N., Gonzalalez-Caban, A., & Hussain, A. (2006). Factors that Influence Administrative Appeals of Proposed USDA Forest Service Fuels Reduction Actions. *Forest Science, 52*(5), 477-488.

Larson, L. L., Breazeale, S. B., Hauser, K., & Pierson, G. (2001). *NFMA Planning Rule Review: A Report Requested by the USDA*. USDA Forest Service Retrieved from http://www.fs.fed.us/emc/nfma/includes/2007_rule/2001_04_10_NFMA_Planning_Review_Report.pdf.

Latour, B. (1987). *Science in Action: How to Follow Scientists and Engineers Through Society*. Cambridge, MA: Harvard University Press.

Latour, B. (1996). Do Scientific Objects Have a History? Pasteur and Whitehead in a Bath of Lactic Acid. *Common Knowledge, 5*(1), 76-91.

Latour, B. (1997). On Actor-Network Theory: A Few Clarifications Retrieved Last accessed January, 2010, from http://www.nettime.org/Lists-Archives/nettime-l-9801/msg00019.html

Latour, B. (2005). *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford: Oxford University Press.

Latour, B., & Woolgar, S. (1986). *Laboratory Life: The Construction of Scientific Facts*. Princeton, New Jersey: Princeton University Press.

Law, J. (Ed.). (1992). *A Sociology of Monsters: Essays in Power, Technology, and Domination*. London: Routledge.

Law, J., & Hassard, J. (Eds.). (1999). *Actor Network Theory and After*. Oxford, UK: Blackwell Publishing.

Leopold, A. S., Cain, S. A., Cottam, C. M., Gabrielson, I. N., & Kimball, T. I. (1963). *Wildlife Management in the National Parks*. USDOI National Park Service Retrieved from http://www.nps.gov/history/history/online_books/leopold/leopold.htm.

Lotan, J. (1979). Integrating Fire Management into Land-Use Planning: A Multiple-Use Management Research, Development, and Applications Program. *Environmental Management, 3*(1), 7-14.

Lotan, J. (1981). *Fire Policy and Ecosystem Management: Integrating Summary.* Paper presented at the Fire Regimes and Ecosystem Properties: Proceedings; 1978 December 11-15; Honolulu, HI. Gen. Tech. Rep. WO-26, Washington, D.D.

Lynch, M. (1993). *Scientific Practice and Ordinary Action: Ethnomethodology and Social Studies of Science*. Cambridge: Cambridge University Press.

Marcot, B. G., & Thomas, J. W. (1997). *Of Spotted Owls, Old Growth, and New Policies: A History Since the Interagency Scientific Committee Report. Gen Tech. Re. PNW-GTR-408*. USDA Forest Service Pacific Northwest Research Station.

Martz, J. (2003). *Montana State of the State Address 2003*. Retrieved from http://www.stateline.org/live/details/speech?contentId=16161.

McGuire, J. R. (1973). State of the Forest Service. *Fire Management, 34*(2), 1.

McNicoll, C. H., & Hann, W. J. (2003). *Multi-Scale Planning and Implementation to Restore Fire Adapted Ecosystems, and Reduce Risk to the Urban/Wildland Interface in the Box Creek Watershed.* Paper presented at the Proceedings of the 22nd Tall Timbers Fire Ecology Conference: Fire in Temperate, Boreal, and Montane Ecosystems, Tall Timbers Research Station, Tallahassee FL, USA.

Meslow, E. C. (1993). Spotted Owl Protection: Unintentional Evolution Toward Ecosystem Management. *Endangered Species Update, 10*(3-4), 34-38.

Moore, W. (1974). From Fire Control to Fire Management. *Western Wildlands, 1*(3), 11-15.

Morgan, P., Aplet, G. H., Haufler, J. B., Humphries, H. C., Moore, M. M., & Wilson, W. D. (1994). Historical Range of Variability -- A Useful Tool for Evaluating Ecosystem Change. *Journal of Sustainable Forestry, 2*(1), 87 - 111.

Mortimer, M. J. (2002). The Delegation of Law-Making Authority to the United States Forest Service: Implications in the Struggle for National Forest Management. *Administrative Law Review, 54*.

Mortimer, M. J. (2006). Assessing the Potential of Congressional Responsibility for National Forest Management. *Society & Natural Resources: An International Journal, 19*(6), 563 - 570.

Mosse, T. (2004). Is Good Policy Unimplementable? Reflections on the Ethnography of Aid Policy and Practice. *Development and Change, 35*(4), 639-671.

Mrowka, R. (2003). Thoughts Upon Leaving the Agency I love, from http://www.fseee.org/fsnews/mrowka.shtml

Mutch, R. W. (1974). I Thought Forest Fires Were Black! *Western Wildlands: A Natural Resource journal, 1*(3).

Napolitano, J. (2005). *Testimony before the Subcommittee on Forests and Forest Health of the Committee on Resources U.S. house of Representatives, 109th Congress, first Session, Oversight Hearing, GAO Five year Update on Wildland Fire and Forest Service/Bureau of Land Management Accomplishments in Implementing the Healthy Forest Restoration Act*. Retrieved from http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_house_hearings&docid=f:98808.pdf.

NASF. (2000). Resolution No. 2000-7: Forest Service Cohesive Strategy for Reducing Wildland Fire Hazards.

National Academy of Public Administration. (2001). *Managing Wildland Fire: Enhancing Capacity to Implement the Federal Interagency Policy*. Retrieved from http://209.183.198.6/NAPA/NAPAPubs.nsf/9172a14f9dd0c36685256967006510c d/c8471bdde4668a6085256b74005a0415?OpenDocument.

National Academy of Public Administration. (2002). *Wildfire Suppression: Strategies for Containing Costs*. Retrieved from http://208.89.204.184/NAPA/NAPAPubs.nsf/17bc036fe939efd685256951004e37 f4/30934d60aafd52e885256c7d0055a3b8/$FILE/WILDFIRE+Back+and+Researc h+Sept+02.pdf.

National Research Council. (2007). *Scientific Review of the Proposed Risk Assessment Bulletin from the Office of Management and Budget*. National Academic Press Retrieved from http://books.nap.edu/openbook.php?record_id=11811&page=107.

National Wildfire Coordinating Group. (2005). *Quadrennial Fire and Fuels Review*. Retrieved from http://www.forestsandrangelands.gov/reports/documents/2005/qffr_report.pdf.

National Wildfire Coordinating Group. (2009). *Quadrennial Fire Review*. Retrieved from www.nifc.gov/QFR/QFR2009Final.pd.

Nazzaro, R. (2005, February 17). Testimony before the Subcommittee on Forests and Forest Health of the Committee on Resources, House of Representatives, 109th Congress, 1st session. Wildland Fire Management: Forest Service and Interior Need to Specify Steps and a Schedule for Identifying Long-Term Options and Their Costs.

Nie, M. (2003). Drivers of Natural Resource-Based Political Conflict. *Policy Science, 36*(3-4), 307-341.

Nie, M. (2004). Statutory Detail and Administrative Discretion in Public Lands Governance: Arguments and Alternatives. *Journal of Environmental Law and Litigation, 19*(2), 223-289.

Nie, M. (2008). *The Governance of Western Public Lands: Mapping Its Present and Future*. Lawrence, Kansas: University Press of Kansas.

Nie, M. (2010). *National Forest System Land Management Planning Rule, Statement Before the National Science Panel, March 30, 2010*. Retrieved from http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5143395.pdf.

Niemi, G. J., & McDonald, M. E. (2004). Application Of Ecological Indicators. *Annual Review of Ecology, Evolution and Systematics, 35*, 89-111.

NSTC. (1999). *Ecological Risk Assessment in the Federal Government, CENR/5-99/001*. National Science and Technology Council, Committee on the Environment and natural Resources Retrieved from oaspub.epa.gov/eims/eimscomm.getfile?p_download_id=36384.

O'Toole, R. (1988). *Reforming the Forest Service*. Covelo, CA: Island Press.

Odum, W. E. (1982). Environmental Degradation and the Tyranny of Small Decisions. *BioScience, 32*(9), 728-729.

Omi, P., N., & Kalabokidis, K. D. (1998, November 16-20). *Fuels Modification to Reduce Large Fire Probability.* Paper presented at the Proceedings of the Third International Conference on Forest Fire Research, 14th Conference on Fire and Forest Meteorology.

Oppenheimer, J. (2001). In the Red: National Forest Logging Continues to Lose Millions: Taxpayers For Common Sense.

Pollet, J., & Omi, P. N. (2002). Effect of Thinning and Prescribed Burning on Crown Fire Severity in Ponderosa Pine Forests. *International Journal of Wildland Fire, 11*(1), 1-10.

Pub. L. No. 106-209, STAT.114, (2000) Department of the Interior and Related Agencies Appropriations Act, 2001.

Pyne, S. (1982). *Fire in America: A Cultural History of Wildland and Rural Fire*. Seattle and London: University of Washington Press.

Pyne, S. (2004). *Facing the Flames: The Forest Service Takes on Fire A Conference on Fire and Forest Health*. Paper presented at the USDA Forest Service: the Next 100 years, Boise State University. http://www.andruscenter.org/images/publications/USDA_Forest100_CR.pdf

Quigley, T. M., & Arbelbride, S. (1997). An Assessment of Ecosystem Components in the Interior Columbia Basin Volume II PNW-GTR-405: USDA Forest Service Pacific Northwest Research Station.

Quincy Library Group. (2000). *A Real Cohesive Strategy: The Quincy Library Group's Response to the GAO Report and the Forest Service Response*. Retrieved from http://www.qlg.org/pub/miscdoc/cohesivestrategy.htm

Regan, H. M., Colyvon, M., & Burgman, M. A. (2002). A Taxonomy and Treatment of Uncertainty For Ecological and Conservation Biology. *Ecological Applications, 12*(2), 618-628.

Romme, W. H., & Don, G. D. (1989). Historical Perspective on the Yellowstone Fires of 1988. *BioScience, 39*(10), 695.

Rothman, H. (2005). A Test of Adversity and Strength: Wildland Fire in the National Park System, from http://www.nps.gov/fire/fire/fir_wil_history.cfm

Rykiel Jr, E. J. (1998). Relationships of Scale to Policy and Decision Making. In D. L. Peterson & T. V. Parker (Eds.), *Ecological Scale: Theory and Applications* (pp. 485-498): Columbia University Press.

Saaty, T. (2000). *The Fundamentals of Decision Making and Priority Theory with the Analytic Hierarchy Process*. Pittsburgh, PA: RWS Publishing.

Saaty, T., & Vargas, L. G. (2001). *Models, Methods, Concepts & Applications of the Analytic Hierarchy Process*. Norwell, MA: Kluwer Academic Publishers.

Sampson, R. N., Adams, D. L., Hamilton, S. S., Mealey, S. P., Steele, R., & Van De Graaff, D. (1994). Assessing Forest Ecosystem Health in the Inland West. *Journal of Sustainable Forestry, 2*(1), 3 - 10.

Sando, R. W. (1978). Natural Fire Regimes and Fire Management: Foundations for Direction. *Western Wildlands, 4*(4), 35-44.

Schmidt, K. M., Menakis, J. P., Hardy, C. C., Hann, W. J., & Bunnell, D. L. (2002). *Development of Coarse-Scale Spatial Data for Wildland Fire and Fuel Management, RMRS-GTR-87*. USDA Forest Service Rocky Mountain Research Station, Fort Collins, CO Retrieved from http://www.fs.fed.us/rm/pubs/rmrs_gtr87.pdf.

Schuster, E. G., Cleaves, D. A., & Bell, E. F. (1997). *Analysis of USDA Forest Service Fire-Related Expenditures 1970—1995, PSW-RP-230*. USDA Forest Service, Pacific Southwest Research Station Retrieved from http://www.fs.fed.us/psw/publications/documents/rp-230/rp-230-fm.html.

Shabecoff, P. (1988, September 10). Park and Forest Service Chiefs Assailed on Fire Policy, *New York Times*. Retrieved from http://www.nytimes.com/1988/09/10/us/park-and-forest-service-chiefs-assailed-on-fire-policy.html?pagewanted=all

Simberloff, D. (2005). The Politics of Assessing Risk for Biological Invasions: the USA as a Case Study. *TRENDS in Ecology and Evolution, 20*(5), 216-222.

Skinner, C. N., & Chang, C.-R. (1996). *Fire Regimes Past and Present. In Sierra Nevada Ecosystem Project: Final Report to Congress, Vol. II, chap. 38.*: Retrieved from http://ceres.ca.gov/snep/pubs/web/PDF/VII_C38.PDF.

Smith, M. D. (2006). Cumulative Impact Assessment Under the National Environmental Policy Act: An Analysis of Recent Case Law. *Environmental Practice, 8*(4), 228-240.

Spinney, F., C. (2002). *Statement before the Subcommittee on National Security, Veterans Affairs and International Relations, Committee on Government Reform U.S. House of Representatives.* Retrieved from http://www.ranum.com/editorials/must-read/spinney/spinney_testimony.htm.

Spinney, F., C. (2010). The New QDR: The Pentagon Goes AWOL. *Counterpunch,* (February 3). Retrieved from http://www.counterpunch.org/spinney02032010.html

Stephens, S. L. (2000). Testimony before the Subcommittee on Forests and Forest Health of the Committee on Resources, House of Representatives, June 7, 2000.

Stephens, S. L., & Moghaddas, J. J. (2005). Silvicultural and Reserve Impact on Potential Fire Behaviour and Forest Conservation: Twenty-Five Years of Experience from Sierra Nevada Mixed Conifer Forest. *Biological Conservation, 125*(3), 369-379.

Stephens, S. L., & Ruth, L. W. (2005). Federal Forest-Fire Policy in the United States. *Ecological Applications, 15*(2), 532-542. doi: doi:10.1890/04-0545

Stephens, S. L., & Sugihara, N. G. (2006). Fire Management and Policy Since European Settlement. In N. G. Sugihara, J. W. van Wagtendonk, K. E. Shaffer, J. A. Fites-Kaufman & A. E. Thode (Eds.), *Fire in California's Ecosystems* (pp. 612). Berkeley, CA: University of California Press.

Stratton, R. D. (2006). *Guidance on Spatial Wildland Fire Analysis: Models, Tools, and Techniques, RMRS-GTR-183.* USDA Forest Service, Rocky Mountain Research Station, Fort Collins, CO Retrieved from http://www.fs.fed.us/rm/pubs/rmrs_gtr183.pdf.

Strauss, A., & Corbin, J. (1998). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (second ed.). Thousand Oaks, CA: Sage Publications.

Suchman, L. (1987). *Plans and Situated Action: The Problem of Human-Machine Communications.* New York: Cambridge University Press.

Suter, G. W., II. (1993a). A Critique of Ecosystem Health Concepts and Indexes. *Environmental Toxicology & Chemistry, 12*, 1533–1539.

Suter, G. W., II. (1993b). *Ecological Risk Assessment.* Boca Raton, FL: Lewis Publishers.

Swetnam, T. (2000). Testimony to Committee on Resources, Subcommittee on Forests and Forest Health Oversight Hearing on Preventing Wildfires Through Proper Management of the National Forests, Albuquerque, New Mexico, August 14, 2000.

Teensma, P. D. (1996). Integrating Fire Management Into Land Management Planning for Westside Forests. In C. C. A. Hardy, Stephen F. (Ed.), *The Use of Fire in Forest Restoration. Gen. Tech. Rep. INT-GTR-341* (pp. 81-82): USDA Forest Service Intermountain Research Station.

Thomas, J. W. (1994 February 3). New Directions for the Forest Service. Statement presented before the Subcommittee on National Parks, Forests, and Public Lands and the Subcommittee on Oversight and Investigations, Committee on Natural Resources, US House of Representatives.

UCS. (No Date). Spotted Owl Research Manipulated to Promote Logging Initiative. Retrieved July, 2010 http://www.ucsusa.org/scientific_integrity/abuses_of_science/spotted-owl.html

US EPA. (1998). *Guidelines for Ecological Risk Assessment*. U.S. Environmental Protection Agency, Risk Assessment Forum Retrieved from http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=12460.

US EPA National Center for Environmental Assessment. (1998). *Guidelines for Ecological Risk Assessment, EPA/630/R-95/002F*. Retrieved from http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=12460.

US FEMA. (2001). *Mitigation Planning How-To Guide # 2 (FEMA 386-2)*. Retrieved from http://www.fema.gov/library/viewRecord.do?id=1880.

USDA Forest Service. (1987). *Bitterroot National Forest Plan, Final Environmental Impact Statement*. USDA Forest Service.

USDA Forest Service. (1994a). *The Forest Service Ethics and Course to the Future, FS567*. USDA Forest Service.

USDA Forest Service. (1994b). *Western Forest Health Initiative*. USDA Forest Service.

USDA Forest Service. (1995). *Course to the Future: Positioning Fire and Aviation Management*. USDA Forest Service Washington Office Fire and Aviation Management.

USDA Forest Service. (1997). *Report of the Forest Service*. USDA Forest Service Retrieved from http://www.fs.fed.us/pl/pdb/97report/.

USDA Forest Service. (1999). *1998 Report of the Forest Service, Results Act Performance and Accountability Report*. USDA Forest Service Retrieved from http://www.fs.fed.us/pl/pdb/98report/index.html.

USDA Forest Service. (2000 a). *An Agency Strategy for Fire Management: A report from the National Management Review Team.*: USDA Forest Service Washington Office Fire and Aviation Management Retrieved from http://www.fs.fed.us/fire/management/USDA_Report.pdf.

USDA Forest Service. (2000 b). *Protecting People and Sustaining Resources in Fire-Adapted Ecosystems A Cohesive Strategy The Forest Service Management Response to the General Accounting Office Report GAO/RCED-99-65 October 13, 2000*. USDA Forest Service Washington Office Retrieved from http://www.fs.fed.us/publications/2000/cohesive_strategy10132000.pdf.

USDA Forest Service. (2000 c). *Policy Implications of Large Fire Management: A Strategic Assessment of Factors Influencing Costs*. Retrieved from http://www.fs.fed.us/fire/management/Large_Fire_Mgt.pdf.

USDA Forest Service. (2000 d). *Policy Implications of Large Fire Management: A Strategic Assessment of Factors Influencing Costs. A Report by the Strategic Overview of Large Fire Costs Team*. USDA Forest Service Retrieved from www.fs.fed.us/fire/management/Large_Fire_Mgt.pdf.

USDA Forest Service. (2001). *Record of Decision. Sierra Nevada Forest Plan Amendment Environmental Impact Statement*. USDA Forest Service Retrieved from http://www.fs.fed.us/r5/snfpa/library/archives/rod/rod.pdf.

USDA Forest Service. (2002 a). *The Process Predicament: How Statutory, Regulatory, and Administrative Factors Affect National Forest Management*. Retrieved from http://www.fs.fed.us/projects/documents/Process-Predicament.pdf.

USDA Forest Service. (2002 b). *Overview of Forest Planning and Project Level Decisionmaking*. Retrieved from http://www.fs.fed.us/emc/nfma/includes/overview.pdf.

USDA Forest Service. (2003). *Forest Service Handbook (FSH) 5109.19 - Fire Management Analysis and Planning Handbook: Chapter 50 - Fire Management Planning*. Retrieved from http://www.fs.fed.us/im/directives/fsh/5109.19/5109.19_contents.doc.

USDA Forest Service. (2004 a). *Forest Service Handbook (FSH) 1909.15 - Environmental Policy and Procedures handbook: Chapter - Zero Code*.

USDA Forest Service. (2004 b). *Forest Service Handbook (FSH) 1909.15 - National Environmental Policy Act Handbook: Chapter 10 - Environmental Analysis*.

USDA Forest Service. (2004 c). *USDA Forest Service Strategic Plan for Fiscal years 2004-08*. Retrieved from http://www.fs.fed.us/publications/strategic/fs-sp-fy04-08.pdf.

USDA Forest Service. (2005). *36 CFR Part 219, National Forest System Land Management Planning; Final Rule*. Federal Register: January 5, 2005 (Volume 70, Number 3). pp. 1023-1061 Retrieved from http://edocket.access.gpo.gov/2005/05-21.htm.

USDA Forest Service. (2006 a). *NEPA/NFMA Forest Plan Implementation Training Course (1900-01)*.

USDA Forest Service. (2006 b). *Kootenai National Forest Fire Management Plan*.

USDA Forest Service. (2006 c). Forest Plan Implementation Course 1900-1 Notebook and Class Exercise.

USDA Forest Service. (2006 d). *FACTS Appendix B: Activity Codes*. Retrieved from http://www.fs.fed.us/r1/kootenai/maps/gis/documents/facts_app_b.pdf.

USDA Forest Service. (2007 a). *FY 2007 Program Direction: Fire and Aviation Management*.

USDA Forest Service. (2007 b). *USDA Forest Service Strategic Plan FY 2007-2012*. Retrieved from http://www.fs.fed.us/publications/strategic/fs-sp-fy07-12.pdf.

USDA Forest Service. (2008a). *36 CFR Part 219, National Forest System Land Management Planning; Final Rule*. Retrieved from http://edocket.access.gpo.gov/2008/E8-8085.htm.

USDA Forest Service. (2008b). *Forest Service Handbook (FSH) 2409.19 - Renewable Resource Handbook: Chapter - Zero Code*.

USDA Forest Service. (2009). *Forest Service Handbook (FSH) 1909.15 - National Environmental Policy Act Handbook: Chapter 30 - Categorical Exclusion from Documentation*. Retrieved from http://www.fs.fed.us/im/directives/fsh/1909.15/1909.15_30.doc.

USDA Forest Service. (2010 a). *Planning Rule Team Draft Document, 4th National Roundtable 7/28/10: Restoration and Resilience*.

USDA Forest Service. (2010 b). *Framework for the Planning Rule*. Retrieved from http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5180297.pdf.

USDA Forest Service, Bureau of Indian Affairs, USDOI Bureau of Land Management, USDOI National Park Service, & USDOI Fish and Wildlife Service. (1999). *A Strategy for Increasing Fuels Treatment on Federal Lands in the Pacific Northwest. Draft Report to PNWCG*. Retrieved from http://www.fusee.org/docs/fuelbreaks/strategy_fuel_treatment.html Last accessed May, 2009.

USDA Forest Service, & USDOI Bureau of Land Management. (1994). *Interior Columbia Basin Ecosystem Management Project, Project Charter*. USDA Forest Service USDOI Bureau of Land Management Retrieved from http://www.icbemp.gov/ Last accessed July, 2010.

USDA Office of Inspector General. (2005). *Audit Report: Forest Service Implementation of the Government Performance and Results Act. Report No: 08601-01-HY*. Retrieved from http://www.usda.gov/oig/webdocs/08601-01-HY.pdf.

USDA Office of Inspector General. (2006). *Audit Report: Implementation of the Healthy Forest Initiative. Report No: 08601-6-AT*. Retrieved from http://www.usda.gov/oig/webdocs/08601-6-AT.pdf.

USDA., & USDOI. (1995). *Federal Wildland Fire Management Policy & Program Review Report*. Retrieved from http://www.nwcg.gov/branches/ppm/fpc/archives/fire_policy/mission/1995_fed_wildland_fire_policy_program_report.pdf.

USDA., & USDOI. (1998). *Wildland and Prescribed Fire Management Policy: Implementation Procedures Reference Guide*. NIFC Retrieved from http://www.nwcg.gov/branches/ppm/fpc/archives/fire_policy/pdf/strategy.pdf.

USDA., & USDOI. (2001). *Review and Update of the 1995 Federal Wildland Fire Management Policy*. NIFC Retrieved from http://www.nwcg.gov/branches/ppm/fpc/archives/fire_policy/history/index.htm.

USDA., & USDOI. (2002 a). *Restoring Fire-Adapted Ecosystems on Federal Lands, A Cohesive Strategy for Protecting People and Sustaining Natural Resources. Unpublished Report*.

USDA., & USDOI. (2003). *Interagency Strategy for the Implementation of the Federal Wildland Fire Management Policy*. NIFC Retrieved from http://www.nwcg.gov/branches/ppm/fpc/archives/fire_policy/pdf/strategy.pdf.

USDA., & USDOI. (2004). *HFI/HFRA Interim Field Guide*. USDA and USDOI Retrieved from http://www.fs.fed.us/projects/hfi/field-guide/.

USDA., & USDOI. (2009). *Guidance for Implementation of Federal Wildland Fire Management Policy*. NIFC Retrieved from www.nifc.gov/policies/guidance/GIFWFMP.pdf.

USDA., USDOI., EPA., & NOAA. (1995). *Ecosystem Analysis at the Watershed Scale: Federal Guide for Watershed Analysis Version 2.2*. Retrieved from http://www.fs.fed.us/r6/frewin/projects/watershed/waguide.pdf.

USDA., USDOI., NASF., & NAC. (2002 b). *Memorandum of Understanding: Development of a Collaborative Fuels Treatment Program*. Retrieved from http://www.forestsandrangelands.gov/resources/documents/9-21-en.pdf.

USDA., USDOI., & The Nature Conservancy. (2004). *Interagency Fire Regime Condition Class (FRCC) Guidebook Version 1.1*. USDA and USDOI: USDA and USDOI.

USDA., USDOI., & The Nature Conservancy. (2008). *Interagency Fire Regime Condition Class (FRCC) Guidebook Version 1.3.0*. USDA and USDOI Retrieved from http://frames.nbii.gov/documents/frcc/documents/FRCC+Guidebook_2008.10.30.pdf.

USDA., USDOI., USDC., & USEPA. (1993). *Forest Ecosystem Management: An Ecological, Economic, and Social Assessment. Report of the Forest Ecosystem Management Assessment Team*. USDA, USDOI, USDC and USEPA Retrieved from http://www.blm.gov/or/plans/nwfpnepa/#1993%20FEMAT%20Report Last Accessed July, 2010.

USDOI Bureau of Land Management, State of Florida Division of Forestry, USDA Forest Service, & White Mountain Apache Tribe. (2000). *Cerro Grande Prescribed Fire Independent Review Board Report*. USDOI Retrieved from www.nps.gov/cerrogrande/IndependentReviewTeam_Final.pdf.

USDOI National Park Service. (2001). *Cerro Grande Prescribed Fire Board of Inquiry Final Report*. USDOI National Park Service. Retrieved from http://www.nps.gov/cerrogrande/Board_report-feb26final.pdf.

Van Wagtendonk, J. W. (1996). *Use of a Deterministic Fire Model to Test Fuel Treatments*. Centers for Water and Wildland Resources, University of California, Davis.

Vaughn, J., & Courtner, H. (2005). *George Bush's Healthy Forests: Reframing the Environmental Debate*. Boulder, CO: University Press of Colorado.

Vigerstad, T. J., & McCarty, L. S. (2000). The Ecosystem Paradigm and Environmental Risk Management. *Human and Ecological Risk Assessment, 6*(3), 369-381.

Wakimoto, R. H. (1990). National Fire Management Policy. *Journal of Forestry, 88*(10), 22-26.

Weaver, H. (1943). Fire as an Ecological and Silvicultural Factor in the Ponderosa Pine Region of the Pacific Slope. *Journal of Forestry, 41*(1), 7-14.

Western Governors Association. (2001). *A Collaborative Approach for Reducing Wildfire Risks to Communities and the Environment: A 10-Year Comprehensive Strategy*. Retrieved from http://www.westgov.org/index.php?option=com_joomdoc&task=doc_download&gid=252&Itemid=.

Western Governors Association. (2002). *A Collaborative Approach for Reducing Wildfire Risks to Communities and the Environment: A 10-Year Comprehensive Strategy Implementation Plan*. Retrieved from http://www.westgov.org/wga/initiatives/fire/implem_plan.pdf.

Western Governors Association. (2004). *Report to the Western Governors on the Implementation of the 10-Year Comprehensive Strategy*. Retrieved from http://www.westgov.org/wga/initiatives/fire/tempe-report04.pdf.

WFLC (Wildland Fire Leadership Council). (2010a). *Cohesive Wildfire Management Strategy Briefing Paper, August 6, 2010*. Retrieved from http://www.forestsandrangelands.gov/strategy/documents/briefingpapers/csbriefin gpaper08062010.pdf.

WFLC (Wildland Fire Leadership Council). (2010b). Cohesive Strategy Process Framework: A Blueprint, April 22 2010.

White, L. (2009). Understanding Problem Structuring Methods Interventions. *European Journal of Operational Research, 199*(3), 823-833.

Wiens, J. A. (1999). The Science and Practice of Landscape Ecology. In J. M. Klopatch & R. H. Gardner (Eds.), *Landscape Ecological Analysis* (pp. 371–383). New York: Springer-Verlag.

Wildland Fire Leadership Council. (2004). *Large Fire Suppression Costs: Strategies for Cost Containment: A Report to the Wildland Fire Leadership Council From the Strategic Issues Panel on Fire Suppression Costs*. Retrieved from http://www.forestsandrangelands.gov/reports/documents/2004/costmanagement.p df.

Wilkinson, T. (1998, April 27). Forest Service Seeks a New (Roadless) Road to the Future, *High Country News*.

Williams, J. T. (1995). *The Role of Fire in Ecosystem Management*. Walnut Creek, California: USDA Forest Service Pacific Southwest Research Station.

Yaffee, S. L. (1994). *The Wisdom of the Spotted Owl: Policy Lessons for a New Century*. Washington D.C.: Island Press.

Zimmerman, T. G., & Bunnell, D. L. (2000, May 23-27, 1999). *The Federal Wildland Fire Policy: Opportunities for Wilderness Fire Management, RMRS-P-15-VOL-5*. Paper presented at the Wilderness ecosystems, threats, and management, Missoula, MT.

APPENDIX A

Interview Schedule

Interview Questions

1. Describe the development, planning and analysis of a fuels management project.

2. How are project objectives determined?

3. How are fuels management projects selected and prioritized?

4. How are existing conditions that affect fire behavior and ecology determined?

5. What methods are used for this determination? (Probe for specific models, data, sampling protocols, classification systems particularly FRCC if not brought up.)

6. What are the criteria used?

7. Why were these criteria selected?

8. How does the planning process affect the development of projects? (Probe for project objectives, size, boundaries and treatment type if not brought up.)

Added Probe Questions

- Where do project ideas originate?

- How does NFMA analysis progress?

- Who is involved and at what stage?

- Describe how projects and specialists are funded at these different stages.

- Describe the role of districts and the forest leadership team and their relationship in the development of the program of work and project prioritization.

- How is the level of NEPA analysis and documentation (CE, EA & EIS) decided? (Probe for litigation pressure)