

AN ABSTRACT OF THE THESIS OF

Angela J. Findley for the degree of Master of Science in Forest Resources presented on May 9, 1996. Title: Analyzing Multiple Worldviews of Forestry: Local Perceptions of the 1994 Fires on the Wenatchee National Forest, Washington.

Abstract approved: _____ Signature redacted for privacy.

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In the social context, distinct worldviews provide multiple, subjective, durable and conflicting views of natural resource situations. This research analyzes worldviews that shape people's perceptions, understandings and evaluations of forests and forestry in order to examine conflict associated with forestry issues. Differences in local residents' views of wildland fires and the fire recovery management situation affecting three communities in north central Washington are explored. In addition, insights for facilitating worldview differences that inevitably surface in value-laden natural resource conflicts emerge from this study.

Data was gathered through 122 semi-structured interviews; subjects represented diverse interests, attachments and ideologies relative to forestry. A key-informant and chain-referral selection strategy accessed social networks interested in forestry management issues. Qualitative data analysis identified issues salient to fire recovery management and themes characteristic of shared forest values.

Five general views of fire recovery represented the relationships between the level of human intervention in forest management strategies and the level of risk affecting the ecosystem or neighboring communities. Levels of intervention were relatively tangible, but levels of risks varied by subjective definitions of desirability. The acceptability of specific forest management tactics could be traced to different values one places on the forest and worldviews through which one sees and understands the situation.

These views of fire recovery were compared to an existing typology that focused on social relationships, cultural biases and general views of nature. The five views found in the data could be explained by four universal worldviews of nature.

Worldviews evolve from individual cognition and social interaction. To the extent that worldviews are value based, they tend to be distinct and enduring because values are not easily changed. Conflict grounded in worldview differences is therefore often inevitable and unresolvable. However, collaborative conflict management provides natural resource professionals with tactics to facilitate discussion in the face of these differences and to generate improvements in the relationships and the conflict situations. Implications from this study suggest constructive conflict management and natural resource policy can accommodate worldview diversity.

**Analyzing Multiple Worldviews of Forestry:
Local Perceptions of the 1994 Fires
on the Wenatchee National Forest, Washington**

by

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Angela J. Findley, Author

ACKNOWLEDGMENTS

*Every time I've raced my shadow
When the sun was at my back,
It always ran ahead of me,
Always got the best of me.
But every time I've raced my shadow
When my face was toward the sun
I won.*

— *Shel Silverstein, "Shadow Race"*

In pursuing graduate studies, completing class work and writing this thesis, I relied on many people who helped me gather courage to face the sun.

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Analyzing Multiple Worldviews of Forestry: Local Perceptions of the 1994 Fires on the Wenatchee National Forest, Washington

CHAPTER 1. INTRODUCTION

An ecosystem, such as a forest, is ever-changing as it responds to disturbances, life and death cycles, and environmental conditions. As residents of neighboring forest communities, consumers of forest products, recreationists seeking leisure experiences, or members of regional and global ecological systems, humans are connected to and influenced by the environment. Thus, our interactions with forests must accommodate this dynamic ecosystem in some form or another. Natural resource policy and management strategies for public lands are oriented toward the diverse range of dimensions of the environment, itself, and human interaction with it, including: biological characteristics of species; ecological interrelationships; physical composition and structure of the landscape; technologies that improve understanding and use; legal mandates that guide management directions; cultural practices and symbolic meanings attached to the environment; and social interaction in policy formation and decision making.

Choosing a particular policy, not only involves an understanding of the inherent properties of the ecosystem, but depends on one's perception of the environment and the desirability to act (including non-action) on it in a particular manner. To pursue an understanding of the differences in perception, definition and management schemes involved in making natural resource decisions, this research emphasizes the role that values and worldviews play in natural resource policy. Fire disturbance is the central

issue in the study area to explore social and cultural responses to managing the local national forest.

Wildland fire frequently affects eastside forests of the Pacific Northwest.

Lightning started fires are the result of fuel availability on the ground, topography and weather conditions. To alter the occurrence or patterns of fire, humans can only manipulate fuel conditions since we do not have any means of directly controlling topography or weather. During a fire, fuel manipulation takes the form of fire suppression tactics; at other times, fuel manipulation is part of land management activities.

Humans have indeed been actively involved in manipulating fuel conditions. For example, Native Americans once started fires to stimulate the regeneration of desired vegetation for sustenance (Pyne, 1982); Anglo settlers created a tradition of fire suppression to preserve forest resource commodities, such as timber (Oliver et al., 1994); and currently, researchers are investigating vegetation and debris conditions to restore historic fire frequency, intensity and magnitude conditions (Everett, 1994). In these three examples, different connections between the forest and concerned people were at issue and hence different actions were pursued.

To begin understanding the social dynamics that surround people's connections to a particular forest area and perceptions of appropriate fire recovery management responses, it is important to look at the larger context of forestry in the Pacific Northwest. The communities neighboring the northern portion of the Wenatchee National Forest in central Washington, the study area, are interdependent components of the region. The events occurring in these communities are influenced by the political context of the

region as well as contribute to regional discussions of natural resource policy. A description of the broader political context provides background to recent policy challenges faced by communities in their efforts to influence public forestry management.

RECENT POLITICAL EVENTS

Forestry on the Pacific Northwest public forest lands has undergone dramatic changes in the last two decades, which has been characterized by turbulence in the timber industry. The historical trend shows timber harvests significantly increasing from WWII until the mid-1980s. Pacific Northwest national forest harvests peaked at 3,850 mmbf in 1986 (Warren, 1990), whereas timber harvests on those same lands steadily dropped to 948.7 mmbf in 1994 (Warren, 1995). The results of this decline are numerous and often focus on economic factors: the loss of revenue to federal, state and county governments; loss of primary and secondary jobs; reduction in timber receipts supplementing school budgets; increases in mill closures and displacement of skilled work forces; an increase in lumber, pulp and paper prices; and many more.

To examine the reasons behind this timber supply reduction, one must look at some of the tangible and intangible factors that reduce the amount of wood fiber being harvested for commodity purposes. Examples of tangible factors include: gaps in the distribution of harvestable timber; laws and regulations for management guidelines (Multiple Use Sustained Yield Act, National Forest Management Act, National Environmental Policy Act, and Endangered Species Act); activism by environmental or preservation movements; a heavier reliance of private industry seeking timber off public lands

due to depletion of resources on their own lands; and new technologies to increase wood utilization and processing efficiency. These tangible factors are often situated at a national policy level, which requires individuals and groups to proceed through systematic channels in order to instigate change.

Many intangible factors are also at work, complicating one's sense for a systematic policy response. Multiple, and often incompatible, interests compete for the same areas of forest; definitions of what a forest or its elements mean to individuals or groups vary; ways of life vary between rural communities and urban areas among them; problem solving styles differ among individuals; working relationships with agencies and special interest groups are grounded in tradition, historical events and daily symbolic interactions. These factors are often ambiguous and not easily modified. For example, a single definition for the value of a burned snag does not exist. It can be defined as salvageable timber, animal habitat, physical structure on a landscape, nutrients for forest cycling, or a resource for interpretive recreation. Subjectivity enters the process and adds complexity to problems we once thought solvable through objective study.

Throughout the Pacific Northwest, forest value differences among political interest groups became overwhelmingly evident when U.S. District Court Judge William Dwyer invoked an injunction on timber sales. The endangered species listing of the northern spotted owl had repercussions on forest use, specifically on timber harvesting in areas that provided habitat for this species. As managers of the national forests, the Forest Service attempted to provide Judge Dwyer with a final and then supplementary environmental impact statement in order to bring forestry management out of the court

room and back into the woods. Finally, the injunction was relaxed in 1994 aided from efforts initiated by the summit called by President Clinton to develop new management strategies for westside national forests. By this time, other species had been threatened or endangered as well as new localized conflicts had broken out on the national forests.

National Forests throughout the Pacific Northwest region were shaken to the core, first with re-adjusting policies for the spotted owl and second with continued public scrutiny of other management issues. A few examples include: salmon and trout habitat in streams throughout forest lands demanded new protection policies (McIntosh et al., 1994); forest health concerns on the eastside questioned policies on insect epidemics, fire occurrence and suppression, past high-grading cutting practices, recreation demands, and settlement of rural areas (Oliver et al., 1994; Quigley, 1992); the cumulative effects on river basins from timber harvesting, fire management, livestock grazing, mining and irrigation practices received renewed attention (Wissmar et al., 1994); and, salvage forestry again brought questions like "what should stay in the woods?" and "what should come out?" to the forefront of public debate.

When the debated questions shift from discrete and tangible natural resource issues, such as the volume of available timber and the allocation of resources, to intangible qualities of the forest and how issues are defined, a new complexity emerges. Instead of answering questions of "what *can* happen in the forest?" value-laden disputes surface in questions of "what *should* happen in the forest?"

VALUE-LADEN NATURAL RESOURCE CONFLICT

Decisions concerning management of public lands have always been surrounded by conflict due to the many interest groups and the associated wealth of the natural resources (Wondolleck, 1988). With the increasing pressure on scarce resources and the implementation of laws and regulations guiding public land management, disputes have become complex in terms of the multiple issues relevant to the dispute, multiple parties involved in the decision making process and the multiple arenas for influencing decisions and policy formation.

Wondolleck (1988) argues conflict should not be eschewed: "What should be of concern is the outcome of this conflict: the apparent inability of administrative decision-making processes to resolve these inevitable disputes and therefore make decisions that are viable. Administrative processes that are not decisive are processes ill-suited to the problems they are meant to address" (p. 2). As stewards for the National Forest lands, the Forest Service has played a role in many public land disputes. A traditional decision making paradigm has been institutionalized within this agency:

The paradigm is not only a model of action premised in conservation ideals, it also represents the culture of the public-forestry profession. As a result, the profession itself has reinforced the paradigm as through the esprit de corps of the agency. Throughout the twentieth century, there has been a revolving door between the Forest Service, faculty in forestry schools, and leaders in the professional forestry associations. Therefore, the paradigm has become entrenched in the profession's code of ethics and standards of behavior, and in Forest Service guidelines (Wondolleck, 1988, p. 30).

The argument on this point concedes that the processes designed to address problems and make decisions is an anachronism; therefore a procedural reform is needed.

To begin reforming the decision making processes, the sources of natural resource conflicts must be examined. In addition to the allocation of resources and decision making authority, differences in fundamental values among interested parties are key components. Crowfoot and Wondolleck (1991) identifies some of these value differences as: an intrinsic value in things that are wild and natural or not, a societal obligation to protect species and habitat or not, a priority on maintaining biological diversity and environmental integrity for future generations versus a priority on harnessing nature's resources to service the needs of today's society, different stakes in the outcomes of the decisions, and the uncertainty and risks of actions taken on the environment.

For example, many people advocate for 'sustainable' management policies, yet this concept's meaning varies depending on the value emphasis. Gale and Cordray (1991) provides eight answers to the question "What should forests sustain?" These answers range from valuing a dominant product (such as timber), which supports local communities, to a global village scenario and ecosystem-centered systems, which reinforces a holistic scheme. One's understanding of why sustainability is desirable and how that desire pertains to the status quo affects the ability to learn about differing interests and values regarding the management of natural resources (Shearman, 1990).

Another dimension to the fundamental differences among values revolves around preferences for the desirability and acceptability of management strategies and/or biophysical states occurring in the environment. Brunson (1993) offers seven propositions about the criteria that guide one to judge whether a situation is acceptable or not, by questioning: why the situation exists, whether it is a result of natural causes, whether

alternatives exist, the desirability of alternatives, the risk associated with the situation, other conditions in the geographic proximity, and the social context.

Despite complex and divergent values held by individuals and groups, the public agencies are also thrust into the perplexing task of developing management objectives and strategies consistent with laws and regulations, technical feasibility, political currents and public interest. In the attempt to develop plans, the agencies must interact with the public. Magill (1991) notes several barriers natural resource professionals encounter when interacting with the public: an attitude of "we know best," a belief in their professionalism such that they are above politics and politicians, the use of technical jargon, and a lack of training to deal with value-laden questions. The latter is the topic, which chapter 2 addresses by providing a theoretical foundation to understand value and worldview differences. For the purpose of this thesis, elements from several theories are integrated to explain the significance and influence value systems have on natural resource policy.

FOCUS OF THESIS

Individuals and groups, locally and nationally, voice interests on decisions made by land management agencies for the public lands. If there is dissatisfaction with decisions, actions, or even non-actions taken by the agencies, tensions between various interest groups often develop. These tensions are manifest in many ways. Common examples include: latent distrust with agency personnel or organizational units; polarization between community interest groups; regional and national attention focusing on

local issues; rising political emphasis on decisions made by the agencies; appeals and litigations against agency decisions; and discord within and/or between agencies.

This thesis examines social and cultural dimensions of a natural resource issue. More specifically, values and worldviews of local community residents are analyzed as they relate to a particular forestry situation in the Pacific Northwest. To begin to understand the tensions that permeate this situation, local community residents explain their perception of appropriate management directions in terms of their own values and rationales. First, this data is analyzed to identify commonalities and differences of individual values and worldviews. Then a sociocultural typology is adopted to illustrate fundamental differences among worldviews of natural resources and management directions.

The resulting typology from this thesis provides a useful tool for natural resource professionals. Already, there exist so many useful tools to measure, evaluate and predict ecological and economical variables of the forests. But, fewer tools exist to help understand social and cultural dimensions of natural resources. Hopefully, a typology that explains how various worldviews generate tensions around natural resource issues can aid decision makers in managing constructive conflict and developing well informed natural resource policies.

STUDY AREA

Criteria and Limitations

Three communities neighboring the northern portion of the Wenatchee National Forest were the study area for this thesis. Criteria for the study area, in which a researcher could study values salient to forest policy and management, focused on selecting an area that (1) was an identifiable and compact community adjacent to public forest land, (2) could be defined by social and commercial networks, and (3) had a prevailing issue or event around which the interviews could be organized and stimulated subjects' interest in current forestry management.

Preliminary design of this research assumed a single researcher would collect data, using qualitative methods. Hence, the first criterion limited the size of the study area so that one researcher would be able to conduct interviews that captured the breadth and depth of values present in the community. The purpose of the second criterion was to select an area that included major social and commercial networks within the study area rather than excluded relevant data on the basis of a subject's residency in a neighboring community. By combining these two criteria, the process attempted to select a study area that was manageable for one researcher yet included as many local residents interested in forestry issues as possible.

The communities of Chelan, Entiat, and Leavenworth met the above criteria with several modifications. Most importantly, a larger research team was invited to the WNF in order to facilitate public involvement meetings and provide a social assessment, which identified current forestry issues and categorized stakeholder groups and political

coalitions. Due to this larger research team, data collection from interviewing local residents was conducted by two team members, which allowed for a larger area to be covered and faster accumulation of knowledge.

The research team came to the WNF as the Forest Service sought assistance in developing fire recovery plans for the aftereffects of wildland fires in 1994. These fires were a major forest disturbance, burning over 180,000 acres and interrupting day-to-day social and economic activities of the residents. Fires adjacent to these communities burned homes, closed roads, and threatened water supplies. Public interest in local forest management intensified as a result of direct personal experiences with these wildland fires and suppression activities. To assist the Forest Service in assessing the social dimensions of the fire recovery situation, the research focused on local perceptions of appropriate management responses to the fires.

The primary limitation of the three communities meeting the study area criteria is their proximity to Wenatchee, fifteen to thirty miles away, which establishes significant social and commercial networks. Wenatchee has a population of 24,000 whereas Chelan, Entiat and Leavenworth number 3000, 500 and 2000 residents, respectively. However, each of the three communities are unique and differ in their use of the national forest, which allows for localized tensions to develop within each community. Moreover, Wenatchee did not experience the severe degree of direct interaction with wildland fire in 1994 as the other three communities and therefore was not as strongly impacted by fire recovery issues. While, Chelan, Entiat and Leavenworth each lost residential homes and

structures and literally had fires in their backyards, Wenatchee only suffered prolonged smoke and the threat of fire if extreme weather conditions prevailed.

To adjust for significant stakeholders or special interests located in Wenatchee, especially if not present in the study area, researchers included these subjects in the interviewing process. Approximately 5% of the subject population lives in Wenatchee or East Wenatchee. This subset often holds positions in the county governments; works for state or federal government agencies, which manages land and resources for the region; or are actively involved in special interest groups concerned with public land management in the study area.

Since this adjustment could be made to incorporate voices outside the study area without jeopardizing the original intent of the research, the communities of Chelan, Entiat and Leavenworth were chosen to pursue an analysis of local values and world-views with regard to forest management. The major fires heightened many residents' interest and concern for well managed national forests. The importance and salience of fire recovery management enhanced local residents' willingness to discuss personal experiences they had with wildland fires and express views on the direction land managers should take.

Description of Fires and Local Response

In July 1994, lightning storms started dozens of wildland fires on the Wenatchee National Forest. Due to dry conditions, high temperatures, gusty winds and large volumes of available fuel, four major fires burned over the landscape. These fires

damaged structures, threatened lives, and required \$69 million for suppression activities (Wenatchee National Forest, 1994). Appendix 1 outlines the location, acreage burned and fire suppression costs for the Tyee Creek, Hatchery Creek, Rat Creek and Round Mountain fires.

Nineteen homes were lost in the Tyee Creek fire; eighteen homes were lost in the Hatchery Creek Complex; and an additional 76 outbuildings were destroyed throughout the burns. Personnel included over 9600 fire fighters and administration, including 1600 National Guard and Marine troops. Fire fighters and other personnel came from 25 states to join local structural and wildland fire crews. Structural protection was strengthened by the Washington State Emergency Mobilization Act, allowing city fire departments from western Washington to send personnel and equipment.

Evacuations required many residents to leave their homes and work places, as well as shut down popular tourism and recreational attractions. Not only was late July and August fraught with trauma associated with fire threatening the community and ever present smoke, but economic losses were substantial because the prime tourism season was effectively preempted.

While fire has historically been a part of the natural environment and way of life for residents in Chelan County, events of the 1994 magnitudes and intensities have not occurred for years. Significant fires that burned large areas of the northern Wenatchee National Forest, all on the Entiat Ranger District, include the 1988 Dinkleman fire, burning approximately 50,000 acres, and a series of fires in the summer of 1970, including the Mitchell Creek fire and Entiat fire, burning 42,000 and 31,000 acres

respectively. Other fires in 1970 combined to burn an additional 30,000 acres. The Tyee Creek fire, in 1994, started in the same ranger district and eventually burned three to four times as large of an area that any recent single fire burned. The 1994 fires were the largest and most threatening that many residents had seen in their lifetimes. The Tyee Creek and Hatchery Creek Complex fires were described as frightening and unusual occurrences. Some long time residents were more accepting of wildland fires, however the size and intensity of 1994 fires directed many to question past and current forestry management practices. Due to the number of people and communities affected by these fires, the quantity and severity of acreage burned, the ongoing research conducted by natural resource scientists, interests voiced by groups outside the affected area, and competing uses on a limited landscape area, the aftermath of the 1994 Chelan County fires was potentially ripe for conflicting opinions on the direction fire recovery should take. At the core of these often divergent opinions were fundamental views of nature and human coexistence. This study examines these deeply held values and exposes their commonalities and differences.

RESEARCH OBJECTIVES

This thesis focuses on some of the intangible factors of forestry policy: (1) views of nature held by local residents of the affected communities; (2) the range of values for appropriate management directions; and (3) a framework to encourage an understanding of the variation in worldviews. The research questions pursued in this thesis are part of a larger effort supported by the Forest Service to develop fire recovery plans for the

Wenatchee National Forest. Research objectives are chosen to gain an understanding of local residents' specific attitudes, values, rationalities and worldviews toward fire recovery plans.

This thesis analyzes subjects' views of nature and variations in their definitions of appropriate management. A typology that differentiates these views of fire recovery can provide natural resource professionals and decision makers with a means to understand the diversity of values present in the study area. An increased awareness of value and fire recovery view differences can help identify constraints on the policy process as well as illuminate areas for creative management. By identifying intangible factors present in a particular natural resource situation, new directions can be pursued for relieving destructive conflict. If the issues of disagreement center on value differences, it is necessary to understand these variations in order to design policy targeting the underlying issues rather than symbolic representations of the issues.

This thesis attends the following two objectives for studying the social structure of opinions and values toward forestry and wildfire in north central Washington:

- 1. Provide an analytical framework that describes the variation in multiple views of fire recovery and, more generally, views of nature.**
- 2. Explain the importance of variation in fire recovery views on the policy process.**

STUDY APPROACH

In the autumn of 1994, within weeks after the containment and suppression of the fires, 122 semi-structured interviews were conducted by the author and a co-researcher. Subjects live in communities directly affected by one or more of the wildland fires in

north central Washington. The selection process began with the researchers meeting with local Forest Service personnel and resident key informants to develop a list of names of residents who are active in forestry issues or represented various stakeholder groups. The intent of this preliminary sample of subjects was for researchers to meet and interview individuals representing a diverse spectrum of interests. From this list of subjects, researchers scheduled interview appointments. A secondary list of subjects was developed using a chain referral process, whereby researchers asked interviewees for names of other persons who were active in local forestry issues or have interests in fire recovery management plans.

All data and methodology for this thesis is qualitative in nature, which attempts to gain an understanding of local issues from the local residents' perspective. Researchers studied three communities, which comprised areas most affected by the fires. The interviewing process was concluded in each community when data became "saturated," that is when most of the information received was repetitive and relatively little new data was acquired.

Qualitative analysis, using grounded theory, reveals general themes as well as shared meanings and divergent viewpoints with respect to fire recovery issues. Thesis analysis comprises an effort to build salient theories describing differences and commonalities in opinions and values held by subjects regarding forestry issues. The findings of this analysis are presented in the form of a typology matrix, which describes five fundamentally distinct views toward nature.

ORGANIZATION OF THESIS

Chapter 2 contains a review of literature, which discusses social psychological and cultural theories that explain how values and worldviews provide lenses that shape our views of nature. This chapter also explores conflict and its management relevant to multiple worldviews in natural resource policy. Chapter 3 details research methodology. Data analysis comprises Chapter 4 where a conceptual framework of worldviews is inductively developed from semi-structured interviews with local residents. Chapter 5 compares the data analysis findings to theories presented in the literature review. Lastly, implications this research topic has for natural resource policy are identified.

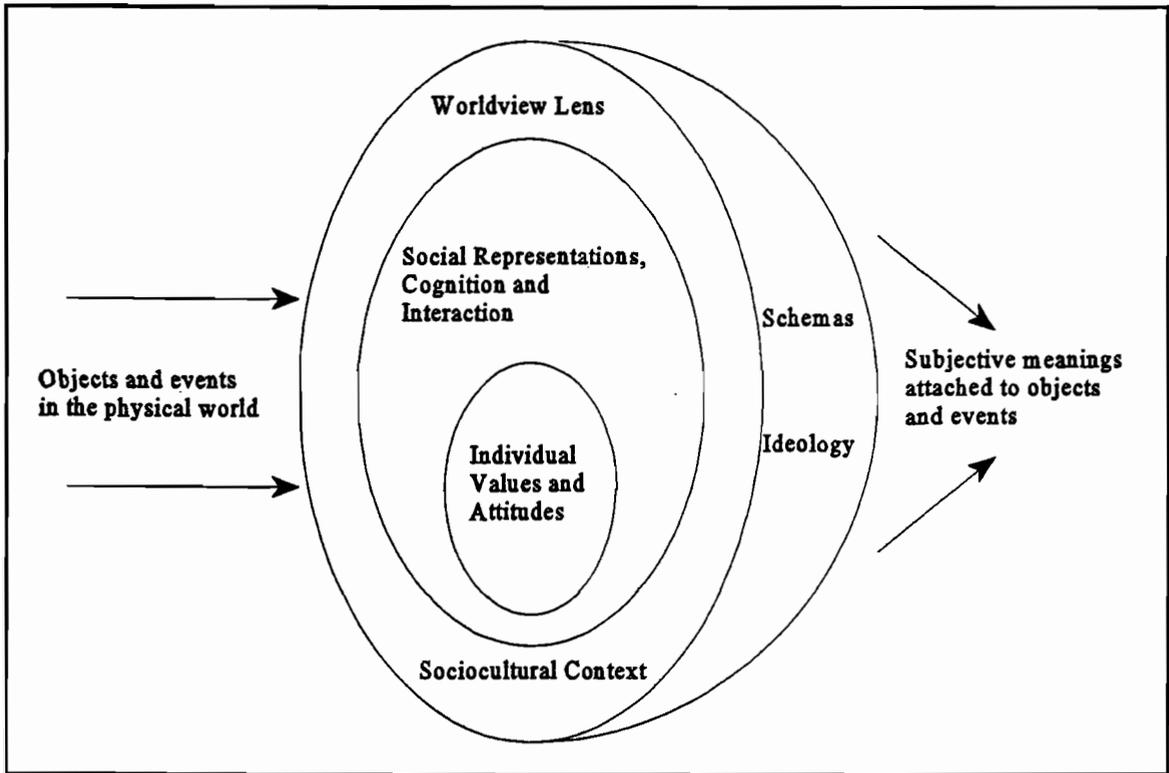
CHAPTER 2. LITERATURE REVIEW

What are worldviews? What roles do they play in natural resource policy situations? Despite the straightforwardness of these questions, the answers are anything but simple. This chapter is divided into two sections to organize responses to each question. The first section begins by defining the concepts of individual and social values and then uses these definitions to construct a discussion on worldviews at a social and cultural level. As values clash and differing worldviews spark disagreement, conflict often develops. The second section explores the role that conflict management plays in the context of multiple worldviews.

A FOUNDATION FOR UNDERSTANDING MULTIPLE WORLDVIEWS

The manner in which we perceive and attribute meaning to objects and events depends partially on how we view the world. To define worldview, Wilson and Morren (1990) borrows a German concept: "*Weltanschauungen* (the plural) consist of the experiences, feelings, emotions, attitudes, values, morals, beliefs, tastes and personalities of individuals, as well as their patterns of reasoning and intelligence and their store of knowledge" (p. 41). Worldviews are lenses that help us see the world for more than a collection of physical objects and events; worldviews provide us with subjective meanings for these objects and events; worldviews are social and cultural phenomena (Figure 1).

FIGURE 1. WORLDVIEW AS A LENS



Individual values are a fundamental component of one's worldview, because they are durable mental structures that discern the desirable and the undesirable (Rokeach, 1973). Yet individual values evolve in a social context, which is rich in shared knowledge, various cultures and differing ideologies. Our social realities are partially constructed from the interwoven nature of individual and social values. This section takes an integrated approach to explore the concept of worldview as value constructs embedded in a social context by using several theories from social psychology.

Furthermore, one knows the social world to be pluralistic: different attitudes, beliefs and values; different ways of thinking, prioritizing and evaluating; different cultures; and different languages (Schwarz and Thompson, 1990). Worldviews also are plural, one only needs to look at the political arena to see tensions among various views on issues. Anthropology offers a model that categorizes worldviews by distinguishing among common dimensions in social relationships, hence reducing this plurality to five typologies. Building on this sociocultural model, worldviews of nature can be similarly structured. However, to achieve this level of explanation, we must ground it in an understanding of individual values.

The Role of Individual Value Systems

Values are evident when we ask questions such as: What *should* happen in the national forest? This question can take many forms and generates even more responses. But eventually some course of action (or non-action) is pursued by decision makers. Current regulations guiding Forest Service decisions stipulate that input for the decision

making process include scientific expertise and public participation. It is therefore understandable that responses to management directions span a diverse spectrum. At the core of these various responses are the values held by involved parties.

Hechter (1993) states that "Values are relatively general and durable internal criteria for evaluation" (p. 3), which contrasts with specific and unsteady preferences and attitudes. Rokeach (1973) distinguishes among three types of beliefs to identify values as prescriptive or proscriptive beliefs: "A value is an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence" (p. 5). Values are composed of cognitive, affective and behavioral components. Rokeach offers the following explanations:

- (1) A value is a cognition about the desirable.... To say that a person has a value is to say that cognitively he knows the correct way to behave or the correct end-state to strive for;
- (2) A value is affective in the sense that he can feel emotional about it, be affectively for or against it, approve of those who exhibit positive instances and disapprove of those who exhibit negative instances of it; and
- (3) A value has a behavioral component in the sense that it is an intervening variable that leads to action when activated (p. 7).

One manner in which the cognitive component of values is activated involves the distinctions an individual makes. For example: Is natural *good*? What is *natural*? What is *unnatural*? Is a wildland fire that is larger and more intense than any other previously documented fire *natural* because lightning struck and weather conditions prevailed? Or, is it *unnatural* because human forest practices and fire suppression tactics led to abnormal fuel conditions? Conflict among these, and other, attributions are rooted in our

fundamental distinctions as we assign subjective meanings to objects, events and end-states. Wildavsky (1993) states "When [social] consensus breaks down, when concepts (and hence the words that refer to them) become politicized, a struggle over meaning and morality takes place" (p. 47). The durability of these distinctions are not completely fixed, instead they "represent movable boundaries that are always subject to cultural contention" (Hechter, 1993, p. 17)

The recurring principle in this discussion is that individual values are interwoven with a social and cultural context. White (1993) argues "values do not come as separate coins but in symbolic packages that derive alongside and together with form[s] of social organization" (p. 63). This interaction of values at individual and social levels motivates the next step in understanding worldviews as social phenomena.

A Social Context for Values: Social Representations

Values and value systems for the individual (1) guide evaluations of alternative actions and end-states; (2) are complex in their construction from cognitive, affective and behavioral components; (3) and endure casual changes in attitudes and preferences (Rokeach, 1973; Hechter et al, 1993; Schwartz, 1993). Social values differ significantly from individual values in that they certainly are more than an aggregation of individual values. Shared social values are correlated around social networks (White, 1993) and are reinforced by social representations, schemas, worldviews, and ideologies.

Augoustinos and Walker (1995) pursues social representation theory to explain the role of attitudes in social cognition:

Work on the intra-individual, or micro-level focuses on how attitudes work. Macro-level concerns place attitudes in a social context, and illustrate their fundamental social character. Attitudes are social, in origin, in function, and in consequence. They originate in social life, they communicate meaning, they are shared, and they have social consequence (p. 29).

Although Augoustinos and Walker focuses on the relationship between individual attitudes and social representations, it also states that "social representations theory attempts to deindividualize [values, belief systems and ideologies] and reinstate their collective character within an integrated social psychological theory" (p. 143). The substance of social representations can be explained by Moscovici (1988):

Social representations ... concern the contents of everyday thinking and the stock of ideas that gives coherence to our religious beliefs, political ideas and the connections we create ... They make it possible for us to classify persons and objects, to compare and explain behaviours and to objectify them as parts of our social setting (p. 214).

Social representation theory refines Fletcher's (1984) definition of common sense: "a cultural group's body of shared beliefs about the world" (p. 204). Three aspects to this common sense include: (1) a set of shared fundamental assumptions about the nature of social and physical world, (2) a set of cultural maxims and shared beliefs about the social and physical world, and (3) a shared way of thinking about the social and physical world (Fletcher, 1984). This definition spans not only the content of common sense (assumptions, maxims and beliefs), but also the cognitive process (a shared way of thinking).

Social representations and common sense are both stores of knowledge that are held at the social level, yet are accessible to the individual to make sense of the world. Social cognition focuses on the processing of social information. One aspects of this is schema theory: "an informational processing model of perception and cognition which

attempts to isolate the mechanisms by which people come to understand the complex social world in which they live" (Augoustinos and Walker, 1995, p. 32). Unlike social representations, which are collective in nature, schemas operate at the individual level by linking past events and people with current experiences (Hewstone, 1989). However, as in values, schemas are grounded in the social context. By providing structure and process, schemas organize new social information according to knowledge stored in one's memory. Augoustinos and Walker argues that schema and social representation theories might strengthen models of social cognition by recognizing "how different levels of explanation have been invoked to account for the way existing social knowledge is used in social cognitive processes" (p. 184). By using social representation theory, new information can also be organized by available stores of shared knowledge at the social level.

Up to this point, the discussion has laid the groundwork to consider the interaction of individual values and social representations as well as the function of schemas to process new information. Worldviews differentiate as plural themes arise from differing social representations. Shared values and social representations link commonalities in worldviews, but conversely, segregate differences among worldviews. Multiple worldviews provide multiple assignments and attributions of meaning to objects and events. The reinforcing nature of the social context establishes an interdependent relationship between the individual and society. Thus, shared worldviews promote common values and social representations among individuals, whereas unshared worldviews may cause tension between one's values and social representations and other's in the social arena.

Our social reality is created in part as values, social representations and worldviews are actualized through institutions and ideologies. Ideologies are defined as "a collection of beliefs, attitudes and values organized around some coherent core and associated with a particular group in a social structure" (Augoustinos and Walker, 1995, p. 28). The previous discussion on values and social representations reveals several of the components of ideologies: "the social psychological processes and mechanisms by which certain representations and constructions of the world serve to legitimate, maintain and reproduce the existing institutional arrangements, social and power relations within a society" (Augoustinos and Walker, p. 288). The purpose for exploring ideologies is that they are an identifiable product of one's worldview, which itself is more subtle. Ideologies manifest in several ways, such as: political belief systems, system justification ("the means by which power, control and dominance are maintained" (p. 291)); consciousness (beliefs, attitudes, opinions, stereotypes, etc.); discourse; and material practices in everyday life and rituals (Augoustinos and Walker, 1995). Worldviews are not the only contributor to ideologies, as an in-depth study of the above list might provide. Culture influences social groupings and their respective ideologies. Gross and Rayner (1985) provides insight on the significance of culture:

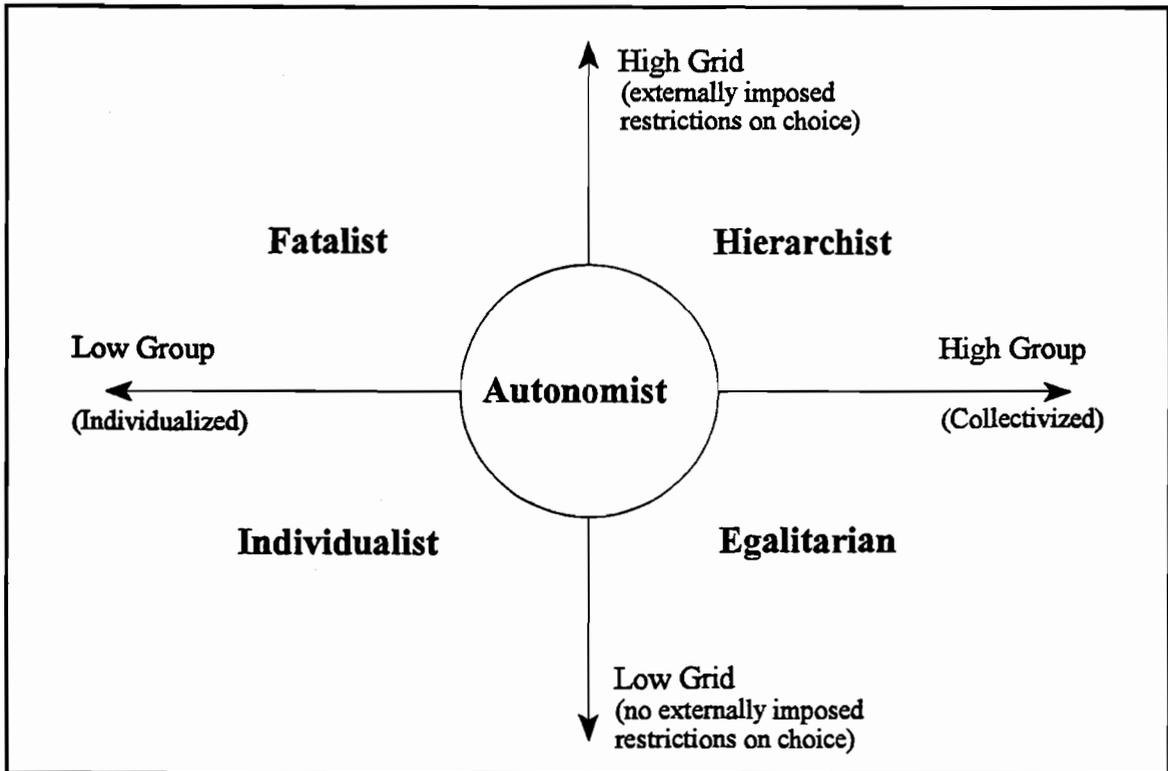
Understanding the culture of a social unit tells us how its members define themselves in relation to members of other communities and how they define their standing among themselves. Hence, the emerging concept of culture, as the way in which people make sense of their world, may explain why people do what they do, as well as why they do it in one way and not another (p. 2).

This cultural context leads this discussion to consider a typology for sociocultural organization and worldview differentiation.

Cultural Theory

Anthropology offers various cultural theories, which supplement a social cognition approach to understanding worldviews. Douglas (1978) presents Grid/Group analysis to describe the social context of an individual in a society by identifying four types of sociocultural relationships depicted along two dimensions: " 'Grid' for a dimension of individuation, and 'Group' for a dimension of social incorporation" (p. 7). Grid refers to the level of control over choice — high grid gives control to external agents, society and social structures, whereas low grid gives control to internal agents, the individual. Group refers to the individual's attachment to society — individualized versus collectivized. Figure 2 illustrates the four sociocultural relationships that emerge from cultural theory's Grid/Group analysis and an additional relationship that is explained later in this section.

The Individualist is responsible only to him/herself, the Fatalist is subject to external forces and is unable to influence events in his/her life; the Hierarchist is situated in traditional organizations where procedure dominates social movement; and the Egalitarian emphasizes the concerns of the whole over concern of the individual by whatever methods support the former. Thompson, Ellis and Wildavsky (1990) suggests a fifth relationship with its own culture: the Autonomist. This individual "tries to remain autonomous avoiding, where possible, involvements that would enable him to call on the support of others and, at the same time, enable others to make calls upon him" (Thompson, 1982, p. 37).

FIGURE 2. CULTURAL BIASES FROM GRID/GROUP ANALYSIS

(Adapted from Douglas, 1982; Thompson et al., 1990; Schwarz and Thompson, 1990)

The differentiations provided by Grid/Group analysis explain how individuals construct their social realities within a pre-existing cultural context. Douglas (1982) describes this process as:

... individuals creating their social conditions by the bargaining and argumentation which sets up social categories or breaks them down. We assume that they choose how they deal with each other, but the choice for a certain kind of social relationship unwittingly involves the chooser in a particular constrictive social environment (p. 246).

Cultural biases, often of a socio-historical nature, affect how we see and interact with the world. Thompson et al., (1990) defines cultural bias, simply as shared values and beliefs.

Yet, cultural biases are not a singular influence on the individual:

[Social] relations and [cultural] biases are reciprocal, interacting, and mutually reinforcing: Adherence to a certain pattern of social relationships generates a distinctive way of looking at the world; adherence to a certain worldview legitimizes a corresponding type of social relations (Thompson et al., 1990, p. 1).

Social relations refer to interactions among individuals and groups and can be explained by looking at the cognitive aspects individuals use to make choices and negotiations as well as the methods that groups use to strengthen or weaken their boundaries (Douglas, 1982). The five sociocultural relationships integrate the concepts of shared values at individual, social and cultural levels. One's cultural bias allows that certain social representations and ideologies constrict or affect our choices and worldviews due to pre-existing culture in the social context where individuals interact. We cannot think or act in a context where social and cultural aspects are absent. Even in the remotest natural environment, we carry language and stored knowledge with us; we cannot escape the social beings that we are nor the cultural influences that permeate our worldview.

The discussion to this point has dealt with expanding the cognitive aspects of worldviews to a sociocultural explanation. Attention can now shift from a generic context toward views of nature and of natural resource management. To do this, an additional layer is added to the five typologies of worldviews developed from cultural theory.

Considering Nature in Cultural Worldviews

Holling (1978) introduces four scenarios to represent various perceptions of nature's response to a disturbance: Nature Benign, Nature Ephemeral, Nature Perverse/Tolerant and Nature Resilient. The addition of Nature Capricious is made to these perceptions as cultural theory is applied (Thompson et al, 1990; Schwarz and Thompson, 1990). Figure 3 illustrates four of these perceptions of ecological resilience as a ball responding to a surface. A description of Nature Resilient is provided later in this section.

Disturbances to ecological systems are portrayed by moving the ball along the surface, away from its equilibrium point (where the ball is currently placed). Arrows depict the ball's response to disturbance — the ecosystem's ability to return to equilibrium. Nature Benign is the most forgiving and resilient; regardless of the magnitude of the disturbance (the ball's distance from equilibrium), the ecosystem will revert to its original state. Nature Ephemeral is the opposite; it is most unforgiving and least resilient to disturbances. The smallest disturbance, in this view, causes the ball to roll off the

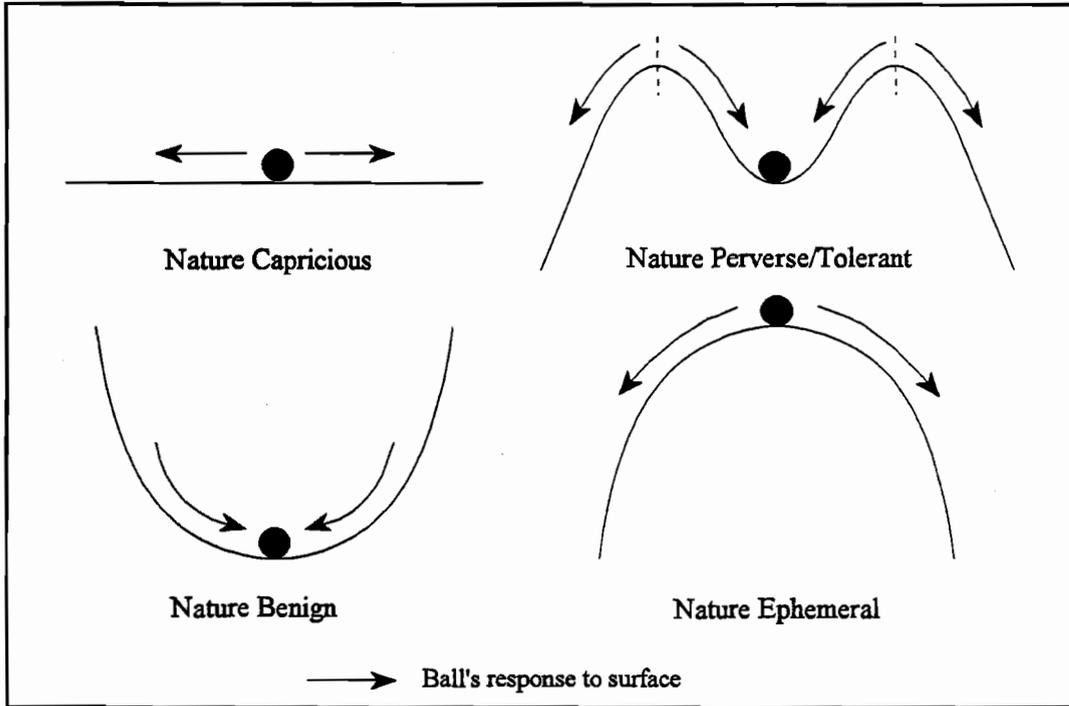
surface; hence, the ecosystem is unable to return to its original state. This view discourages even minor interference with nature because of its fragility (Holling, 1978).

Nature Perverse/Tolerant appears to be a combination of the previous two views. However, it represents the possibility of several stable states for an ecosystem. Small disturbances return the ball to its original condition. Large disturbances send the ball past the boundary of forgiveness. For examples of systems moving into different states, Holling notes "A river can become an open sewer, or the economy of a nation can suddenly begin to prosper" (p. 9). The focus in this view "hinges upon mapping and managing the boundary line between these two states," which promotes testing and establishing predictability.

Nature Capricious views disturbances in nature and ecosystem resilience as random, therefore the ecosystem copes rather than responds. Thompson et al., provides a rationality for this view:

... in the flatland of Nature Capricious there are no gradients to teach us the difference between hills and dales, up and down, better or worse. Life is, and remains, a lottery. It is luck, not learning, that from time to time brings resources our way (p. 28).

Lastly, Nature Resilient moves beyond the ball reacting to the shape of the surface; it takes on transformational properties in which the surface reacts to the ball (Thompson et al, 1990). Holling (1978) describes Nature Resilient such that "resilience is a property that allows a system to absorb and *utilize* (or even benefit from) change" (p. 11). It is an ecosystem's ability to adapt and evolve to larger ecological changes (Holling, 1986). The graphical illustration of Nature Resilient would show a series of surface positions, each a product of the prior surface and the ball's action upon it.

FIGURE 3. FOUR VIEWS OF NATURE

(Adapted from Thompson et al., 1990; Schwarz and Thompson, 1990)

When coupled with the cultural biases and social relationships, these five views of nature provide a typology for worldviews of nature. The pairings as described by Schwarz and Thompson (1990), each with a distinct ideology, are as follows:

1. **The Individualist-Nature Benign:** "As long as we all do our individualistic, exuberant things, a 'hidden hand' will lead us to the best possible outcome" (p. 8).
2. **The Egalitarian-Nature Ephemeral:** "Their small-scale organizations tread lightly upon our fragile earth, and they are only too happy to re-educate those who ... threaten the destruction of the entire planet" (p. 9).
3. **The Hierarchist-Nature Perverse/Tolerant:** to effectively control one stable state, "you need precise knowledge of the line between equilibrium and disequilibrium" (p. 10).
4. **The Fatalist-Nature Capricious:** "All you can do is try to cope, as best you can, with a situation over which you have no control" (p. 10).
5. **The Autonomist-Nature Resilient:** "change is inevitable" (Thompson et al, 1990, p. 32).

Schwarz and Thompson (1990) claims that these worldviews and ideologies are mutually exclusive, and that the pluralism is essential: "The three active rationalities — the hierarchist, the individualist, and the egalitarian — structure the world in different and (in the right circumstances) complementary ways" (p. 12). It is this plurality that may cause friction, or conflict, among various worldviews in reaching consensus on issues since each worldview originates from a different set of values. Negotiation among these worldviews leads to changes, or evolution, in the social context of natural resource management. A "new synthesis" from integrative negotiation captures cultural pluralism and society's quest to persist: "Diversity, contradiction, contention and criticism ... are the best tools we have for understanding the inchoate. We must learn to husband [these

plural ideologies] and make the most of them. Divided we stand; united we fall"

(Schwarz and Thompson, 1990, p. 13)

The challenge for this project is to analyze the study area and to determine whether, and how, each of the worldviews is present, if others are present, and the extent to which this typology accurately describes the social context. The final task of this chapter is to explore theories that aid the subsequent discussion on potential implications of conflict from the presence of multiple worldviews in natural resource policy situations.

CONFLICT AS A POTENTIAL DEVELOPMENT OF MULTIPLE WORLDVIEWS

Theories of Conflict

The concept of conflict itself is broad and often seemingly self-evident. However, theorists from various disciplines have attempted to define this concept in order to explore its structure and management. Some definitions are:

"Conflict means perceived divergence of interest, or a belief that the parties' current aspirations cannot be achieved simultaneously" (Pruitt and Rubin, 1986);

"Conflict is an expressed struggle between at least two interdependent parties who perceive incompatible goals, scarce resources, and interference from the other party in achieving their goals" (Hocker and Wilmot, 1991);

"A conflict exists whenever incompatible activities occur....An action that is incompatible with another action prevents, obstructs, interferes, injures, or in some way makes the latter less likely or less effective" (Deutsch, 1973).

These definitions each refer to some degree of interdependency among parties and to some incompatibility in achieving their goals, objectives or aspirations. Deutsch (1973)

further asserts that conflict is more complex and that there are identifiable variables that affect the course of conflict: characteristics of the parties, prior relationships among the parties, the nature of the disputed issue(s), the social environment within which the conflict occurs, the interested audiences to the conflict, the strategy and tactics employed by the parties in the conflict, and the consequences of the conflict to all parties.

Wehr (1979) generalizes the elements of conflict into three categories: the involved parties, issues and dynamics of the social interaction. Conflict parties are defined as "decisional units which are directly or indirectly involved in the conflict and have some significant stake in its outcome" (Wehr, 1979, p. 19). These parties include primary persons who are directly involved, secondary persons who are indirectly involved in the outcome, and interested third parties "who have an interest in the successful resolution of the conflict" (Wehr, 1979, p. 19). Issues of the conflict are categorized as facts-based, values-based, interests-based and non-realistic, which refer to "what is," "what should be," "who will get what," and intangible issues such as communication quality or situational affect in the physical setting, respectively. Lastly, Wehr identifies five common social conflict dynamics: precipitating events, issue emergence, transformation, proliferation, polarization, spiraling, and stereotyping and mirror-imaging. The interaction of three conflict party levels with dissimilar issues and the potential for five different means of conflict development quickly describe the complexity that may result.

Another set of elements that factor into the structure of conflict are intangible issues, which usually result from interpersonal or inter-group behavior. Examples of

these intangible issues include power distribution, face-saving, trust, norms of justice, openness of communication, and conflict style. To understand the intangible issues in conflict one can examine the constructs parties use to frame their perceptions of incompatibilities and interdependencies. Littlejohn, Shailor and Pearce (1994) looks at the manner in which "conflict arises from differing social realities" (p. 67) in order to coordinate third party intervention. Differing social realities result as the importance and meanings that one party attaches to objects and actions differ from those another party attaches to the same objects and actions. Littlejohn et al (1994) identifies, but does not limit, the differences in social reality to three parts: the moral reality, the conflict reality and the justice reality.

(1) "Moral realities consist of assumptions about proper conduct." A person's moral reality is a deeply held philosophy that guides one's actions in terms of interacting with others and belonging to a community and society.

(2) Conflict realities respond to a party's "definition of conflict and an idea of how conflict should be handled."

(3) Justice realities "consist of principles used to establish the proper outcome or consequences of conflict resolution" (Littlejohn et al, 1994, p. 72).

Understanding natural resource conflicts also involves another fundamental reality: the relationship of humans to the biological and physical elements of nature.

The structure of conflict ranges from relatively easily identifiable elements such as primary disputing parties and substantive issues to additional secondary and third parties and multiple definitions of the issues. Moreover, the structure can quickly become complex depending on the emotional and interpersonal factors among the parties.

Many elements of the conflict require a close examination of the discourse used by the parties so that interested researchers can begin to understand the perceptions held by the parties and how these perceptions differ. By attempting to understand these differences, one can hope to understand some of the barriers that cause a dispute to continue, stagnate or escalate.

Importantly, conflict need not be a negative experience or situation. Tjosvold (1991) presents a list of benefits derived from positive conflict: awareness of problem(s); incentives to change an organization, group or self; improved solutions; higher morale through tension reduction; personal development; self- and other awareness; psychological maturity by developing empathy and confidence; and fun from being stimulated and involved. Managing conflict so that it promotes these benefits encourages a learning experience. Yet, if this opportunity is avoided or not seriously addressed, Tjosvold argues that, "Poorly managed conflicts pose great hazards because they disrupt the ability to solve problems, including the ability to deal with conflict" (p. 4).

With the assumption that striving for positive results from conflict is desired, then the importance of identifying the interdependencies and incompatibilities is an initial step in managing conflict situations. However, an understanding must be followed with tools at resolving differences or to bridging misunderstandings and differing social realities. The next section addresses theoretical tools that can be employed in working with a conflict situation.

How Do We Manage Conflict?

Keltner (1987) identifies the Struggle Spectrum as six stages that conflict can pass through: mild difference, disagreement, dispute, campaign, litigation, and fight or war. Escalation progresses conflict from mild differences to increasingly more competitive and violent stages. De-escalation brings parties back to less polarization on conflict issues. Another occurrence in conflict progression is stalemate, where conflict remains at one stage without escalating or de-escalating.

These paths (escalation, de-escalation and stalemate) that take conflict through various stages may each be beneficial or disadvantageous to conflict management depending at which stage they occur. Recalling that conflict can be a positive experience, escalation may be beneficial in early stages to clarify issues and parties' interests. Stalemate and de-escalation are obvious improvements when conflict is on the path to violence. Conflict managers, who choose an active role in conflict, have specific tactics available to escalate, de-escalate and stalemate conflict, which can be described in two general categories: negotiation and third-party intervention.

The category of negotiation can be further divided into distributive and integrative negotiation. Distributive negotiation is often the process we engage to purchase a house, a car, or even bargain for trinkets at a flea market. This negotiation situation can be described as:

... the goals of one party and the attainment of those goals are in fundamental and direct conflict with the goals of the other party. Resources are fixed and limited, and each party wants to maximize his/her share of the resources. As a result, each party will resort to a set of strategies and tactics in order to maximize his/her share of the outcomes that are obtained (Lewicki and Litterer, 1985, p. 76).

Distributive negotiation is useful in matters of allocation — who gets which resources, who has decision making authority. The focus of this type of negotiation centers on outcomes rather than process, a competitive relationship rather than one that is collaborative, and positions rather than interests (Walker, 1994).

Integrative negotiation does focus on process, collaboration and interests.

"Integrative [negotiation] is the process of identifying a common, shared, or joint goal and developing a process to achieve it. It is meant to be a collaborative process in which the parties define their "common problem" and pursue strategies to solve it" (Lewicki and Litterer, 1985, p. 102). At this negotiation's best, problem solving tactics are employed by all conflict parties to find mutually beneficial resolutions (Pruitt and Rubin, 1986). In actual practice, complex conflict situations often seek improved situations instead of the ideal problem solution or conflict resolution. Tactics for integrative negotiation include: expanding the pie, non-specific compensation, logrolling, cost cutting, bridging, fractionating the conflict, alternation, unlinking the issues, and intangible issues conversion (Pruitt and Rubin, 1986; Walker, 1994).

When parties are unable to manage their conflict themselves, third-parties are often sought to intervene in the process or outcomes. A variety of roles that third-party intervenors can take in conflict management include: a member of a coalition, an observer, a mediator, an arbitrator, a conciliator, a fact-finder, a mediator/arbitrator, an analyst, a counselor, or a representative (Walker, 1994). Third-parties may use distributive or integrative negotiation strategies, or a combination, to fulfill their roles in managing the dispute or conflict.

The Conflict Management Versus Conflict Resolution Distinction

Conflict resolution is one form of conflict management. Resolution implies that incompatible goals, aspirations and issues have reached some type of closure, whether that be a mutually agreed upon solution or a competitive "win." Management implies a broader scope of issues, parties, relationships, forums and time spans, where conflict moves through episodes.

Conflict resolution may be more feasible in cases of disputed interests-based and procedural issues. Interest-based issues correspond to disagreements over the distribution of resources (Wehr, 1979). Procedural issues correspond to the rules of negotiation or conflict resolution. Unless, facts-based and values-based issues are significant factors in disputes over distribution and process, these tangible issues can usually be resolved.

However, if the conflict centers on different perceptions of the facts, "what is," or values-based issues, "what should be," then resolution may not be feasible. Cognitive biases influence our perceptions and judgements, thus producing conflicting statements of "what is." Values, the enduring prescriptive beliefs, are fundamentally held evaluative criteria (Rokeach, 1973). Perceptions of what the facts are in a conflict may be susceptible to resolution, if some objective form of interpretation is available. However, values tend to be stable and less open to negotiation.

As the discussion in this chapter focuses on the part that values, individually and socially, plays in worldviews of nature, conflict in natural resources is susceptible to complex and most likely unresolvable conflict. This point should not be despaired since conflict can be beneficial (Tjosvold, 1991). Creative and innovative conflict manage-

ment can yield improvements, rather than solutions, to conflict situations. The interplay of multiple values and worldviews may at first seem to cause friction in the natural resource policy process, but a closer examination and incorporation of differing views may lead to improved socially and ecologically acceptable management strategies.

CHAPTER 3. METHODOLOGY

CONCEPTUAL FRAMEWORK

The objectives of this thesis are to identify and analyze worldviews on fire recovery forestry and on nature, in general. Since one's worldview is a combination of values, attitudes, beliefs, feelings, norms, knowledge and rationality, it is not an explicit phenomenon that can be investigated. Due to the subtlety of worldviews, the methods employed in this thesis attempt to glean nuances in worldviews by using qualitative analysis of semi-structured interviews with research subjects (Ss). "Qualitative methods are the most useful and powerful when they are used to discover how the respondent sees the world" (McCracken, 1988, p. 21). The richness of meaning that can be investigated with qualitative methods provides insight on this subtle phenomenon. Specific data sampling strategies to generate an informative data base for this research are borrowed from Rapid Rural Appraisal methodology, which is discussed in a later section.

Qualitative data analysis, including grounded theory, is applied to the data in order to interpret subjects' definitions of the issues and prescriptions and rationalities for appropriate forestry management. Grounded theory, as developed and refined by Glaser and Strauss (1967), encourages social scientists to take an inductive approach for theory building by searching for meaning in the data itself. The general steps in using grounded theory analysis of a research problem are: (1) gathering data that adequately captures breadth and depth of meanings relevant to the research problem, (2) coding data according to salient concepts and relationships, (3) attributing meaning as recounted by data

sources, (4) building theory grounded in the sampled database, and (5) building general theory to which the grounded theory may provide conceptual models or abstractions for larger populations or situations (Glaser and Strauss, 1967; Strauss and Corbin, 1990).

Several data gathering styles and instruments are available to the researcher for qualitative analysis. Furthermore, a combination of quantitative and qualitative methods can supplement the research. For this thesis, semi-structured interviews with a brief structured demographic questionnaire was chosen for data gathering instruments. Table 1 outlines available empirical methods by indicating strengths and weaknesses of each.

Semi-structured interviews consist of the researcher generating several topics to be explored with interview Ss. These topics are usually broad enough to allow for various issues to be raised and described by the subject, yet narrow enough to give the interview a coherent nature. Since the issues salient to Ss' worldviews were unknown prior to speaking in-person with them, the research could not use a quantitative survey method. The goal was not to measure the "known" variables across a population. An open-ended approach was necessary to allow Ss the freedom to express issues in their own worlds.

Open-ended surveys allow for personal responses, but the structured questions do not support an in-depth discussion of raised issues. This weakness is a strength in semi-structured interviews, which encourages flexibility in the interview to spend discussion time on issues identified by Ss that are relevant to the topic areas. Unstructured interviews go one step further by eliminating the topic areas (the semi-structure) and encourage the interviewer to learn about issues relevant to Ss' everyday activities and life ways.

TABLE 1. EMPIRICAL METHODS FOR SOCIAL SCIENCE

Method	Strengths	Weaknesses
<p><i>Quantitative Surveys</i> (ASTD, 1986; Oppenheim 1992; Dillman, 1978)</p>	<p>Can sample large and dispersed populations quickly</p> <p>Responses to the same question can be compared</p> <p>Low cost involved with data collecting and processing</p>	<p>Response may not be accurate according to what Ss would say in their own words</p> <p>Scope is limited because Ss cannot offer qualitative insight</p> <p>Low response bias</p>
<p><i>Open-ended Surveys</i> (ASTD 1986; Oppenheim 1992; Foddy, 1993)</p>	<p>Information obtained is insightful and often accurate</p> <p>Researcher can probe Ss' responses, if survey is done in person</p> <p>Gives Ss freedom to respond in their own words</p>	<p>Scope is limited to the questions asked (although responses are not as limited as in quantitative surveys)</p> <p>Time consuming to collect and process data</p> <p>Demands more time from the subject</p>
<p><i>Semi-structured Interviews</i> (McCracken, 1988; ASTD, 1986)</p>	<p>Maximizes the value of time spent with Ss by using interview guide--keeps interview on broad topics</p> <p>Stimulates in-depth description and discussion on issues offered by Ss</p> <p>Subject/interviewer relationship can foster trust in order to discuss sensitive issues</p>	<p>Time consuming data gathering for interviewer and Ss</p> <p>Time consuming to process data</p> <p>Results not usually statistically generalizable to larger population</p>
<p><i>Unstructured Interviews</i> (Oppenheim, 1992; McCracken, 1988)</p>	<p>Gives the researcher the beginnings of a conceptualization of the problem or issues</p> <p>Ss express ideas in their own words</p> <p>Deep immersion into Ss' thoughts and life ways</p>	<p>Interviews can be an ever-expanding realm of possibility</p> <p>Even more time consuming than semi-structured interviews to gather and process data</p>

TABLE 1. EMPIRICAL METHODS FOR SOCIAL SCIENCE (continued)

Method	Strengths	Weaknesses
<p><i>Focus Groups</i> (Morgan, 1988)</p>	<p>Able to observe a large amount of interaction on a topic in a limited period of time</p> <p>Opportunity to gather data from group interaction</p> <p>Able to evaluate similar topics at different research sites and/or different populations</p>	<p>Researcher has less control over data</p> <p>Not able to know if individual behavior will mirror group interaction</p>
<p><i>Participant Observation</i> (Labovitz and Hagedorn, 1981)</p>	<p>Researcher is immersed in the "natural" setting to observe events and interact with Ss</p> <p>Researcher is able to observe spontaneous reactions to events</p> <p>Researcher is able to record the context to give meaning to Ss' expressions and behaviors</p>	<p>Researcher's presence may influence the dynamics of the setting</p> <p>Unreliability may result since two separate researchers may result in different observations</p> <p>Events that are interesting to the research may not occur during the observation</p>
<p><i>Ethnography</i> (Lofland, 1995; Lofland and Lofland, 1984; Phillips, 1971; Mitchell, 1993)</p>	<p>Able to collect a wide and diverse range of data over a long period of time</p> <p>Able to directly observe Ss behavior and interactions with others</p> <p>Researcher is able to compare two "worlds"-- the researcher's culture and the culture of his/her field study</p>	<p>Labor intensive since it requires total immersion in a different way of life</p> <p>Secrecy may be an issue if the researcher chooses not to identify him/herself as such to Ss</p> <p>Researcher bias may result due to a comparison of his/her prior knowledge and values to experiences in the field</p>

Since this research is concerned with the general topic of fire recovery forestry, the semi-structured interview provides a means to focus the time spent with Ss on issues relevant to this topic. Additionally, the exploratory nature of semi-structured interviews promotes a data gathering environment where Ss generate issues and explanations rather than responding to a pre-structured list of issues that may or may not have been salient to their worldviews.

Other qualitative methods include: focus groups, participant observation and ethnography. Focus groups are excellent choices when the researcher wants to learn about a group's interaction and discussion on a particular topic (Morgan, 1988). Since this thesis is more interested in individual thoughts and experience, a group-centered method is not appropriate.¹ Participant observation requires some event or place where Ss assemble. This method is helpful when describing and analyzing a social context, but not as helpful when searching for more subtle phenomena, such as worldviews. Lastly, ethnographic research offers a full exploration of people's ways of life on many dimensions. The focused nature of this research does not fit the holistic approach that ethnography takes to understand a particular population.

Hence, semi-structured interviews provide flexibility to allow Ss to speak their own minds on fire recovery forestry, but allow the researcher from being overwhelmed with unrelated issues of Ss' day-to-day activities. Initial research questions, instruments

¹However, a focus group might be a preliminary step to constructing the semi-structured interview guide. This research used key informants in its preliminary phase instead of focus groups.

used to operationalize the research focus, and data analysis techniques are discussed further in the following sections.

RESEARCH QUESTIONS AND INTERVIEW TOPICS

Questions for the thesis research are qualitative in nature and seek an understanding of local concerns, interests, values and social organization around events stemming from the wildland fires in the summer of 1994. Preliminary discussions with local key informants supplemented a review of the applicable literature and enabled researchers to develop research questions. Additionally, a richer understanding of the situation came from the data collection process, and hence research questions and interview topics were modified as more data was gathered. Research questions guiding the analysis and discussion of multiple worldviews on fire recovery forestry management are:

1. How are issues described and what themes are organized around these issues?
 - a. What issues are salient to wildland fire and fire recovery, according to subjects?
 - b. What themes represent subjects' perceptions of events and issues? How do they differ?
 - c. How do the similarities and differences of these themes interact with or are independent of one another?
 - d. Are distinct worldviews present that categorize how subjects perceive fire recovery, forestry and nature?
2. Do the sociocultural worldviews (Douglas, 1978; Thompson et al., 1990) adequately characterize subjects' perceptions?
3. Are these worldviews distinct?

Specific interview topics targeted by the research questions centered around: subjects' attachments to the national forest, perceptions regarding the role of fire, opinions of the appropriate management direction for fire recovery, and attitudes toward the Forest Service. These topics were chosen by the research team as a narrow and cohesive set of elements that would provide insight to where each interview subject was "coming from," where each subject wanted fire recovery management "to go," what social barriers might hinder the fire recovery process, and how confident each felt about the Forest Service being able to carry out fire recovery efforts on the WNF.

SAMPLING STRATEGY AND DATA GATHERING

The practice of Rapid Rural Appraisal (RRA) lends a useful sampling strategy for gaining admittance to local knowledge and culture, which also offers the benefits of a time and cost efficient means of gaining insight into residents' interests. Beebe (1987) defines RRA as "a way of organizing people and time for collecting and analyzing information where time constraints demand decisions before a local situation can be fully understood" (p. 48). Often the breadth and depth of information needed to understand a complex social situation requires timely immersion in a particular setting and/or a rigorous survey instrument, which may involve lengthy data analysis and expense. RRA is a tool which provides a "short cut with trade-offs between timeliness, accuracy, relevance, and actual use of information" (Chambers, 1987, p. 37)

The goals of RRA are to gather data from a broad spectrum of the population, but to avoid lengthy sampling of a large portion of the population (Gibbs, 1987). Specifi-

cally, an efficient means of gaining understanding of a culture or situation is to go directly to those people who have rich knowledge (Chambers, 1987; Grandstaff and Grandstaff, 1987). RRA acknowledges the wealth of knowledge, logic, and analysis held by local people, and targets them as effective informants to the outside researcher. One caveat is that RRA will miss sampling every member or a random subset of the population, and therefore will likely lose some parts of the total potential data (Gibbs, 1987). RRA requires careful reflection on the part of the researchers to decide at what point to end data collection without sacrificing breadth, depth, and accuracy of the data (Beebe, 1987).

The sampling strategy began with researchers meeting with key informants to develop a broad list of local stakeholder groups believed to have some interest in fire recovery and/or forestry issues. Then, researchers met with more local informants to acquire names of local residents who were known to have an interest in forestry issues or represented a stakeholder group.

With this preliminary list of subjects, initial telephone calls led to interview appointments. The interviews began with an informal introduction of the study purpose and design and informed consent, and were held in private homes, work places, local restaurants, and other convenient meeting places. At the conclusion of interviews, subjects were asked for names of other people they thought important for the researcher to speak with. Thus, a chain referral process was employed to attain additional potential subjects. Sampling of this strategy continued in each of the three target communities until researchers deemed that sufficient breadth and depth of data was collected. This

decision was based on: (1) the diversity and saturation of interviewing several members of relevant stakeholder groups, and (2) when interview data became repetitive such that very little new data was being gathered (Glaser and Strauss, 1967).

A total of 122 interviews were conducted by the author and a co-researcher. To judge whether the researchers sampled the broad spectrum of stakeholder groups, Ss were categorized by their primary interest in fire recovery. Categorization by stakeholder group went through three phases during the course of the research. Prior to any data collection, a list of stakeholder groups was developed by the researchers to identify different interests that connected community residents and organizations to the management of the WNF. The second phase involved modifying this preliminary list in cooperation with key informants, who were familiar with the study areas. Finally and most significantly, the data collection and analysis process informed researchers of how Ss identified themselves with national forest management issues. Stakeholder groups only categorized Ss on different use or experiences with the forest, therefore researchers added political coalition categories to capture differences in expressed ideologies on forest management directions.

As interviews were scheduled and completed, researchers attended to the distribution of Ss by stakeholder group, and later by political coalition, in the interest of sampling a broad spectrum of the community. One caveat on categorizing interviews by stakeholder group was that subjects often had interests in multiple groups. In fact, it was rare that a subject could only be put in one stakeholder group. Appendix 2 displays the distribution of subjects by stakeholder group and community. Another characteristic

about this sampling distribution was that repetitious data was encountered after fewer interviews in each successive community. Data gathering was terminated after 46 interviews in Community A, 39 interviews in Community B, and 37 interviews in Community C. This increasing efficiency can be attributed to the researchers needing more information and time to understand the local situation in the earlier stage of data gathering, whereas by later stages researchers required less contextual description, fewer explanations of local phenomena, and because of issue and group overlap between communities.

INSTRUMENTATION

Semi-structured Interview Guide

To address the research questions, a semi-structured interview guide with four topic areas was developed. Four to six questions per topic were identified to stimulate interview discussion as well as provide descriptions of the fire recovery issues important to local residents (Appendix 3). These topic areas were developed in cooperation with local informants and decision making authorities, who offered their professional advice by identifying which data would be more salient to future forestry management issues as well as which issues were generating discourse at the local area. Additionally, the interview guide was modified during the interview process by the researchers, who found that some questions encouraged insightful discussions whereas others were redundant or confusing to subjects.

At the completion of the interview, a brief structured questionnaire was used to gather basic demographic information such as: age, place of birth, tenure in the community, date of family settlement in community, occupation, current or previous affiliations with land management agencies, and level of education. This information provided a profile of Ss in terms of the length of their residence in the community and occupational connections to natural resource management.

Interviews averaged one hour in length, and varied from 20 minutes to three hours. Frequently, two subjects were present at one interview. In these cases, data was jointly collected and counted as a single interview, however any differences in values, attitudes or opinions were preserved in transcriptions of the data.

Data Recording

Actual data recording was done through note-taking by researchers during interviews. Subsequent notes were jotted down after interviews and out of the presence of subjects, such that the researchers debriefed themselves of relevant statements and behaviors observed in the interviews. Furthermore, written notes were then transcribed into a computer database (using Filemaker Pro software). This media lent itself to uniform formatting of each interview and further facilitated qualitative analysis of the data.

DATA ANALYSIS

Several levels of data analysis is applied in this thesis. The first level aims to disaggregate the large, rich assortment of stories, opinions and beliefs in order to "see what goes with what" (Miles and Huberman, 1994, p. 245). An appropriate technique to begin to understand the raw data is grounded theory methodology. Strauss and Corbin (1990) defines a grounded theory as "one that is inductively derived from the study of the phenomenon it represents" (p. 23). It is a case where the researchers let the data speak for itself — letting meaning emerge from the data. Moreover, grounded theory "is discovered, developed, and provisionally verified through systematic data collection and analysis of data pertaining to that phenomenon" (Strauss and Corbin, 1990, p. 23). Analysis of the data began during data collection, the interviewing process, and continued after all interviews and transcriptions were completed. Once data gathering was complete, a thorough analysis began with developing coding categories to note patterns and themes, which organize the data in meaningful forms to answer research questions. Miles and Huberman (1994) suggests this tactic when data is in a raw or disorganized format such that a researcher can "note recurring patterns, themes, or "gestalts," which pull together many separate pieces of data" (p. 246). The coding categories come from inductive data analysis as suggested by Dey (1993), "Categories should not be imposed upon the data arbitrarily; the categories adopted should reflect the data. The distinctions established through categorization should be meaningful in terms of the data being analysed" (p. 98).

Three categories of coding schemes structure the data analysis in order to guide the researcher toward clarifying multiple worldviews. First, the relationship that each subject shares with nature, as symbolized by the local national forest, is examined. A description of how each subject's attachment to nature provides insight to one's view of the role nature and humans play in local, national and global contexts. The second coding category focuses on how subjects define the burned forest resources, which often targets salvage timber management.

Lastly, subjects' perceptions of appropriate management for fire disturbances are coded. A systemic relationship is suggested among pre-fire ecosystem conditions, post-fire ecosystem conditions, and human intervention in the forest ecosystem. Figure 4 illustrates a simplified version of a lightning caused fire disturbance on a forest ecosystem. This thesis attempts to clarify the various interpretations of the post-fire ecosystem condition, which frame desired intervention strategies based on subjects' perceptions of the desirability of post-fire conditions, perceived causes for those conditions and rationale for intervention.

Coding of the data is systematically assigned to interview transcriptions by the researcher, using each subject's own words and the researcher's best interpretation of meaning. However, Dey (1993) states,

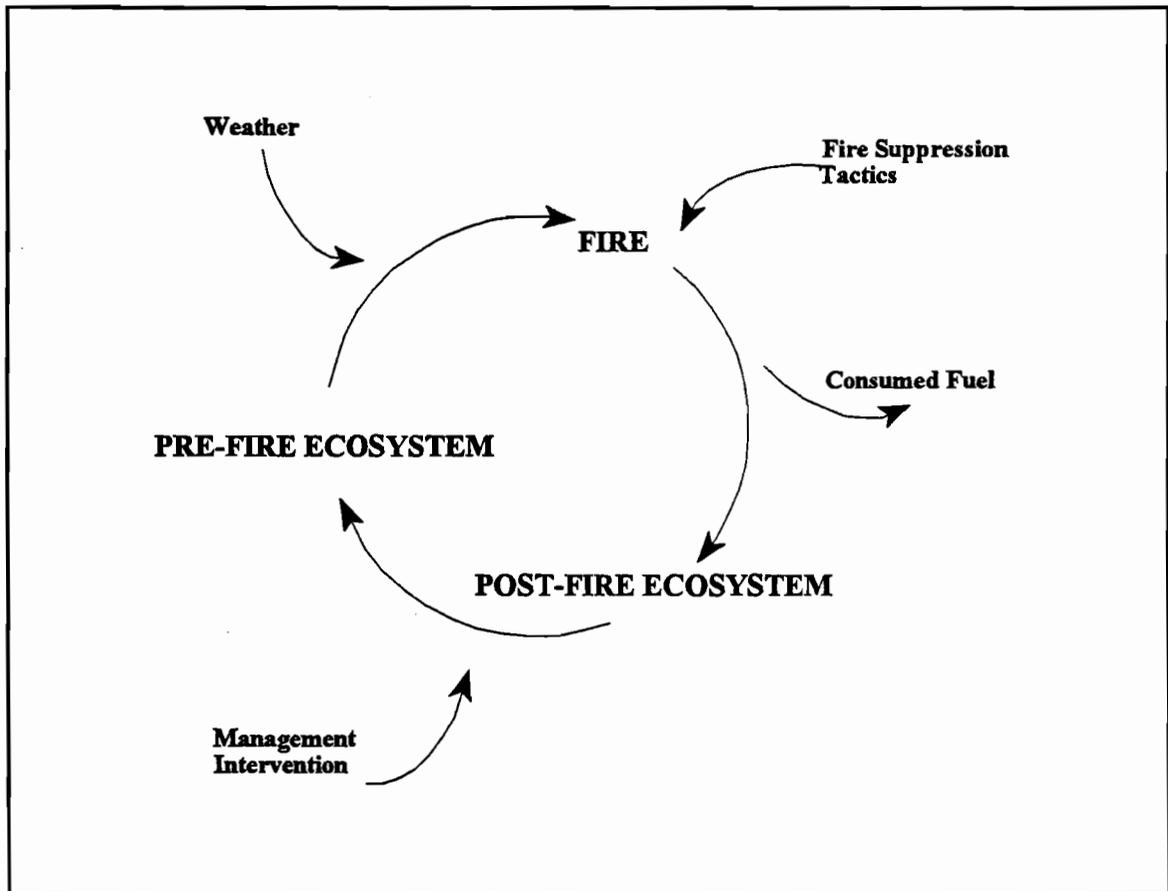
Flexibility is required to accommodate fresh observations and new directions in the analysis. Categories may be extended or modified to cope with data which does not fit, but at some point categories which cannot cope with the range and complexity of the data must simply be discarded in favour of more promising alternatives (p. 111).

Therefore, based on the inductive nature of grounded theory, it is necessary for the researcher to remain open to new salient codes to be assigned to the data in essence for the development of meaningful results.

Once a general understanding is achieved, the next level of analysis sharpens the knowledge gained from earlier analysis. Comparing and contrasting patterns, themes and concepts refines and calibrates the meaning derived from the data.

The last level of analysis attempts to aid the researcher "see things and their relationships more abstractly" (Miles and Huberman, 1994, p. 245). Similarly, Glaser and Strauss (1967) suggests this level to begin building general theory from a particular study. This thesis, due to its narrow focus, does not generate its own theory, but instead compares its findings to the more general cultural theory framework. Specific tactics employed at this level include: noting relations between variables, whereby conceptual frameworks are described in terms of connectivity, and finding intervening variables, which explain disconnectedness of variables and concepts (Miles and Huberman, 1994).

The data analysis begins by breaking down the data pieces to develop a clearer understanding of subjects' worldviews toward nature, and specifically toward the Wenatchee National Forest fire recovery situation. Then, themes emerging from the data are compared to a pre-existing conceptual framework. The applicability of the sociocultural worldviews framework is discussed in terms of its "fit" to the WNF data. Lastly, this framework is offered to natural resource professionals to explain the dynamics of differing worldviews for this study and for further use in other natural resource situations.

FIGURE 4. A THIRD CODING CATEGORY: THE BASIC FIRE DISTURBANCE SYSTEM

CHAPTER 4. DATA ANALYSIS

DESCRIPTION OF THE STUDY AREA

Background

Three communities comprise the study area, which borders the northern portion of the Wenatchee National Forest. Leavenworth, Entiat and Chelan have populations of approximately 2000, 500 and 3000, respectively. The study area is located in the east foothills of the Cascade Mountains and is northwest of Wenatchee, the Chelan county seat. These communities share common economic and social components such as predominant agricultural and recreation industries and a rural ways of life. Apple orchards can be seen along all highways when traveling in this portion of Chelan county, as well as all phases of the apple products processing.

Tourism is a significant contribution to the economic well-being of these communities. Skiing, fishing, hiking, backpacking, bird watching, horseback riding, mountain biking, mushroom picking, hunting, camping, boating, water sports, dog sledding, and more are available throughout the area. Since the Seattle metropolitan area is only about two hours away by car, these communities provide accessible weekend get-aways for many western Washingtonians.

The rural structure of these communities is characterized by low density residential areas and the ways of life tied to agriculture, timber and ranching industries as well as outdoor leisure activities. Although there is a significant amount of housing clustered

around the towns, there are many residents who have settled in "forest pockets," creating a private atmosphere and often enjoying the national forest as their backyard.

Forestry issues and public land management are critical to each community due to many factors, including the proximity of the national forest and privately owned forest lands, dependence on forest resources for recreational and aesthetic appeal, direct product consumption, and the natural character of special places to residents. Three Ranger Districts of the WNF are situated next to these communities and place Ranger Stations in each town.

These components of the landscape, agricultural and recreational industries, and the rural structure link the communities of Leavenworth, Entiat and Chelan to shared ways of life. However, each community is unique. Brief historical accounts are provided in the next sections to describe each community and the distinct characteristics that contribute to its uniqueness.

Leavenworth

Prior to the 1960's, Leavenworth relied economically on logging timber resources, growing fruit, and supporting railroad traffic by being a turnaround destination. However, during the 1960's, the railroad left and logging decreased such that Leavenworth faced a grim outlook. It was at this point, creative opportunities for the town were sought. A Bavarian Village theme was decided upon and economic development targeted tourism and recreational aspects from the natural beauty and ruggedness of the area. This transformation included the establishment of motels, restaurants, Bed &

Breakfasts, souvenir shops, specialty boutiques, seasonal festivals, and a physical redesign of building facades to realize the Bavarian style.

Currently, the Bavarian Village has become a success until the Summer of 1994 when fires threatened the livelihood of this tourism dependent town. Fire recovery is an emotional issue for many local residents, not only because of direct economic impacts, but also because of direct impacts on individual lifestyles. Leavenworth is home to many people who enjoy the natural environmental beauty, outdoor recreation, rural community structure, and countless other unique characteristics.

Conflicts have existed within the Leavenworth community over the role of timber production and economic dependence on the Wenatchee National Forest. Due to a strong history and tradition of the logging occupational community in Leavenworth, there has always been friction between those who support timber production and those who do not. Additionally, Leavenworth has attracted new residents from western Washington and out-of-state. An urban migration into the rural community has added to a diverse accumulation of environmental values. Different views of the role of natural resource use emerge, separating people who have moved into the community versus people whose families have lived in the Leavenworth area for several generations. Long time residents tend to support commodity production and wise use of the forest, whereas newcomers tend to support multiple-use or preservation of the forest. Not all long time residents and newcomers can be characterized in this manner, but trends in the data do suggest this value difference.

Entiat

Located where the Entiat River joins the Columbia River, Entiat is the smallest of the three communities in the study area. This town developed from timber, ranching and agricultural traditions. Timber was harvested to produce packing boxes for the apple industry. The lumber mill, which had the longest duration, was established in 1898 and continued to operate until 1972, when an industrial fire damaged it beyond repair (Mendez, 1995). A new owner rebuilt the mill in 1976, but production lasted only three years until it was permanently closed in 1979 (Mendez, 1995). Many interview subjects often referred to this mill closing as a significant economic disturbance that caused a depression, which Entiat is still trying to recover from.

Another important factor in Entiat's history is the relocation of the town center. The current location is the third site. The original town site was moved once to situate the town closer to nearly laid railroad tracks laid (Mendez, 1995). However, when the Rocky Reach Dam project was approved in 1960, Entiat moved again because its site would be flooded by the new Entiat Lake reservoir behind the dam. Several longtime residents criticized the last move because the new town lost its physical, institutional and community character due to its dispersed geographic placement.

Entiat has remained predominantly an agricultural based economy since the mill closed in 1979. Several campgrounds along the Entiat River and a city park on the Columbia River attract recreationists during the summer and hunters during the fall. Timber continues to play an important role for residents employed in the harvesting sector, since much land is forested and managed by public and private owners. Conflict

over forest practices often emerges between timber workers coming from family and community traditions and new forest management policies stressing other uses that are mandated to the local Ranger District.

Chelan

Chelan is located on the southeast end of Lake Chelan. For the past 40 years, Chelan has relied on agriculture and tourism as primary economic sources, whereas timber has not played a significant role in the economy. Lake Chelan has provided a recreational source for water sports, fishing and ferry trips to the National Recreational Area up-lake. Additionally, the national forest lands offer a variety of camping, hiking, backpacking and wilderness opportunities. Prior to 1994, a cross country ski facility was open to the public on the privately owned Bear Mountain Ranch.

Most interview subjects commented on the close relationship that the local ranger district has with the community. The Chamber of Commerce, local government and the local Forest Service personnel collaborate to provide services that support the economic development of the tourism industry. One reason for the success of this collaboration is that the Chelan district of the Wenatchee National Forest does not harvest much timber, so the timber versus recreational management conflict is minimized. However, there are active local environmental interests in Chelan that do monitor activities on the district in order to encourage lawful and thoughtful management of the National Forest. Even though timber is not a significant output of this district, some residents have hopes that it could eventually be a part of future forest management. Additionally, with the effects of

the Tyee fire, many are considering the issue of salvage logging and its appropriateness on the Chelan district. There is friction among persons supporting salvage harvesting and those who do not.

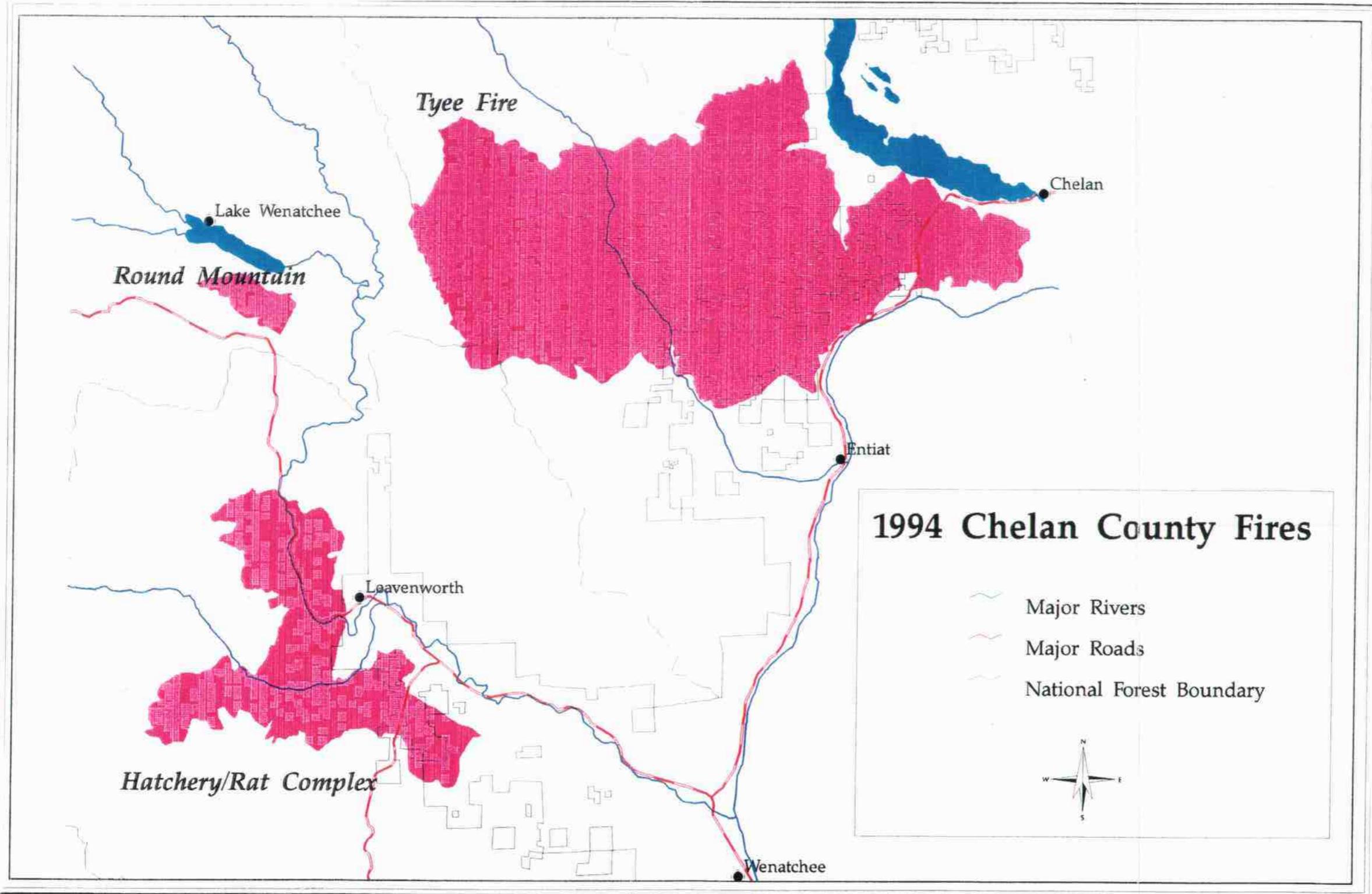
As in the case with Leavenworth, Chelan has also experienced an urban migration into its rural community. Similarly, value differences within the community are diverse.

A Momentous Event

On Sunday evening, July 24 [1994], a lightning storm moved through Central Washington, igniting more than 41 fires on the Wenatchee National Forest and a total of 99 fires in Washington State.... The storm came on the heels of record-breaking summer temperatures, reaching into the 100 degrees range, to forests already impacted by several years of drought-like conditions.... Extreme fire behavior thwarted significant containment efforts through the first few days of initial attack on these fires. Fire behavior was said to defy description or comparison with what most seasoned firefighters had previously seen (WNF, 1994).

Three fires of major proportions developed from this storm: the Tyee Creek fire on the Entiat District, the Hatchery Creek fire on the Leavenworth District, and the Round Mountain fire on the Lake Wenatchee District (Map 1). Additionally, the Rat Creek fire was ignited from human causes on July 29th and grew incredibly quickly to a large magnitude. This fire eventually joined the Hatchery Creek fire and both became known as the Hatchery Creek Complex fires.

The remainder of this section describes the events surrounding the Hatchery Creek Complex and Tyee Creek fires and their recovery aftermath. Although the Round Mountain fire was no small event, most of its effects concern private forest land owners.



Thus, in the context of public forestry issues, this thesis concentrates on the other two fires.

Hatchery Creek Complex Fires

The Hatchery Creek fire ignited in Tumwater Canyon, which was within ten miles of Leavenworth. In the first four days, this fire grew to 1,500 acres. Then on July 29th, the Rat Creek fire ignited to burn approximately 5,500 acres that day and 9,500 acres the next. By August 7th, the two fires had merged and burned over 33,000 acres. This Complex was contained by August 24th and eventually burned 43,463 acres of forest land.

Fire came closest to Leavenworth on its western edge, burning mountain ridges which added to its Alps-like scenic charm. Residents northwest and southwest of the town were evacuated, although many stayed to defend their homes against the encroaching fires. US Highway 2 access to the west was closed during most the fire, which sealed off the most direct route to the Seattle-metro area. Highway 2 east remained open, allowing access to Wenatchee. Road access to the south along US Highway 97, which links the area to Interstate 90, was also closed at times.

Not only were the residents besieged with thousands of fire fighters, dozens of structural fire equipment, helicopters and overhead personnel in their community, but the continual presence of smoke darkened the daylight and layered everything with ash. Stress from loss or threatened property as well as fire fighter safety was a continual

pressure. The possibility of evacuating the Leavenworth town center depended on unknown weather conditions, which could have meant severe property loss.

One guarantee from this event was the loss of a prime tourism season. Road closures kept most tourists away for two weeks, and fire threats and a perceived "destruction" scenario kept other tourists away the remainder of the season. Media coverage of these fires was national and often was perceived to be more destructive of the town and its surroundings than it actually was. For instance, subjects recalled tourists' comments such as: "Where did the fire burn? I can't see any damage." or "I didn't think Leavenworth survived." When in fact, no structures in town suffered fire damage, and burned mountain ridges could be viewed from town with a knowledgeable eye.

Immediate rehabilitation efforts began to stabilize hillside slopes and streams. Due to consumed vegetation by the fire, land managers were concerned with soil and debris sliding off slopes and into streams when fall rains and spring snow melts would come. Seeding of sterile grasses began in the hopes of stabilizing those slopes; structures were placed in streams to help filter large debris flows; and burned snags were fallen in crosshatch patterns to prevent large quantities of soil movement on slopes.

Longer recovery management plans were initiated by the Forest Service, the Soil Conservation Service, state and federal Fish and Wildlife Departments, the state Department of Natural Resources, the Bureau of Land Management, and other local agencies. Since most of the land burned was national forest land, the Forest Service was the main party responsible for recovery efforts.

Tyee Creek Fire

Burning 135,170 acres, the Tyee Creek fire was the largest fire, on record, on the WNF. The magnitude of this fire required extensive fire suppression resources due to many threatened residential structures located throughout the area. Yet, another imposing factor of this fire was the intensity at which it burned. Many fire personnel recounted stories of fire storms occurring in several areas that surpassed all prior experiences with wildland fire.

This fire began when lightning ignited fuel located in a previously burned area from one of the 1970 fires. It started on the Entiat RD, but soon spread to burn significant acreage of the Chelan RD and smaller portions of the Lake Wenatchee RD. Due to the steep slopes of this area, high fuel loads, extreme weather conditions, limited air support to suppress the fire, concern for fire fighter safety,² and no foreseeable knowledge of the next few weeks' events, access to this fire was treacherous and aggressive suppression tactics were constrained. Approximately two-thirds of this fire's area burned in five days, astonishing many experienced fire fighters.

Road closures occurred on the Entiat River Road (the only access Entiat Valley residents had), US Highway 97A (the main access from Wenatchee to Entiat and Chelan), and South Shore Road (the only access some residents along Lake Chelan had unless leaving by boat). Residents were evacuated throughout the area, but the downtown areas of Entiat and Chelan were not severely threatened.

²The Chelan county fires occurred within one month of the Storm King Mountain, CO tragedy, where 14 fire fighters lost their lives. Thus, protecting this personnel was highly salient to all fire suppression staff.

Similar to Leavenworth, but on a larger scale, Entiat and Chelan became the temporary sites for fire fighter tent cities and staging areas for equipment. Some interview subjects likened it to being in a war with soldier encampments. Town populations doubled, or more in the case of Entiat, and focused everyone's attention to the daily and sometimes hourly reports of fire behavior.

By August 19th, the Tyee Creek fire was contained with only high altitude back-country areas continuing to burn. Immediate rehabilitation efforts began to stabilize slopes and streams. In many areas, the intensity of the fire burned much of the vegetation, leaving minimal physical structure to hold soils to the hillsides. Flash-flooding after large fires have a significant history in the Entiat River Valley. These floods are often more dangerous to residents than the fires because of their unpredictability and quick development.

Rehabilitation work included grass seeding programs, stream structure placements, dike construction, stream channeling, water barring roads, crosshatch falling of snags, and other means to protect homes from high water runoff and debris movement. This work continued until it was hampered by weather, which meant some residents experienced fire activity for one month and rehabilitation for up to an additional three months. As in the case of the Hatchery Complex, the Tyee fire burned mostly public forest land and therefore the Forest Service, specifically the Entiat and Chelan RDs were the main parties responsible to develop long term recovery plans.

ISSUES AND THEMES FROM INTERVIEWS

Interviews were conducted during a six week period in October and November of 1994. Personal experiences with the fires were recent, and reflections on the causes of the fires and management strategies before, during and after these fires were currently in the forefront of subjects' thoughts. The accounts shared with researchers were emotional, personal, reflective, often grounded in other wildland fire experiences, and a serious component of their lives as residents of these communities. The remaining analysis of this chapter is based on data gathered from interviews. All quotations in this chapter come from interview data, unless otherwise noted, and are not cited to preserve the anonymity of each subject. This section begins by describing salient issues identified by subjects and then develops themes which depict shared ideologies on issues.

Fire Recovery Issues

Four general categories represent many of the issues raised by interviewees: direct concerns related to the fires, long term management considerations, fire suppression considerations, and the general political climate regarding local land management. Brief descriptions of specific issues included in each category is provided below. Further analysis, later in this chapter, takes an in-depth look at the complexity of several of these issues.

Direct Concerns Related to the 1994 Fires

Flood and Erosion Threat

Risks associated with flooding and erosion are prevalent along many streams in the burned areas in all three communities. Leavenworth has many residential structures located near Icicle Creek and depends on road access through Tumwater Canyon. Additionally, the city's source of water is the Icicle Creek, which could be jeopardized with high levels of siltation from erosion.

The Entiat River Valley has many canyons and ephemeral streams to channel snow melts and precipitation from summer thunderstorms. Flash-flooding is a great concern from many residents living in the valley as well as debris flows after large wildland fires.

On the Chelan RD, erosion concerns are the greatest on the south shore of Lake Chelan. Many residential structures are located in this area, and only one road provides access to these people. Several creeks where the fire burned upstream flow into the Lake, hence large quantities of debris and siltation could temporarily change its condition. However, the Lake is extremely resilient to disturbances due to its inherent circulation patterns.

"Some of the areas are in flood danger, especially Slide ridge, which is past First Creek on the south shore. The flood threat is from a quick spring thaw. One big problem if there are floods and landslides, is that there is only one road into that area. Access may become limited. Fortunately, most of the people have boats that they can rely on if necessary."

"The threat of snow melt in the spring is great and has a potential for mud flows and rock slides. There are inherent and vulnerable spots for debris flows already in the area regardless of fire. But with fire, these threats

are more risky. Places like South Shore and First Creek are very sensitive to these threats."

Many of the short term rehabilitation projects targeted high risk flooding and erosion areas. Local agencies stressed that residents in these areas need to actively monitor weather conditions during the spring and summer to increase their preparedness.

Utilization of Burned Trees

Significant changes to the structure of the forest has occurred as a direct result of the fire. Many, but certainly not all, Ss believe actions are necessary to reduce or redistribute the quantity of burned trees. Key topics of this issue include: ecological purpose, fuel reduction, threats of insect and disease epidemics, and commodity extractions. The latter topic is commonly referred to as salvage logging, which is a major issue because of the size of the fires and the amount of standing snags left behind. Many view these standing snags as a useable and commercially valuable resource. Standing snags also pose a threat of fuel loading and insect and disease epidemics in the forest. So, many groups advocate for salvage logging to use a resource that is currently deteriorating, which then reduces the risk of snags becoming fuel for future fires and habitat for insects and disease epidemics. Salvage logging requires activity in the forest and on the burned areas. Road building and use become issues in the extraction process. Opponents of salvage logging cite the ecological importance of snags, which provide many structural, habitat and nutrient functions in the ecosystem.

Water Quality

Water quality has already been affected by the fire in terms of the amount of fire retardant and ash that has been deposited into streams and lakes. Further potential additions to streams include above average amounts of silt and debris due to flood and erosion. Water quality is essential for fish habitat, other aquatic species, stream dynamics, city water facilities, and irrigation projects. Long term turbidity and increased stream temperatures will put pressure on the normal plant and animal species residing or migrating to the local streams. Water quantity and quality are important factors to city water consumers and orchardists and farmers who irrigate their crops.

Wildlife and Habitat Concerns

Due to the loss of habitat for many wildlife species during the fire, there is a shortage of food source and shelter for these species. Many residents have had wildlife visiting their yards during Autumn 1994, which usually they do not see until later in the winter. It appears that wildlife are seeking lower elevations or populated areas for food at earlier times than usual. Many people are speculating there is not as much available food and shelter in the typical autumn and early winter locations, therefore wildlife are more desperate and searching for alternative sources of food and shelter. Many people have a profound concern for the obstacles wildlife will face this winter.

Immediately after the fires, many residents experienced various wildlife in their yards that they typically do not see. There seemed to be some displacement of insects

and wildlife after the fire, but this was temporary unlike those species continually searching for food and shelter.

Long Term Forest Management Considerations

Forest Health and Desired Future Conditions

Forest health and desired future condition are often the main topic of discussions among local, regional and national voices. Many are concerned about the conditions of the forests, especially when large quantities of land are burned or have trees dying from insect, disease, light, water and nutrient stress. Various definitions exist on what a healthy forest is: the ecological conditions present, community dependence on commodity and aesthetic resources, appropriate management objectives, and natural variations in its conditions.

Silvicultural Practices

The Leavenworth and Entiat communities have long histories of managing the forest for timber production. Land managers, forestry consultants, timber industry and loggers often advocate for the use of silvicultural practices in order to cultivate timber as one forest output. Practices include: thinning (pre-commercial and commercial), prescribed burning, pruning, slash management, sanitation and salvage removal, harvesting, replanting, and other vegetation management. The goal for using these practices has been to produce healthy and commercially valuable timber. Many groups favor these practices for managing the forest in order to minimize damage from insects, disease and

fire. There are strong opinions from different groups about the use and non-use of these silvicultural practices on the National Forest in the past, present and future. This issue is one fundamental factor of deciding how to manage the forest for the future and what conditions should be part of that future condition.

Fire Suppression Considerations

Forest/Residential Interface

There is a lot of discussion about the fire suppression priorities, which gave priority to protecting human life over structures, and both of these over protecting the environment from fire. There is not much disagreement about human safety as a first priority, especially after the tragic loss of lives in Colorado earlier in Summer 1994. However, the debate of protecting homes and other structures over protecting the forest and environment from burning encompasses this issue of whether people should be allowed to build and live in the forest interface and whether they should receive fire protection. Some Ss argue that there should be some limitations to the amount of people allowed to build in remote forested areas, entailing some type of county zoning. Others argue that there should not be any restrictions — those who do build in fire prone areas should not expect extreme efforts by public agencies to protect private homes and structures. The key factor is that some Ss believe that homes and structures can be replaced to some extent, although emotionally difficult, whereas lost ecosystems and soil productivity take decades to gradually recover.

Use of Public Money for Fire Suppression and Rehabilitation

Due to the size and behavior of these fires on public lands, the costs of fighting them and rehabilitating and recovering lost forest ecosystems is tremendous. As taxpayers, most residents are concerned about the expenditures these fire have entailed. People begin to question whether certain expenditures were effective and efficient uses of public tax dollars. Fire suppression priorities have come under question: Should public money be used to protect private structures, or should individuals be more financially accountable? Another question about using public money to aid the rehabilitation and recovery process is: How much protection against flood and erosion is desired or sufficient? The threat of flood and erosion is a risk without definite knowledge of potential damage. There are estimates based on historical occurrences that big floods follow big fires, but the question of using large amounts public money to anticipate these risks has generated some controversy.

"Project" Fire Concept

Predominantly, this concept developed from interviews with Entiat residents, although a few Ss in the other communities made similar references. "Project fire" was the label that local residents described their perception of the Forest Service's attitude toward large wildland fires. Specifically, the fire's link to budget allocations. The logic flows from the idea that large allocations come to the RD to fight fire. Since Entiat had not had a large fire recently, they risked losing budget allocations for fighting fires in the

future. Therefore, some Ss explained that the FS needed to increase their budget and, thus, decided to let this fire grow to "project" size instead of putting it out earlier.

Fire Suppression Versus "Let it Burn" Policies

The role of fire in forest ecosystems is complex, especially when human communities are located near. Fires do not stay within political boundaries such as land ownership lines, city limits, and agency jurisdictions. With the knowledge and resources, many fires can be contained and suppressed. But, questions arise about the positive effects that fire brings to the environment.

In early traditions stemming from the establishment of the Forest Service, fire suppression was deemed a priority to protect natural resources. From observations over decades of fire suppressed ecosystems, it appears that changes in species composition and forest structures have occurred from reduced fire frequency. Land managers and community residents must struggle with decisions concerning when to let a wildland fire burn and when to intervene with fire suppression. Short term considerations about property and human life loss must be balanced with long term environmental considerations.

Political Influences on Local Forest Management

Threat of Outside Environmental Pressure

There is a growing concern for policies legislated in Washington, DC that restrict land use and management on private and public lands. Local residents perceive that their

decision making voice is not heard, and that policies are being implemented or tied up in litigation without consideration of local effects. Many local residents blame environmental special interest groups lobbying in Washington, DC for the restrictions placed on National Forests and private lands, such as limited tree removal in spotted owl habitat. There are differences in opinion about whether national environmental groups have too much or too little control over public and private land management.

Additionally, there is a high percentage of tourists and recreationists from western Washington, referred to as 206-ers³. Some local residents believe the 206-ers to have more decision making or voting power because of higher state population distribution west of the Cascade Mountains. This leads to feelings of resentment because locals live next to the forest year round, whereas 206-ers come over for weekends and summer vacations. Hence, 206-ers are perceived to support recreation opportunities and low intervention management, whereas some locals want more commodity opportunities and high intervention for fuel management in the National Forest to protect local economies and infrastructure.

Federal Government Influence

Restrictions on public and private land use has provoked a sense of helplessness and desperation among the residents of rural communities because the government has been too controlling or allowed special interest groups in Washington, DC to wield

³This nickname corresponds to the (206) western Washington telephone area code, and separates the perceived urban dwellers of the state from persons living east of the Cascade Mountains.

political power over rural policies. Rural residents are beginning to organize and develop strategies of their own to bring more decision making power back to local communities and to the individuals. One strategy is the implementation of a Catron County, NM style ordinance, which would require federal agencies to consider the effects a management plan or policy would have on the local cultures, customs and economics of a community. Local residents want to have some control over what happens on private land as well as public land located in the local area, and they want the federal government to have some accountability to the rural communities that neighbor the public lands.

One major factor that contributes to the significance of this issue is the high percentage of publicly owned land in Chelan County. Approximately 90% of the land base is managed by federal and state agencies. Part of the remaining 10% of privately owned land is timber land managed for industrial purposes. With less than 10% of Chelan County owned by local residents, the events and policies on public land significantly affect the lives and livelihoods of these communities.

Public's Trust of the Forest Service

Generally in Leavenworth and Chelan, the local residents tend to think that the local ranger district personnel are friendly, supportive of the community, and active in doing their jobs as best they are able. During the fires, most residents said that the RDs' efforts to keep the public informed, regarding how the fires were behaving and how the Forest Service would respond, was open and plentiful. Most residents had positive comments about their experiences with the Forest Service, however some residents had

prior negative or unresolved experiences that were not related to the fire. Some Ss distinguished between the RD personnel and higher levels in the agency, such as the WNF Supervisor's Office or the Washington, DC office. These latter levels were criticized on policies that did not pertain to local conditions. For example, there are late successional reserves that were created to foster spotted owl habitat. Yet, many residents do not believe this species to be a natural inhabitant of the area.

The community's relationship with the Entiat RD was significantly different than the other two RDs. Some Ss expressed positive praise for the personnel, whereas others expressed personal dislike or general frustration with the Entiat RD. Factors contributing to Entiat Ss' attitudes toward this district include: traditional logging and silvicultural practices, current management policies that stress non-timber resources, fuel (mis)management objectives, local RD personnel, local on-the-ground experience versus non-local or book-learned experience used to make decisions, distrust of federal government, and outside environmental pressure. The Entiat area is known as the Cascade Breaks where a frequency of lightning storms occur. Wildland fires are prone to ignite here, therefore the Forest Service's ability to manage this district and its fires is often the community's fundamental gauge to measure success.

Themes from Shared Values and Ideologies

The themes emerging from interviews as Ss discuss the values they place on the national forest and formulate ideologies on forestry management are described in this section. Two general categories distinguish values that center around (1) a particular

view of the environment and human coexistence, and (2) an emphasis on certain uses of the national forest. The five themes in the former tend to be mutually exclusive, that is Ss tend to consistently align their values, attitudes and opinions with only one theme. Whereas, the themes in the latter category are often tied to occupational and livelihood components of Ss' lives, which may include more than one use of the forest. Brief descriptions of these themes of grouped shared values and ideologies are as follows. It is important to note that the eleven themes identified do not suggest only eleven singular value systems. Instead, there are variations within each theme.

Views of the Environment and Human Coexistence

Environmental Interests

Environmentalists view the environment as an entity that was not humanly created and therefore prefer little or no human interference in its processes. Many have concerns about plant and animal species and ecosystem processes that are affected by human activities occurring in or putting pressure on the environment. Environmental Interests can be divided into two groups, which have slightly different views of appropriate natural resource management: (1) non-intervention and (2) intervention to return ecological states within historic ranges of variability.

(1) Non-intervention Environmentalism advocates that natural resources are managed best by nature and not humans. Those who have this view argue that human intervention has put many species at risk as well as degraded ecosystem processes. To

stop this risk from increasing, they favor a "hands-off" management plan that allows the forest to recover from disturbances on its own without human intervention.

"Human influence changes how the forest will react. Man wants to control everything. But the forests burned naturally and people should let nature takes its course. People need to realize they really don't control nature."

"We should not manage, but just coexist."

(2) Return Intervention Environmentalism favors management that recognizes ranges in ecological conditions that are more resilient to disturbances, human and natural. An environment that supports itself is preferred to one that depends on human management. Many holding this perspective believe that the local forests are outside the natural ranges of variability. Therefore, practices that return the forest to within these ranges are favored. It is believed that this strategy will encourage nature to regulate most disturbances and minimize catastrophic disturbances.

"Fire has a natural role in the forest ecology. It burned every 10 years in the past on a regular basis. Fire has historically been important in eastern Washington."

"Opportunities from the fire are that the Forest Service can change their management style and there is a chance to get the forest back to a state similar to before fire suppression. In the lower elevations, this should take about 7-10 years. We view fire as an opportunity and not a tragedy; we hope that persons who have more of an economical view would also see the forest from this perspective."

"The forests need to have nature do its job within a natural range of disturbances. A more natural range can be compared to pre-settlement conditions. At this time, nature was responding to nature. This is realistic in places where there isn't much human settlement, but not always realistic in human interfaces with the forest. But, in the areas without as much human settlement, and there are still these areas, nature must regulate itself."

Multiple-use Interests

Multiple-users view the environment as an entity that is not separate from society. Many believe that there is an interdependent relationship between the environment and society, and advocate that humans can coexist with nature, which includes consumptive, recreational and spiritual use of the forest. Management and human intervention in the environment needs to be sensitive and respectful of the many elements and complex relationships in nature. Overuse, or over-emphasis of one use to the detriment of others, is a concern, and therefore management is necessary to limit risks associated with practices not commensurate with true multiple-use.

Multiple-users share similar concerns voiced by Environmentalists (Return Intervention). However, Multiple-users tend to be less politically organized and take less preservation oriented positions on issues. This is mostly due to their inclination to use resources versus preserving ecosystem processes.

Private Property Rights

Individuals who can be described as having private property rights perspectives are those who support individual choice and autonomy over government legislation and regulation. Instead of centralized government control, whether at a federal or state level, private property rights advocates desire local government decision making and individual choices to have primary control over individual life and property actions. Independence to live their lives and tend to their own properties as they desire is a key factor to this perspective.

A rising concern among many private property rights advocates, is the perceived tendency of the federal government to increase regulation over which activities can and cannot occur on private lands. Another concern is the perceived lobbying power of special interest groups in Washington, DC which support regulating private properties. In order to regain some control of their individual freedoms, many private property rights advocates support legislating a Catron County, New Mexico style ordinance for Chelan County. The principle goal in this ordinance is to require federal agencies to consider local customs, cultures and economics when adopting new management plans. Therefore, federal agencies would respond better to local conditions and needs without disrupting elements of the local communities.

"In private lands, the government shouldn't be telling people what to do."

"I also have some timber land in the Rat Creek area with some burned trees on it. I can't get a permit to log it because it's in an owl circle. There is \$1 million of timber there, but I can't do anything about it. I feel that the environmentalists are wanted to use my private property to save the owls and save big trees. They are pursuing their agenda on my land, which just angers me. I would be willing to sell the land to them if they would pay the value of it."

"Decisions that affect adjacent landowners will affect me. If I have to have areas or buffers that I cannot burn or thin, because of land adjacency, then I will be upset. I want to be able to manage my land so as to keep it cleaned up, not as much underbrush, and able to remove dying trees from bugs and deterioration."

Wise Use Interests

Individuals with a Wise Use orientation to natural resources argue for efficient use of resources. Many recognize that natural resources have some limitation to either

the quantity that is currently available or the quantity that is available on a sustainable yield basis into the future. However, this limitation can be mitigated with intense management of renewable resources so that resources can be produced and used in perpetuity.

Wise Users view natural resources in material and utilitarian forms. Therefore, primary goals for these resources is to cultivate them for use. This coalition has formed in opposition to many environmental coalitions, which advocate non-use and preservation of ecosystems. The Wise Use coalition leadership cadre is relatively small compared to environmental leadership, but the Wise Use following is large, with an especially large concentration in rural communities such as Leavenworth, Entiat and Chelan. Additionally, there is a strong linkage of people who support Wise Use initiative to those supporting Private Property Rights. Wise Use advocates often lobby for their agenda to be pursued on public lands, whereas PPRs are concerned with restrictions on private lands.

Various Emphases on National Forest Resource Use

Federal Agency Employees

The Forest Service agency as a whole as well as the WNF Supervisor's Office and the RDs have organizational cultures. There are expected protocols for gathering and analyzing data and making decisions. These practices do not occur in isolation from public voices nor laws regulations and guidelines governing agency actions, generally. Because this organizational structure exists, those perspectives which differ (often from

persons outside the agency, but not necessarily) might clash with agency beliefs and expectations for the way information is interpreted and reasoning behind decisions.

Data was not directly collected from Forest Service employees in this research, but remarks from non-Forest Service employees strongly suggests that a political structure exists and is a significant presence and influence throughout the decision making process for fire recovery on the national forest lands. Other federal agencies often collaborate with the FS, which occurs in a different forum than public involvement. networks within the FS and among other agencies promote a theme stemming from their organizational cultures as well as emphasizing a scientific analysis of the recovery situation.

Orchardists and Farmers

Management and Owners

Orchardists and farmers are persons who grow fruit or grains in the area. Apple orchardists form the majority of this group. The major issue with regards to forest and natural resource management is water quality. Many orchardists and farmers pump water from the streams for irrigation purposes. Increased silt and debris in the streams cause water pump filters to become plugged, which requires frequent filter replacement.

Labor

Orchard workers in Chelan County predominantly belong to the Latino community. Most Latino workers are migrant, though some have established their home in the area. The attitude encountered regarding forest management issues was indifference.

Latino workers do not consider they have a right to participate in the federal policy process since they are not citizens. Their first reaction to being interviewed was one of perplexity in that someone would be interested in their concerns and interests regarding national forest issues.

Orchard workers did not suffer any major property loss during the fire and were only indirectly affected by smoke, road closures and other effects that distressed the community as a whole. Latino workers reside in housing provided by the owner of the orchard where they work, so they were not concerned with potential property loss.

Interviews identify that the Latino population in Chelan county often forms a parallel community, independent of the American community. Interviewees claim to have suffered discrimination, characteristic of their identity as Latino immigrants to the US. Latino workers claim there was limited information in Spanish regarding the fires, obstructing the flow of information that reached their community. They did recognize efforts made by the Forest Service to provide some information in Spanish as well as the role of their newspaper, El Mundo.

"We won't be affected. Most Latinos live in houses provided by the orchardists. They stay here a few months and then they leave. The fire didn't affect them. We are not citizens, so we have nothing to say about this."

"The fire didn't affect the work at the orchards so life for the Hispanic community kept on going. I think there isn't much concern regarding the fire, so they weren't preoccupied with the forest because they are not settled here long enough; in many ways this is just a passing place."

Timber Industry

The Timber Industry include owners, managers, contractors and employees of large tree growing, timber harvesting, and wood and fiber processing companies. Additionally, this group includes forestry consultants and loggers who may contract with the Forest Service. Many of this group's members tend to value trees as a commodity compared to other plant and animal species and environmental processes in the forest ecosystem, which have a perceived lesser value as a commercial resource. These individuals have similar views of natural resources as do those Wise Use views and are often politically linked with the Wise Use movement.

Tourism Industry

This group includes individuals who manage or are employed with businesses that rely on tourism. Many of the restaurants, hotels/motels, gift shops and recreational service providers gain a large percentage of their income from tourists staying in the area. The interests from this group, as relating to forest and natural resource management, tends to support practices that promote tourism such as recreational opportunities and aesthetic viewsheds. This group is organized mainly through the Chamber of Commerce.

Civic Concerns

This group includes individuals who hold elected, appointed or hired positions in the community, representing local government and local business interests. They tend to support activities that economically benefit communities, which includes tourism,

development, and the sales and extraction of natural resource commodities. However, long term management of the national forest is important to these individuals since economic viability of the communities is intimately connected with an aesthetically pleasing and productive forest. Additionally, these individuals may be well known among the community, therefore their opinions may be persuasive to or provide credibility for local residents.

"As a political representative of the local residents, decisions about the Wenatchee National Forest will affect how I can work to serve my constituents. If policies on the Wenatchee National Forest disagree with my constituents' needs, then I will have to work more in getting change."

"There was a big loss in revenue due to this fire. It has hit the school already — they have reduced the percentage that goes to the arts and grants.... There was also a drop in sales tax and hotel revenue — it's down 11% from last year."

Interaction of Themes on Issues

By comparing the themes on issues, a complexity emerges that begins to describe the social interaction surrounding the 1994 fires. Rather than explore every issue and the variation among themes, several issues are chosen to illustrate the general climate of the interplay among themes. In particular, three issues are treated to an in-depth analysis of interacting themes to glean nuances in differing worldviews: (1) Utilization of Burned Trees, (2) Forest Health and Desired Future Condition of the National Forest, and (3) Silvicultural Practices. The latter two issues include many components of the other issues such as water quality, wildlife habitat, and fire suppression.

Utilization of Burned Trees

Private Property Rights individuals (PPRs) want to have the choice and authority to salvage log on their own property. This choice is restricted when limitations from the Endangered Species Act is invoked or when state riparian and logging regulations apply. Many of this perspective view themselves as the sole owners of their property and that they should have the authority to control all activities occurring on that land. PPRs argue that they can do the best management on their lands because they are the ones who must live with the results. They believe that they can implement the more practical and common sense activities than if forced to comply with bureaucratic regulations. PPRs feel that environmental special interest groups limit what individuals can do on their land. This is frustrating to them when most or all members of the environmental special interest groups are not located in the area and do not experience the effects of such policies and restrictions. If salvage logging is prohibited on private and public lands, those landowners believe they risk increased fire, insect and disease potential in the future from additional woody debris on the ground. This places their homes, property and families in jeopardy.

"On my land, I will cut all the commercially valuable salvage trees and leave any that have real estate (ones that look good). I am already salvaging as much as I can."

"Private owners should be allowed to do their own work, including logging. Private land doesn't belong to the state or federal government, so there is no reason for these governments to have any say or jurisdiction in what happens on those private lands."

"I sold all the salvage I could sell. My grandkids and great grandkids might as well get something out of this. Everything else will be felled to help with erosion control. Dead sticks in the air don't benefit anything."

Wise Users are concerned about regional and national trends of the increased emphasis on recreational uses of the forests over commodity uses. Tourism in Chelan county is popular because of the aesthetics and many recreational opportunities. This leads to managing the national forest to accommodate tourism in addition to timber production. In terms of fire recovery and fuels management, Wise Users are frustrated with recreational needs overriding fuel management needs, such as thinning, harvesting and prescribed fire. Many Wise Users cite that one of their biggest fears is the national forest becoming a national park and that another Hatchery/Rat/Tyee or Yellowstone fire might develop because of the trend to keep land management to minimal intervention. Wise Use advocates see this style as an inefficient use of natural resources and a liability to residents and landowners near the National Forest and across the nation.

Wise Users view long term ecological recovery as essential to this area's ability to produce valuable resources. Many favor human intervention to speed up the recovery process by implementing salvage logging, seedling planting, grass seeding, and other vegetation management. Wise Users tend to have the opinion that the current burned areas are not very productive, yet could be provided with the correct disturbances and vegetative starts. Many believe that by restoring a living forest, the resources such as wildlife, timber, and other flora as well as watershed processes can benefit the community, state and nation better than a non-intervention response to the burned areas.

Wise Users see much of the standing dead or dying trees from the fire as an economic resource and believe the value of that resource will deplete rapidly since the trees are dying and deteriorating. Most believe the timber could be unmerchantable if it

is not harvested by the 1995 summer. Not only is it an economic resource if harvested within one year of the fire, but it has liabilities if left in the environment. Standing and downed snags could provide fuel for the next fires, which could begin with lightning strikes in the 1995 summer. Many argue that the fires of the future might be larger and more intense if all the snags are left in the environment. Another argument supporting salvage logging is that this supply of timber could replace live trees that would be logged anyway. Due to the high demand for timber and wood fiber, Wise Users believe it would be logical to use the salvage resource, which is going to be lost eventually due to deterioration, in place of cutting live trees, which still have years of growth and productivity in the forest ecosystem.

"Number one is to clear timber off. If we take it down, we can plant and it won't be a waste."

"By the time they (the Forest Service) decide to salvage the trees, the timber won't be marketable. The trees have to be taken out of here in one year."

"Environmentalists are stopping us from having all the timber, even the dead stuff falling on top of the grasses. This is a waste of the resource and fuel loading."

"The priority of rehab should be salvage logging. The logs sold could pay or overpay for rehab. Salvage is only going to be good for so long. Logs will get blue stain in the spring. From the standpoint of the taxpayer, the rehab costs too much. If the money came from salvage sales, the rehab money could be spent elsewhere — let rehab pay for itself."

"If the Forest Service doesn't salvage, they are wasting a valuable resource. If they don't clean up the forest, they will have more wildfires and more resource loss just like this time."

"If the Forest Service does nothing, we would lose any and all the value left in the salvage logs. This option is unacceptable, but even more unacceptable is the fuel that would be left, setting up the area to burn"

again and hotter. We will lose even more resources in the long term."

"The Forest Service needs to get those areas logged. It's a crime not to use that timber resource. It will only become diseased if left. The Forest Service can cut the burned timber and reforest the land. If they think some of the trees will live, then don't cut those; but if the tree is dead or going to be diseased, let's log it. We need to look at it from a common sense perspective. The whole region is screaming for wood and there is 150,000 acres of burned timber; let's put it to good use. Plus, the salvage timber harvesting money goes into the general school construction fund, which benefits the entire state."

"It's a shame to see the standing dead timber. The Forest Service should allow it to be salvaged since it's a resource being wasted."

"The resource of timber would be wasted if no salvage occurs, this is morally wrong not to use this resource since it will die anyway. And it might replace green timber sales."

Environmentalists look at the burned areas and see a different stage in the forest's life cycle that may have positive, negative or neutral effects for the long term forest condition. Many are less concerned about strategies that encourage a quick response to restore commodity resources, mainly timber. Instead, many have an immediate concern for wildlife food sources, shelter and other habitat needs. The overriding factors in recovery issues for Environmentalists is that land managers: (1) use scientific knowledge for making judgements about whether or not to employ a certain practice, (2) monitor the situation before and after practices are applied, (3) consider nature's response (no human intervention) as a valid option, (4) consider native species as appropriate regeneration versus exotic species, and (5) be aware of long term effects from recovery practices that may do more harm than good in the short term.

Environmentalists (Non-intervention) are not convinced that having all the woody material left in the forests is a negative consequence. Many feel that the snags serve a purpose: animal habitat, nutrient cycling, physical structure, or some unknown but relevant function. Most are completely against salvage logging because of their view that no human intervention is the most desirable and most natural response. Environmentalists (Non-intervention) would choose to minimize human intervention now — now being as good a time as any to allow the forest to regulate itself.

"Blowdown and beetle kill threats are excuses to salvage log using the reasoning that this is fuel loading.... I am also against the argument that says there are plenty of snags for wildlife, even if half of the burned snags are left. Who's to say if there's enough wildlife with only half or partial snags left?"

"Salvage logging reinforces the concept that forests are resources. Trees are one structural element in the forest, and the dead stuff is the base of everything else in the forest. The forest needs the dead stuff to support life, plant and animal species. Management isn't respecting the evolutionary process of all species, plant and animal, big and small. Management needs to be holistic and respectful of nature and the evolutionary processes."

"We are concerned about maintaining natural processes and nutrient cycling. We question whether the Forest Service are taking out more nutrients than nature can replace. This is a big question after the fire with regards to the potential salvaging efforts on private and public land. The Forest Service needs to think in terms of the big picture; think ecosystem not burnt area."

"The resiliency of the area is tremendous. I question what use there is in taking salvage timber off the forests. The snags will help shade the soil, which keeps temperature down to aid the regeneration. The fallen snags provide structure for the forest floor. Since the forest floor was burned, there is a need to provide some structure which will help retain water and allow mycorrhizae fungi to develop."

Environmentalists (Return Intervention) and Multiple-users are concerned about the impacts salvage logging and extraction might have in the forest. They are also concerned about the effects of leaving too much woody debris in the forest, for fear that future fires would really damage the environmental processes and ability of the soils to be sources of life. Environmentalists (Return Intervention) attempt to weigh the consequences of logging against not logging. They want substantial research conducted to guard against long term effects before any salvage logging occurs. Many support salvage logging as long as no new roads are built and that the forest condition is monitored prior to logging and afterwards. Environmentalists (Return Intervention) recognize that humans have altered the forests significantly, and therefore the current condition does call for some drastic human intervention to get the forest back to a more natural state, or historic condition.

"Salvage should probably be done. I question if all that dead wood is going to be all that good to keep in the forests — is there an ecological need or will it just be a liability. I am ecologically minded and don't want to endanger bird or other animal habitat, so I don't think all the salvage should be left."

"A hands-off policy is too late. In the Entiat area, the Tyee was an unnatural fire and so a hands-off policy is a dumb strategy."

"The desire to salvage is a problem. Salvage logging is going to tear things up even more than they are. Maybe helicopter logging wouldn't impact the soils in some spots, spots that aren't very steep. I want the Forest Service and other people to look at how much damage versus the good in trying salvage will result in the long term. The soil condition in the burned area is very fragile."

Multiple-users favor some human intervention to support productivity of all forest uses. Intervention must be cautious so that long term ecology is not jeopardized by short

term benefits. A balanced management strategy is needed such that one condition in the forest does not threaten another condition significantly. Many suggest that salvage should be done in moderation. Salvage logging should follow all laws and regulations, which are oriented to multiple-use, to ensure that the rest of the ecosystem is considered.

"Salvage should be done, but it should not be an excuse to do rampant clearcutting. It's a shame to waste a resource, if it could be salvaged. However, other impacts shouldn't be ignored."

"Salvage is the main problem. There is a lot of product out there that could be used, but we need a balance.... There should be some resource extraction, but they need to be careful and not damage other parts of the environment."

"I am interested in knowing what the Forest Service is going to do with the timber on the burned areas. I think they will salvage it, but how and when they do it will be the critical issue. They will need to leave some of it standing for wildlife. Salvage needs to be done for economic purposes and for reduction in fuel for future fires. There needs to be a balance of salvage left for animals, but not enough that it creates a fuel problem. Logging decisions have often been made on economic considerations, but there is a need to look at the ecological conditions."

Civic Concern advocates are interested in ecological recovery in order to restore a more pleasing scenic quality to Chelan county and to have a more productive forest ecosystem. A productive forest would be defined as one that does not threaten residents with flood and erosion or future catastrophic fires and one that provides clean water and recreational opportunities. Because of the poor economic returns from the 1994 summer tourism, many Civic Concern advocates see businesses struggling; hence the community struggles. They would like to have a quick recovery in order to minimize short term economic problems. Yet, this quick recovery should not jeopardize long term sustainable use of the forest, because that is synonymous to long term community sustainability.

Civic Concern advocates are mostly in favor of salvage logging because of the derived economic benefits. Additional benefits include a viewshed without snags, which is more aesthetically pleasing to many, and an opportunity to reduce fuel accumulation for future fires. The effects from such large fires in 1994 were mostly perceived as negative, hence a strong desire to avoid similar situations and fires in the future.

"There is skepticism of the Forest Service being able to get the salvage logging done soon enough — there is fear that the resource will be lost, economic values lost to schools and county roads."

"If there is no salvage logging, there will be a potential for fuel accumulation. Salvage and regeneration will quickly get things growing again. The Forest Service needs quick action before deterioration of the timber happens."

The Tourism Industry is most interested in recovery to entice tourists back to Chelan county. Scenic viewsheds and recreation are the major draws to the area in addition to unique community offerings. Tourism favors restoring viewsheds, encouraging educational opportunities regarding fire and ecological recovery, and advertising to reassure potential tourists that the damage from the fires was not as great of a distraction as one might perceive. Additionally, the establishment of interpretive facilities may encourage visitors to come to Chelan county to learn about fire effects.

"Rehab should also be promoted. It should be made into a tourist attraction. Make it a positive and not a negative. The Forest Service should lead an interpretive experience about fire and the forests. If it was publicized correctly, it could be an economic boom."

"The agency should use the fire lines from this summer and turn them into hiking or cross country ski trails and maintain them as permanent fire breaks. We might as well use them now for recreation and in the future to fight fire again."

The Timber Industry can be separated into two categories regarding their positions on long term recovery of the WNF burned lands: those who are dependent on the resources extracted from the national forest and those who are not. Loggers and forestry consultants who earn contracts with the Forest Service in managing resources or extracting resources tend to be interested in salvage logging, quick regeneration, and intensive vegetation management to restore the burned lands with forest cover. Those in the Timber Industry who have their own private lands to manage and who are not dependent on resources extracted from the national forest tend to have hopes about how the Forest Service might manage recovery, but do not have a lot of faith that bureaucratic processes allow these desired recovery practices to be implemented in a timely manner. Both categories of this group believe that given public approval and political authority, the national forest could be managed for a recovery of natural resources and environmental processes. Practices corresponding to this management would include salvage logging most of the standing snags, replanting with a mixture of native tree species at correct spacing, and thinning at future intervals. The goals are to reestablish trees lost in the fires and to manage the level of woody debris and slash on the forest floor. Most persons believe these types of practices can be done in conjunction with wildlife and recreational concerns.

Timber Industry advocates are in favor of salvage logging because it provides economic benefits. Additionally, many view the snags as a liability similar to some Wise Users. Many in the Timber Industry want to manage a predominantly "living" forest on a sustainable basis, which corresponds to safeguarding that forest against damage from

fires, insects and diseases. By removing most of the salvageable wood, they believe these risks to be minimized.

Most Timber Industry advocates argue that salvage logging on the national forest is desirable and supports Forest Service long term goals for multiple use and resource management. But, many are critical and have little faith that the Forest Service is able to implement salvage logging before the wood becomes worthless. Whether the Forest Service salvage logs or not, adjacent timber company landowners are not concerned about salvage supply, since they have enough salvage on their own lands to harvest before time runs out. However, these landowners are concerned about fuel loading on the national forest adjacent to their lands. Fire starting in the national forest could easily spread to their lands, regardless of different practices, including salvage logging.

"The Forest Service is too slow in salvage efforts. Already there are private logs going out of the woods. The state DNR will soon be logging. But the federal government is not even starting. They have only until next spring with the blue stain setting into the ponderosa pine. They only have 8 months — so there should be a red alert to get the salvage out. Every-day I see big trees on the ground that would more than pay for my day's wages on a rehab crew."

"The biggest problem for industrial private forest owners is the loss of commercial timber."

"6500 - 7000 acres of our commercial timber burned from fires that started on Forest Service land."

Forest Health and Desired Future Condition of the National Forest

Wise Users' main focus for sustaining a healthy forest is to have a continued supply of resources being produced. This translates into having a forest that is productive within its capacity to provide resources and environmental processes. Disturbances

that reduce a forest's potential to produce resources is one that is unhealthy, such as when above average insect and disease infestations occur, when larger than normal magnitude or intensity fires burn, or when stand replacement fires burn at too frequent of intervals. Also the plant and animal species composition must be within a historical range of species suited to the climate and vegetation. Many Wise Users refer to ponderosa pine type forests that supported fewer true firs and were more open and park-like. They claim that the forest was not stressed by overcrowding and competition for water and nutrients. This forest type is desirable as a future condition of the local national forest. Wise Users would like to see the forest return to this ponderosa pine type forest, which they believe is more capable of minimizing catastrophes and recovering from insect, disease and fire disturbances.

"I am tired of the environmental arguments, such that a forest is not natural once man intervenes or that once a clearcut is made then there is never a forest again in that area. This is ridiculous! Forests are renewable and can be managed."

"Fire suppression from 75-80 years ago has created an unnatural environment. The dry ponderosa pine/Douglas-fir site has changed to a multi-canopy true fire type. The latter is not a fire resistant forest type and it is prone to drought stress. Grand fir is taking hold in great numbers throughout the region.... Fire needs to be introduced back into the forest with prescribed burns."

"A healthy forest will be one without bugs and disease, and one that is fire resistant."

"Sustainable harvest should be the goal. Even though there are no mills in the local area, housing is a concern. Jobs and affordable housing are issues for this area, which tie into having some harvesting done on the national forest. And, if this suits reducing fire potential in the forests, then both are better off."

"We should utilize [the forest] instead of letting it burn. We should have reforestation; we can be in a cycle of logging and replanting."

Environmentalists are also concerned about the long term condition of the forest. Most want forests sustained because of its natural integrity and contribution to environments on a regional and global scale. Not only are forests important for humans, but for all biological life, chemical processes and physical dynamics. Environmentalists also refer to historical ponderosa pine forest types as a desired future condition. They claim this is how the forest regulated itself prior to human intervention. Forest health is therefore defined as a forest that is able to manage itself without human intervention, or one that is able to stay within natural bounds and be resistant to human disturbances. Environmentalists (Return Intervention) recognize that an absolute restoration to a naturally self-regulated forest is not a reasonable expectation for the future, because humans are now part of the equation. Many argue for a forest that is able to coexist with humans and continue to function within its own cycles. This condition does not have to be fixed; it could be dynamic with disturbances causing new conditions or cyclical conditions. The key is to have a forest that is able to stay approximately within the same range of conditions it would if there were not humans interacting with it, trying to minimize human disturbances that significantly alter natural conditions and responses.

"We need patches of fire in the landscape. We didn't understand it. We grew up with Smoky the Bear telling us fire is bad. This fire was a lesson."

"The Forest Service's goal should be to repair the damage created by man. A healthy forest would be one that is least interfered with by man.... Man creating a healthy forest is an oxymoron. How can man create something natural?"

"It is hard to accept catastrophic fire, especially for those living in the woods. But we can't expect to exclude fire and we can't assume that we are living in a wilderness. Humans are here and coexist with other species. We have to take care of our nest, in the short term and long term."

Environmentalists (Non-intervention), have the perspective that the fires in 1994 were nature's response to the current conditions. And, a desired condition for the future is unknown, because we have to wait and see how nature recovers itself. Forest health becomes ambiguous because humans do not know all the complex functions that "bad" disturbances serve. Perhaps these fires have brought more positive benefits than negative to the forest and its ability to survive. It would be premature for humans to define what is healthy and what is unhealthy, because we do not know all the functions a burned snag or a beetle infested tree serves.

"In my case, I don't consider I lost anything. There hadn't been any fire on my land since 1910. This fire cleaned it out, making it very good and healthy for the forest.... Fire is part of the ecosystem, and it will come through from time to time."

Multiple-users see management practices intervening to a larger degree than do Environmentalists (Return Intervention). Since most forest resources are limited, it will be necessary to manage these resources such that none are depleted or degraded beyond recovery. Again, a balanced approach to management practices is desired to maintain multiple resources into the future. Some consideration of historical conditions of the forest are critical, because many Multiple-users acknowledge difficulties of sustaining non-native species, especially when their maintenance jeopardizes other native species. Many are quick to argue the contradiction in management strategies of trying to sustain

late successional reserves (LSR's) and minimize catastrophic fire. LSR's often have downed woody debris and fuel ladders which encourage high intensity fire buildup.

"The pre-white man forest was one that regulated itself with natural selection. A better forest will come from developing the life of the flora and fauna. Man's harvest may increase if we do not impact the other components of the forest too harshly."

"The Forest Service is struggling between two roles: a caretaker of the forest versus a gatekeeper of the forest. Gatekeeping prevents them from managing the forest and the potential forest fires. I want the Forest Service to be allowed to be caretakers. It is unrealistic to go back to a hands off management policy. We are here now in these forests and we have to manage with man as part of the forests, not just people looking in. Some preserved, untouched or unmanaged areas are okay, but more of the area needs active management, otherwise it will burn again."

Civic Concern advocates define forest health similarly as the Wise Users, where a healthy forest is able to provide resources and support the community without threatening long term productivity. Disturbances that threaten continued supply of resources would put the forest in an unhealthy state. Civic Concern advocates are interested mainly in the resources of clean water, scenic beauty, recreational opportunities, timber, and wildlife habitat. They want the forest to be enjoyed by local residents and by tourists in the short and long terms. Some have researched ideas on the historical ponderosa pine forest type, and so they are interested in learning whether that type of forest will be able to support the community's interests on a sustainable basis.

Timber Industry advocates compare how the Forest Service manages the national forests to how private tree growing companies manage their land. Forest health is defined as being able to grow valuable trees in perpetuity, without significant losses. Some loss due to fire, insect and disease is unavoidable because of the climate and

location. Yet, many feel that by employing the right practices, humans can manipulate the growing conditions of the forest so that it recovers from fire and other disturbances with minimal damage. Thinning, species composition, and spacing are important silvicultural tools for Timber Industry advocates. The desired future condition from a Timber Industry perspective on both private and public lands is to have a forest that will be able to support trees now and into the future. Silvicultural practices must be used to guard against catastrophic events that set the forest and soils back to secondary or primary successional states. If fires burn so hot that soils are sterilized, nobody benefits because of the time needed for nature to restore productive soils; no resources are provided to the community and further problems occur such as erosion and stream dynamic changes.

"The more that the Forest Service can reduce the potential for catastrophic fire, then the more I am pleased with good forestry practices being used on the National Forest."

"The Forest Service needs to consider the possibility of catastrophic fire again.... They need to think of areas in terms of "firesheds" by looking at natural boundaries and then looking for points of control."

Tourism Industry advocates generally want a healthy forest, which is aesthetically pleasing. Many would like to see the greenness restored by replanting trees and shrubs to replace the burned and blackened areas. Future fires of large size and high intensity are not desirable due to its hampering of the recreational experience. Trails and campgrounds were closed throughout burned areas, which restricted recreational use. A desired future condition from the Tourism perspective would be maintaining a living forest with small patches where fire burned or insect and disease killed trees. Many

understand that these disturbances will occur in the future, but would like to see the devastation contained in smaller patches. A healthy forest is a key factor in having a healthy tourism industry. Many visitors come to the area to experience the scenic beauty and recreate in the woods. Viewshed maintenance is a primary element in the desired future condition of the forest. Guarding against a repeat of this summer's fires is also a factor in future National Forest management. Many have heard testimonies supporting the use of silvicultural practices to take a proactive stance in preventing fire, and so they tend to want to learn more about these practices and the feasibility of implementing them.

Silvicultural Practices

Private Property Rights advocates desire the use of silvicultural practices on private and public land. First, many believe that these practices produce desirable results on their own private land. By employing silvicultural practices, private property owners are able to thin forested land, remove insect and disease infested trees, and treat slash accumulation. These practices produce forests that attempt to keep insect and disease epidemics to a minimum and reduce the potential for high intensity fire damage. The goal of private property owners is to maintain their forested land as assets instead of liabilities.

Secondly, PPRs see the public lands as an active part of rural communities. Hence, management of those lands should consider effects on the local communities. Many want public lands to be managed so as to reduce the potential for catastrophic

damage or extreme changes which disrupt the communities. Silvicultural practices are tools that PPRs believe serve this goal.

"It just lies on the ground and piles up to create tons of fuel. When it is not managed correctly, you set up the conditions for a big fire."

Wise Users support many silvicultural practices as methods to conserve forest resources and ecosystems for the future. It is believed that the national forests are getting away from this management style because of environmentalist pressure to more hands-off management. Fires as large and intense as those in 1994 were believed to be more destructive and damaging than what might have occurred if silvicultural intensive management had been applied. Many Wise Users support continued production of resources and environmental processes. Disturbances such as catastrophic fires destroy fundamental elements in the forest, which restricts these goals from being achieved.

Wise Users advocate that land managers, such as the Forest Service, have knowledge and tools to reduce fire size and intensity potential. Many believe management practices to be restricted in the recent past by legal injunctions and ESA concerns, which have overridden land managers' abilities to be good stewards of the forest. Many Wise Users support silvicultural practices and believe them to help minimize catastrophic fires and insect and disease epidemics, which produce a healthy forest for the future. Fuel management is a priority to use resource efficiently into the future, without large risks to losing them to catastrophic and avoidable disturbances.

"Part of the problem is that consumers are too far removed from the end-product. We want less timber harvesting, but we aren't aware of where all the fiber goes to. On a global scale, creating natural resource products will have less impact."

"A Wenatchee World article "Forest fire can be good for the ecology" (8-1-94) shows what the public is reading about forest management. I am upset with the paper's portrayal that this is new science, whereas instead foresters and loggers have known these techniques for a long time, but have been prohibited from using them. Techniques such as thinning, logging and slash removal can mimic fire or reduce the potential intensity of fires, so that fire can be good for the ecology."

"I am a firm believer in logging before fire has a chance to blow up into a huge wild fire. There needs to be the removal of fuel. Logging serves two benefits: an economical boost and fuel management. If we don't do logging for fuel management, we will be in the same situation in 50-60 years."

Environmentalists are wary of silvicultural practices because of the anthropocentric view toward nature that "managing" the forest implies. Many Environmentalists question whether nature should be the regulator instead of government agencies and other land managers. Environmentalists recognize that humans do not have perfect knowledge of how the environment and all its complexities function. Therefore, they are concerned about known and unknown effects that might result when thinning, changing the species composition, or removing insect infested trees. Some question whether long term forest health depends on having "unhealthy" elements in the forest and whether high site productivity involves more than maximized tree growth. Environmentalists (Return Intervention) and Multiple-users want to see careful research before silvicultural practices are employed and then significant monitoring and a willingness by the Forest Service to adapt to new information.

"Thinning and prescribed burning have a place in forest management. But these practices must be done on a manageable scale — the size and number of them that occur on the district. But I feel that the district doesn't have enough personnel to monitor the prescriptions to see whether they were carried out properly and whether they satisfied the objectives."

"The forest has become overgrown and we need to have multiple use. Doing nothing in wilderness areas is fine, but management for the rest is needed."

Environmentalists (Non-intervention) argue that silvicultural practices are intrusive of nature's own processes. History shows that humans have changed forest conditions, arguably to negative consequences. Therefore, forest ecosystems would be better off without any human intervention, especially intensive silvicultural practices.

"I think the best option is no intervention. The fire was devastating because they have suppressed fires for so long.... If the forest is in its natural condition, then it will burn healthy."

Civic Concern advocates and those in the Tourism Industry favor the use of silvicultural practices in order to take an active approach attempting to minimize the potential for high intensity fires. Similar to the Private Property Rights group, Civic Concern and Tourism advocates see the Forest Service as members of the community who share an interdependent relationship with local residents and businesses. Many want to take an active approach in forest management, because they witnessed how little the fire suppression efforts can affect fires of large magnitudes such as the Tye and Hatchery Complex. They want to take aggressive steps to provide a safe, enjoyable and productive quality of life in the community.

"If the forests would have been logged or thinned before the fire, maybe things wouldn't have been so disastrous."

"I feel bad for the loggers and the Forest Service, because they pleaded to do their jobs prior to the fire, but weren't allowed. If they had, then maybe they would have been able to prevent some of the damage."

Those in the Timber Industry favor the use of silvicultural practices in order to continue producing an economically valuable commodity. These practices increase timber production efficiency by minimizing risks to trees such as insects, disease and fire. Also, many silvicultural practices attempt to increase the quality of timber on the stump through pruning, thinning and vegetation management to reduce competition. Many in the Timber Industry feel their skills and services have not been utilized to the fullest, which might have reduced the losses incurred from the 1994 fires. Had more silvicultural practices been employed, many claim that the fires may have burned less intensely in spots and been more easily contained at earlier stages.

Summary

Table 2 lists the arguments or positions each theme develops on the three issues previously discussed in-depth. The first five themes tend to view the forest fundamentally differently, whereas the remaining three themes emphasize certain uses of the forest over others. Environmentalists view the forest as an entity separate, yet interdependent, from human civilization. It is the separateness that focuses the Environmentalists' values on choosing management strategies that encourage nature to be its own self-regulator. Non-intervention Environmentalists believe that hands-off policies are the most natural and human intervention is least natural. Return Intervention Environmentalists acknowledge human intervention in nature's processes and conditions over the years, producing undesirable results. Therefore, human intervention currently needs to help nature recover to more historic ranges of variability (HRVs).

TABLE 2. SUMMARY OF THEME VARIATIONS ON ISSUES

Fire Recovery Issues for the Wenatchee National Forest			
Shared Value Themes	Utilization of Burned Trees	Forest Health and Desired Future Condition	Silvicultural Practices
Environmentalists (Non-intervention)	leave burned trees and resources in forest for habitat, nutrient cycling, etc.	let nature define healthy states, not humans	let nature respond in its own way; self-regulation
Environmentalists (Return Intervention)	moderate salvage logging to reduce fuel hazard	return to HRV conditions as much as possible	use silviculture to get forests back to HRVs
Multiple-use	moderate salvage logging to reduce fuel hazard	manage for balanced use of all resources	use silviculture to enhance all forest resources and uses
Private Property Rights	freedom to salvage log on own property	--	freedom to practice silviculture on private land without government regulation
Wise Use Interests	salvage log and regenerate; "use it, don't lose it"	manage forest to have continued supply of resources in perpetuity	silvicultural practices to conserve forest resources and ecosystem for now and future
Civic Leaders	salvage logging to reduce fuel hazard and generate revenue	provide resources to community without threatening long term productivity	use silvicultural practices to minimize catastrophic fires that jeopardize community lives and livelihoods
Timber Industry	salvage log and regenerate with good silviculture	manage to minimize hazards to wood productivity	silviculture enhances timber production and reduces catastrophic fire
Tourism Industry	salvage log to remove hazards and black sticks from view	manage for continued supply of resources and aesthetic appeal	intensive silviculture to optimize resource production, including aesthetics and recreation

Multiple-users view nature less separate from humans. A major concern is overuse of one forest resource over that of another. Regulation and management is needed to minimize any overuses. Wise Users are also concerned with overuse of resources, but believe intensive management can prevent this as well as reduce risks that threaten a productive resource base. Minimizing risks that deplete resources or reduce efficient production of renewable resources is a key emphasis in the Wise Use theme.

Private Property Rights advocates often share similar concerns with Multiple-users or Wise Users, but they focus on being able to pursue their agenda on privately owned land. Government regulation which prevents or restricts individuals from implementing activities on their own property is the major concern of PPRs.

The differences among Civic Concerns, the Timber Industry and the Tourism Industry correspond to their primary interests in the forest: community well-being, timber production, and tourism offerings, respectively. Most often, these themes do not exist to the exclusion of another. Collaboration among local residents in the communities support all these interests. However, each has a significant role in Chelan county forestry issues and may conflict with others on particular management activities.

Several themes did not emerge in the in-depth description of issues: Federal Agency Employees, Farm and Orchard Management, and Farm and Orchard Labor. As mentioned previously, this research did not sample local Forest Service employees. In hindsight, this significant theme could have been further developed by interviewing this population. The two themes from agricultural components of Chelan county emerge on

issues of water quality and fire suppression — issues that directly effect the farms, orchards, and people depending on this livelihood.

WORLDVIEWS EMERGING FROM DIFFERING THEMES

Themes from the data suggest differences in the way Ss view nature, which generates different definitions of the wildfire events of 1994. Moreover, with multiple definitions of the fires and resulting focus on fire recovery, perceptions of appropriate forest management differ as well among themes. When researchers asked Ss to describe which practices should or should not occur on the WNF, several factors were weighed.

First, one's attachment to nature, often represented by experiences involving the WNF, assigns roles to nature and humans. That is to say, nature's presence, use and efficacy are defined, and human responsibility as stewards is delineated. Secondly, as one considers the 1994 fires, various interpretations are given to the resulting burned resources. Often these definitions are grounded in personal knowledge of the ecosystem, available scientific knowledge, and past experiences with fire.

From these two factors, a third is formulated: appropriate management strategies. In weighing whether to let the forest recover completely on its own or whether to intervene with salvaging efforts and fuel reduction tactics, associated risks must be evaluated. For example: What are the risks in doing nothing? What are the risks in salvage logging? What are the risks in planting one species over another?

TABLE 3. CHARACTERISTICS OF SHARED VALUE THEMES

Shared Value Themes	Attachment to Nature	Definitions of Burned Forest Resources	Appropriate Forest Management	Risks Mitigated by this Management
Non-intervention Environmentalism	Tread lightly on mother earth.	All elements of nature-- burned or unburned, dead or alive-- are important to its functioning. Fires were a natural occurrence.	Hands-off. Let nature recover in its own way.	Human interference can cause unrecoverable species and conditions.
Return Intervention Environmentalism	Recognize past human negative influence on nature. Help correct our mistakes, then let nature be.	The fires burned larger and hotter due to fuel levels greater than HRVs. Some burned resources were natural, but others burned beyond HRVs.	Identify optimum management that returns forest to within HRVs. Minimize risks that push forest further from HRVs.	Increasingly altered ecosystems that are further from HRVs, which might cause unrecoverable species and conditions.
Multiple-use	Resources are limited, so humans must not use one to the detriment of others.	The fires were severe and damaged trees, soil and wildlife habitat.	Apply practices and treatments that conserve all uses of the forest. Minimize risks that contribute to catastrophic loss of any resources.	Loss or irreversible damage to most resources.
Private Property Rights	Privately owned land and resources are the sole property of the owner.	Burned private property from the fires is lost assets, lower property values, fewer personal aesthetic surroundings, etc.	Owner's discretion.	Non-local influence that may not be sensitive to local conditions can cause damage to or unwanted changes to property.

TABLE 3. CHARACTERISTICS OF SHARED VALUE THEMES (continued)

Shared Value Themes	Attachment to Nature	Definitions of Burned Forest Resources	Appropriate Forest Management	Risks Mitigated by this Management
Wise Use Interests	Nature provides useful resources, many of which are renewable and can provide a sustainable yield.	The quantity of resources burned was catastrophic, resulting in a great loss of future product yield.	Intensive management to recover any useable product (salvage) and to protect forests against a repeat of these fires.	Large future losses of resources to catastrophic disturbances.
Civic Concerns	Adjacent forest lands provide many resources beneficial to residents' livelihoods and quality of life.	Immediate loss to summer business revenues; a stressful event in day-to-day life experiences; continued potential risks in forms of floods, erosion and other fires.	Expect professional foresters to reduce the risk of catastrophic fire, but maintain productive and aesthetically pleasing forest.	Loss of lives and livelihoods of community residents.
Timber Industry	Forests produce an economically valuable product that can generate income for communities. Primary resource use is timber.	Loss of a harvestable resource and loss of growing stock for future timber production.	Intensive management to recover any useable product (salvage) and to protect forests against a repeat of these fires.	Large future losses of timber and environmental conditions that support wood production.
Tourism Industry	Forests produce an economically valuable product that can generate income for communities. Primary resource use is recreational opportunities and aesthetic properties.	Loss of current and future recreational opportunities and aesthetic properties.	Expect professional foresters to reduce the risk of catastrophic fire, but maintain productive and aesthetically pleasing forest.	Loss of future recreational opportunities and aesthetic appeal of area, which generates tourism business.

Table 3 characterizes these factors by shared value theme to expose fundamental differences that lead to multiple perceptions of what appropriate fire recovery management should entail. Each management strategy aims to reduce risk, yet differences in risk definitions lead to differing views of what is desirable and appropriate. Table 4 provides graphical illustrations of five combinations of risk levels associated with the level of human intervention in fire recovery management strategies. In addition, explanations of the corresponding management strategy and examples of themes that ascribe to a particular view of fire recovery are listed. Zero-intervention corresponds to a hands-off policy, whereas full intervention corresponds to implementing all technology that is physically, economically and organizationally feasible. Levels of risk vary in definition: risks can be associated with inherent ecosystem conditions and processes, risks can be associated with human enterprises, or a combination of both.

Views A and B both demonstrate that risks are reduced by increasing the level of intervention. The latter varies from the former in that most risks are not reduced until higher levels of intervention are applied to the forest. For example, the threat of wildland fire is not significantly reduced until fuel loading is decreased, vegetation species are suited to low intensity fires, and prescribed burning is implemented at frequent intervals.

Multiple-use, Tourism Industry, and Civic Leader themes tend to support View A. Additional units of intervention do reduce risks gradually, however full intervention is the most successful in minimizing risk. Supporters of View B include Wise Use, Timber Industry, and Farm and Orchard Management themes. Low and moderate intervention

reduces risks minimally. To significantly lower the potential threat of damage to resources, one must intensively manage the forest, farm or orchard.

View C is the opposite of A and B. Higher risks are associated with higher levels of intervention. Low risks correspond to letting nature respond to disturbances on its own, rather than humans intervening with active management strategies. Environmentalists (Non-intervention) represent this view. The forest is jeopardized less if humans let it be. Private Property Rights advocates also fit View C if high levels of risk correspond to invasion of personal freedom, and intervention corresponds to government regulation.

View D demonstrates that risks associated with zero-intervention are high as well as if too much intervention occurs. Appropriate management, thus, involved moderate or optimum intervention to balance associated risks. View D fits the Environmentalist theme, which advocates for intervention to assist the environment recover from past human wrongs. But, intervention must not be so great as to overcorrect the perceived problems.

View E characterizes a disinterested or an ineffective view of human intervention reducing or adding to risks associated with nature. The only theme from the data fitting this view is Farm and Orchard Labor. Most people in this category are not directly affected by activities on the WNF and/or feel they have relatively, if any, voice in the policy process. Other residents in Chelan county are believed to view national forest management, similarly. Since data gathering targeted people having interests in forestry issues, it is not surprising that most themes are distributed across other views supporting risk mitigating management strategies.

TABLE 4. MULTIPLE VIEWS OF FIRE RECOVERY MANGEMENT STRATEGIES AND MITIGATED RISKS

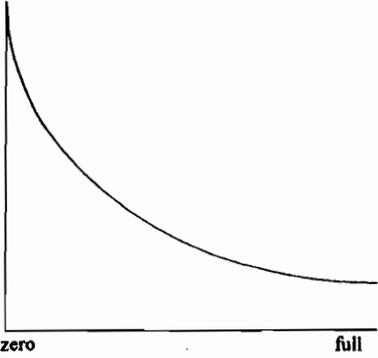
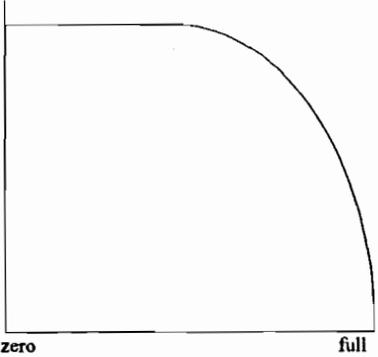
<u>Graphical Illustration</u>	<u>Explanation</u>	<u>Examples of Shared Value Themes</u>
<p>A.</p> 	<p>Moderate intervention mitigates catastrophic risk.</p>	<p>Multiple-use Civic Leaders Tourism Industry¹</p>
<p>B.</p> 	<p>A high level of intervention is needed to have any affect on risk.</p>	<p>Wise Use Interests Timber Interests Orchard and Farm Management</p>

TABLE 4. MULTIPLE VIEWS OF FIRE RECOVERY MANGEMENT STRATEGIES AND MITIGATED RISKS (continued)

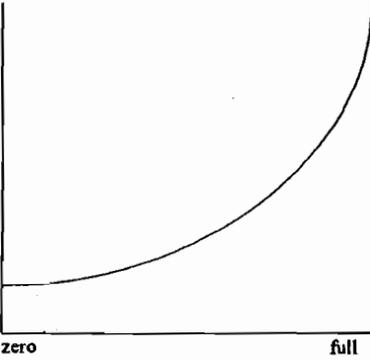
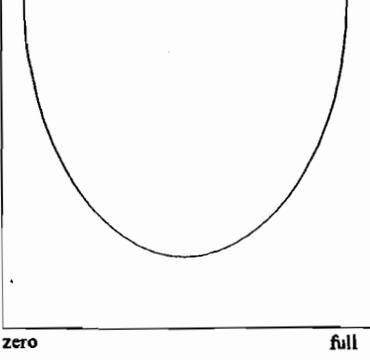
<u>Graphical Illustration</u>	<u>Explanation</u>	<u>Examples of Shared Value Themes</u>
<p>C.</p>  <p>PERCEIVED RISK</p> <p>max</p> <p>min</p> <p>zero full</p> <p>INTERVENTION</p>	<p>Risk increases as more human intervention occurs.</p>	<p>Non-intervention Environmentalism Private Property Rights Interests²</p>
<p>D.</p>  <p>PERCEIVED RISK</p> <p>max</p> <p>min</p> <p>zero full</p> <p>INTERVENTION</p>	<p>Optimum levels of intervention mitigate risk associated with current "out of the natural range of variability" forests and minimizes risk associated with intervention that would push forests out of the natural range of variability.</p>	<p>Return Intervention Environmentalism</p>

TABLE 4. MULTIPLE VIEWS OF FIRE RECOVERY MANGEMENT STRATEGIES AND MITIGATED RISKS (continued)

	<u>Graphical Illustration</u>	<u>Explanation</u>	<u>Examples of Shared Value Themes</u>
E.		Risk is not affected by any level of human intervention.	Orchard and Farm Labor

¹Government regulation protects aesthetic and recreational opportunities from being significantly impacted by overuse or other forest programs.

²Risks to individual freedom increase as government intervention or regulation increases.

CHAPTER 5. DISCUSSION AND IMPLICATIONS

Five views of fire recovery management appear when one analyzes the interview data for shared value themes among Chelan county residents affected by two 1994 wildland fires. This chapter first discusses the applicability of the sociocultural worldview typology on the views of fire recovery management derived from the WNF data. Questions to pursue in this discussion include: Does this typology fit the data? Are these worldviews distinct from one another?

The second section of this chapter considers implications that multiple worldviews of fire recovery, and natural resources in general, have on policy processes. If the assumption is that forestry policies must be socially as well as biologically, economically and physically feasible, then a key factor revolves around the ability of forest managers to consider diverse views of nature that may arise in a particular sociocultural context. As multiple worldviews differentiate in the policy arena, conflict may arise, hence conflict management is an appropriate role for natural resource professionals to assume.

DISCUSSION OF VIEWS OF FIRE RECOVERY AND SOCIOCULTURAL WORLDVIEWS

Does the Sociocultural Worldview Typology Fit?

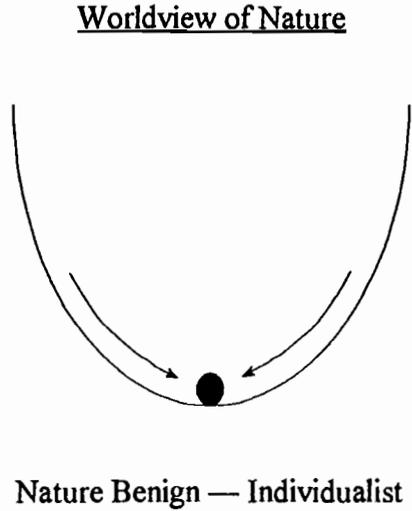
The sociocultural typology identifies five worldviews: Individualist, Egalitarian, Hierarchist, Fatalist and Autonomist (Thompson et al., 1990; Schwarz and Thompson, 1990; Douglas, 1978). Table 5 presents several distinguishing elements for four of these worldviews. The Autonomist worldview is discussed later.

TABLE 5. ELEMENTS OF THREE SOCIOCULTURAL WORLDVIEWS

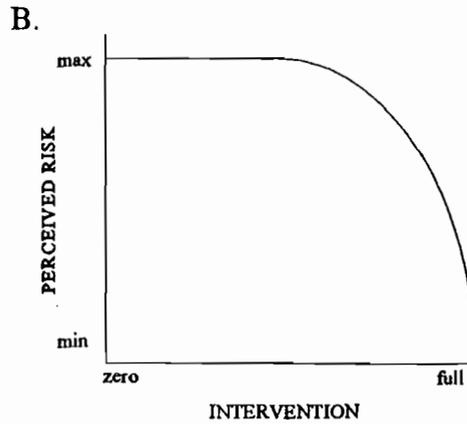
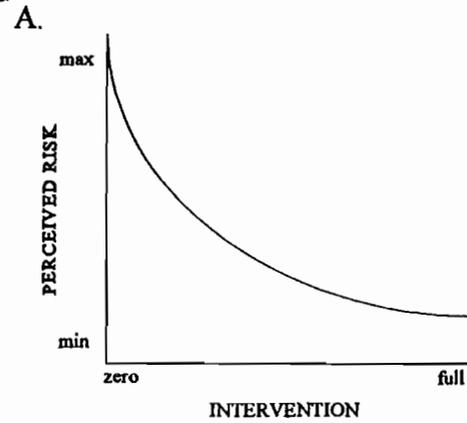
	Individualist	Egalitarian	Hierarchist	Fatalist
View of Nature	benign	ephemeral	perverse/tolerant	capricious
Rationality	substantive	critical	procedural	fatalistic
View of Resources	abundant	depleting	scarce	lottery
Scope of Knowledge	sufficient and timely	imperfect but holistic	almost complete and organized	irrelevant
Desired Systems Properties	exploitability (through inherent fluidity)	sustainability (through inherent fragility)	controllability (through inherent orderliness)	copability (through inherent chaos)
Perception of Time	short term dominates long term	long term dominates short term	balanced distinction between short and long term	involuntary myopia

(Adapted from Schwarz and Thompson, 1990, Table 5.1)

TABLE 6. WORLDVIEWS OF NATURE CORRESPONDING TO VIEWS OF FIRE RECOVERY



View of Fire Recovery Management



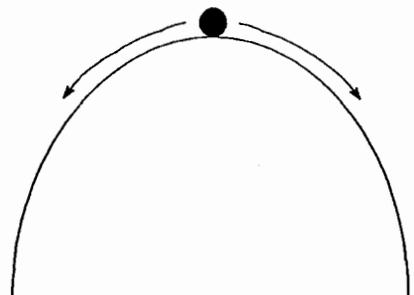
Examples of Shared Value Themes

Multiple-use
Civic Concerns
Tourism (high impact)

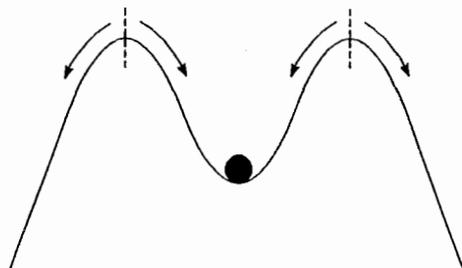
Wise Use Interests
Timber Interests
Orchard and Farm Management

TABLE 6. WORLDVIEWS OF NATURE CORRESPONDING TO VIEWS OF FIRE RECOVERY (continued)

Worldview of Nature



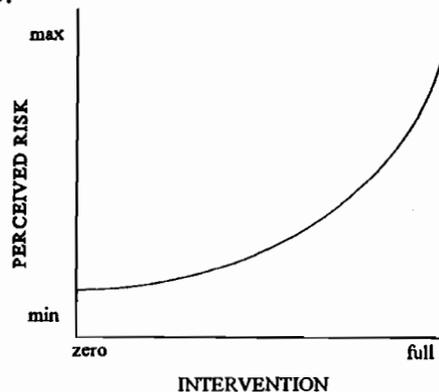
Nature Ephemeral — Egalitarian



Nature Perverse/Tolerant —
Hierarchist

View of Fire Recovery Management

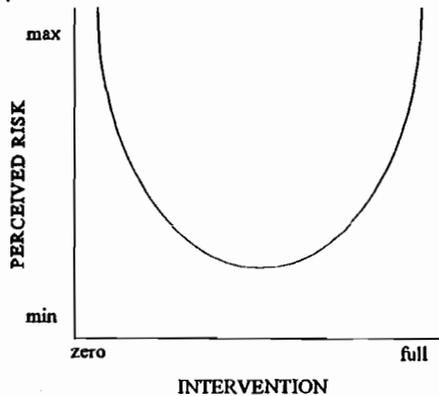
C.



Examples of Shared Value Themes

Non-intervention Environmentalism

D.



Return Intervention Environmentalism
Tourism (low impact)

TABLE 6. WORLDVIEWS OF NATURE CORRESPONDING TO VIEWS OF FIRE RECOVERY (continued)

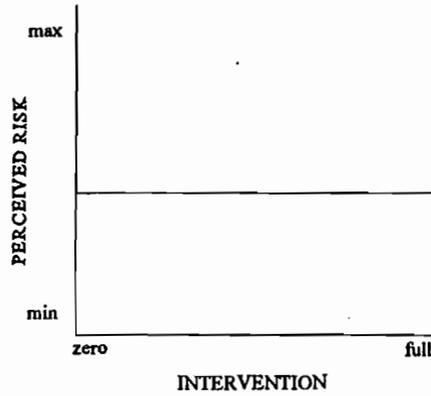
Worldview of Nature



Nature Capricious — Fatalist

View of Fire Recovery Management

E.



Examples of Shared Value Themes

Farm and Orchard Labor

The distinctions shown in Table 5 allude to the subjective nature of perceiving, understanding, and defining objects or events. At the core of these worldviews are fundamentally held values, the evaluative criteria used to discern the desirable from the undesirable (Rokeach, 1973). In addition, social representations, cognitions and interactions, the sociocultural context, and organizing schema frameworks shape our visions of the world (recall Figure 1. *Worldview as a Lens*). Different value emphases, sources of knowledge, and cultural biases encourage one person to believe resources are scarce, but manageable if able to determine the limits between overuse and under-use; another person may believe resources are being depleted by human encroachment on the environment; and yet another person may believe that skills and technology, when applied in a sufficient and timely manner, enhance resource availability and utility.

The views of fire recovery management that correspond to these sociocultural worldviews are displayed in Table 6. The Individualist believes intervention in ecosystem processes to be benign, to have favorable effects. Assuming minimizing risks is a favorable effect, both views A and B of appropriate fire recovery management correspond to an Individualist's worldview. The difference between these two views is the level of intervention necessary to mitigate risks. View B requires a much heavier application of forest practices to have any effect on changing the current forest condition. As Wise Use and Timber Industry advocates speak to the needs for large scale salvaging and fuel reduction tactics, higher levels of intervention in ecosystem processes are called upon.

"Now, they (the Forest Service) have to take out the dead trees because if they leave them there, then they will be fuel for future fires."

"The more that the Forest Service can reduce the potential for catastrophic fire, then the more I am pleased with good forestry practices being used on the National Forest."

"In general, thinning and logging are appropriate practices, instead of locking things up. If they had thinned, the fire wouldn't have taken off like it did. Forests are great, but if you can't use them they won't do any good."

Less intervention is required in view A, which is voiced by Multiple-use, Civic Concern and some Tourism advocates. In this perspective, risks to ecosystem conditions and human communities dependent on resource use begin to be reduced with moderate intervention.

"Salvage should be done, but it should not be an excuse to do rampant clearcutting. It's a shame to waste a resource, if it could be salvaged. However, other impacts shouldn't be ignored."

"If the forests would have been logged or thinned before the fire, maybe things wouldn't have been so disastrous."

Conversely, the Egalitarian worldview believes nature to be adversely affected with human intervention. Environmentalists (Non-intervention) speak often of this plight. Nature as a self-regulator is viewed as the best response. Disturbances that are not humanly caused, such as fire ignited by lightning, are considered natural and appropriate. Response by humans, thus, should be as minimally interventionist in order to accommodate nature's recovery process. Egalitarians focus on long term risks that jeopardize the ecosystem as well as future human generations that depend on nature's life support mechanisms. Therefore, many believe human intervention in the short term has irreversible consequences in the future. Being careful and conservative in our activities

on the forest provides the best insurance to leaving an undamaged and functioning legacy to future generations. It is often argued that our knowledge of ecosystems and effects caused by human intervention is incomplete, requiring a "be safe rather than sorry" motto.

"I worry what we may be overlooking in our efforts to hurry up the process. Maybe we will create a less healthy forest than if we just let nature do it without any intervention."

"I think the best option is no intervention. The fire was devastating because they have suppressed fires for so long.... If the forest is in its natural condition, then it will burn healthy."

The Hierarchist worldview takes a more process-oriented stance on human intervention in the forest ecosystem. Risks can be mitigated with optimum levels of intervention, however there are bounds to which nature is tolerant. Once we cross these bounds, nature is perverse and deviates from its inherent cycle. Environmentalists (Return Intervention) believe these bounds correspond to historic ranges of variability in ecosystem conditions. If human intervention forces ecosystems to change beyond HRVs, then new conditions occur. With scientific knowledge and the process of experimental testing, we can identify these bounds. Policies then need to recognize these bounds and balance resource use with long term ecosystem effectiveness and robustness.

"In some places the fire did get too hot and so the losses were greater because the fire was outside the natural realm. Part of the reason the fires were too big in places, causing it to burn unnaturally, is due to long term fire suppression. I would like to see the forests get back to a natural cycle, with fire occurring every 7-10 years."

Fire suppression from 75-80 years ago has created an unnatural environment. The dry ponderosa pine/Douglas-fir site has changed to a multi-canopy true fire type.... Fire needs to be reintroduced into the forest."

The Fatalist sees nature as capricious, erratic and full of random events. Intervention to alter this randomness is fruitless; risks are uncontrollable by any management strategy. Farm and Orchard Labor was the only theme to represent this worldview. Since this research sought interviews from a population who was active in forestry issues, this worldview did not emerge frequently in the data. However, this is not to say it is absent altogether in the Chelan county population. Instead, the study objectives precluded the full investigation of this worldview.

The worldview characterized by the Autonomist is more difficult to discern than the previous four. Thompson et al., (1990) situates the Autonomist between the other four worldviews and describes its interaction in the social world as follows:

Instead of maximizing their social transactions (which is what the members of the other four categories, each in their distinctive way, are doing), [autonomists] move in the opposite direction: They minimize their transactions. In moving away from all forms of coercive involvement, they arrive at the one part of the grid-group diagram — the center — that is inaccessible to all those who are caught up in either groups or networks (p. 13).

The Autonomist does have unique characteristics apart from the other worldviews, "The other four states correspond to the four possible extremes of involvement: autonomy corresponds to the lack of involvement" (Thompson, 1982, p. 304) Moreover, the Autonomist provides a reference point that represents the absence of social involvement, and therefore gives meaning to the others which represent the presence of some social involvement (Thompson, 1982).

The Autonomist was absent from the emergent views of fire recovery management. Again, as in the case of Fatalists, the data gathering methods sought Ss who were

active in forestry issues or had some connection to the wildland fire events. Potential Ss who hold attitudes, values and ideologies consistent with this worldview are removed from active social networks organized around forest policy. Therefore, including them in this study would have required logistical changes in locating interview Ss.

However, the knowledge of an Autonomist worldview does provide insight into the others. The Individualist, Egalitarian and Hierarchist are actively involved in forestry issues and policy, albeit with differing perceptions of the burned forest lands and appropriate management. And, even the Fatalists are involved or acknowledge the effects these fires had on their lives, regardless of their beliefs of human inability to influence the event.

Are These Worldviews Distinct?

To this point, the discussion has attempted to clarify the differences in worldviews, especially the relevance to multiple perceptions on appropriate fire recovery management. But, problems arise if this research begins to claim that Person 1 ascribes to the Individualist, Person 2 ascribes to the Egalitarian, etc... From an abstract typology which describes the subjective and plural nature of the social world, an accurate representation of each person's view of the world is obscured. Ss do not absolutely fit into one worldview category. Instead, combinations of several worldviews are often present in their rationalities for a particular management scenario or definitions of the burned forest. Whether this is the result of an unrefined typology or is the essence of social science, a key question surfaces.

Worldviews are grounded in the social and cultural context — an interaction between the individual and society at a particular time and place. Thompson et al (1990) asserts that one's cultural bias varies with the social context, and vice versa. For example,

An individual may find himself in cutthroat competition with his business rivals, hierarchical relations in the military, egalitarian relations at home, while treating certain areas of life, say inability to carry a tune, with fatalistic resignation. In this sense each individual, although certainly not "an island, entire of itself," is a self-contained regime" (p. 265).

This consideration leads to three possibilities: an individual sees the world equally from each of the five worldview lenses, an individual sees the world consistently through one lens, or an individual uses a combination of these lenses unequally. The first two cases are extremes and represent a purist way of incorporating social experiences using a consistent set of cognitions, affective responses and norms. The result of these perfectly balanced or pure worldviews is either a case where "evidence for all positions would always appear equally compelling, so that we could never make up our minds" (Thompson et al, p 265), or a case where cooperation and alliances with others would be impossible, respectively. Fortunately, human psychological and social imperfections are beneficial to this dilemma. Using the worldview lenses unequally, depending on the social context, encourages us to formulate substantive ideologies, but also empowers us to communicate with differing worldviews.

Another way of stating that the individual uses these worldviews unequally is that one worldview dominates the others in particular social contexts. This concept of a multiple self with dominant or preferred styles of perceiving, learning and behaving is

not new. Many psychologists and social psychologists have developed instruments to identify variations in personality types (Myers and McCaulley, 1985), cognitive styles (Nunney, 1978), learning styles (Kolb, 1976), and intellectual and ethical developmental stages (Perry, 1970). Results from these theories and empirical tests note themes in the many facets of an individual's social and psychological mechanisms. Worldviews, recalling the definition of Weltanschauungen, integrate these facets within a sociocultural context. Hence, distinct themes in worldviews are present in the social world, but do not come from the aggregation of individual worldviews. Instead, the social context elicits various reactions from individuals that can be characterized by distinct multiple worldviews at the macro-level.

RESPONSES TO RESEARCH QUESTIONS

Responses to research questions identified in chapter 3 are based on the data analysis findings and discussion.

- 1. How are issues described and what themes are organized around these issues?**
 - a. What issues are salient to wildland fire and fire recovery, according to subjects?**

Thirteen issues were consistently raised by Ss and could be categorized by four topic areas. The first topic area included issues directly related to the fires and immediate fire recovery concerns: flood and erosion threats, utilization of burned trees, water quality, and wildlife and habitat concerns. A second topic area addressed long term forest management considerations, viewing the 1994 fires as one episode in a continuum

of events on the national forest. Issues describing these considerations were: forest health/desired future condition and silvicultural practices.

Fire suppression considerations encompassed the third topic with the following issues: forest/residential interface, use of public money for fire suppression and forest rehabilitation, "project" fire concept, and fire suppression versus "let-it-burn" policies. Lastly, the fourth topic identified on-going political tensions surrounding various land management policies. The 1994 fires provided an opportunity for the following issues to emerge: threat of outside environmental pressure, federal government influence, and public trust in the Forest Service. Detailed descriptions of these issues are provided in chapter 4.

b. What themes represent subjects' perceptions of events and issues? How do they differ?

Eleven themes characterizing Ss' perceptions of the fires and appropriate management directions were grouped into two categories. The first group differentiated themes according to ideologies on the human/environment relationship. That is to say, the roles humans assume in managing, using and preserving the environment were delineated. Five themes, which tend to be mutually exclusive, were: non-intervention environmentalism, return intervention environmentalism, multiple-use, private property rights, and wise use.

Themes representing particular emphases placed on national forest resource use are identified in the second group of shared values. These themes are not mutually exclusive since they are often linked to livelihood and leisure components of Ss' lives,

which may include more than one use of the forest. Six themes emphasizing various forest uses included: timber industry, tourism industry, civic concerns, federal agency stewardship, orcharding and farming, and orchard and farm labor. Detailed descriptions of these themes are provided in chapter 4.

c. How do the similarities and differences of these themes interact with or are independent of one another?

Three issues — utilization of burned trees, forest health and desired future condition, and silvicultural practices — were analyzed to explore the interaction, similarities and differences of multiple themes. Table 2 summarized findings from this analysis. Moreover, differences in themes could be characterized by (1) the relationship between nature and humans, (2) definitions of the fires and resulting burned forest, and (3) perceptions of appropriate forest management to mitigate undesirable risks (summarized in Table 3).

d. Are distinct worldviews present that categorize how subjects perceive fire recovery, forestry and nature?

Five views of fire recovery management were described and graphically illustrated on two dimensions: (1) the level of human intervention in forest processes associated with management strategies, and (2) the level of perceived risks on the forest and/or neighboring communities associated with the level of intervention. Table 4 summarized these findings.

2. Do the sociocultural worldviews (Douglas, 1978; Thompson et al., 1990) adequately characterize subjects' perceptions?

Comparing sociocultural worldviews of nature, discussed in the literature review, to the five views of fire recovery yielded similarities. Three fire recovery views corresponded to three worldviews: the Egalitarian/Nature Ephemeral, the Hierarchist/Nature Perverse/Tolerant, and the Fatalist/Nature Capricious. Two fire recovery views were variations on the Individualist/Nature Benign worldview. Not represented in the data was the Autonomist/Nature Resilient. Due to this worldview's tendency to withdraw from social interaction, the study design precluded gathering data on the Autonomist perspective. Table 6 presented these comparisons and identified corresponding shared value themes.

3. Are these worldviews distinct?

At the individual level, multiple worldviews are used unequally depending on the social context. Roles and norms associated with a particular situation encourage one worldview to dominate others. Hence, across situations, individuals often use inconsistent worldviews to perceive, understand and act. However, at a macro-level, such as a community, these worldviews were found to be distinct. In the study area, various perceptions were generated from groups of people, which differentiated worldviews on the fire recovery management situation.

CONCLUSIONS

Conclusions from this study are related to the WNF community area as well as to global worldview differences on natural resource policy. First, multiple themes, which characterize the worldviews of local community relationships and perceptions of the WNF, demonstrate the lack of public consensus on appropriate management directions that the local Forest Service should implement. Secondly, the presence of themes grounded in this study's data correspond to a universal typology of worldviews on nature. Therefore beyond Chelan county and forestry issues, natural resource professionals may find it useful to consider the significant roles that worldviews play in decision making and policy formation.

Differences among worldviews have the following insights on fundamental issues of natural resource conflict.

- **The value component of worldviews provides durable evaluations of desirability that we assign to objects, events and end-states.**

As indicated in chapter 2, values are defined as "an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence" (Rokeach, 1973, p. 5). Values tend to be stable mental structures that provide criteria for evaluations (Hechter, 1993). Compared to attitudes and social norms, values transcend specific objects, events and situations (Rokeach, 1973). Given this durable nature, values provide a cornerstone to one's perception, understanding and formation of ideologies. Therefore, values are not

susceptible to casual changes, and differences are not likely to be compromised or co-opted.

- **The specific tactics to achieve desirable results in managing natural resources are grounded in our values and worldviews. In a social context, the multiple rationalities for choosing a particular tactic over another stems from the multiple, subjective, durable and distinct views we have of the situation.**

Assuming that management strategies are crafted to achieve some desirable purpose, then values and worldviews must be contributing factors. Looking at a natural resource situation, such as the WNF fires, there is often some definition given to that situation. Generally, if the situation is deemed undesirable, then some management strategy is crafted to improve upon the undesirable conditions. However, this process is complicated with plural and distinct definitions of the situations and prescriptions for remedying actions.

Worldviews contribute to this process by providing multiple definitions of the situation. For example, is the burned forest a landscape depleted of useful resources, an ecosystem with less fuel on the ground and closer to historic forest type conditions, or just another phase in a natural cycle? Depending on the definition of what a person sees as well as the role that one believes humans should take in interacting with nature, the prescriptions for change (including no change) begins to take shape.

At the level of implementing policy, specific tactics are chosen to achieve intended desirable end-states. For example, some support salvage logging to reduce fuel loading; some support prescribed burning to reduce fuel loading without depriving the ecosystem of nutrients and benefits from fire; while others support leaving the ecosystem as it is so that nature can run its own course, managing biomass according to natural

environmental processes. Disagreement over these tactics can be traced beyond a superficial line between those who support a particular tactic and those who do not. The disagreement is linked to the desirable or undesirable effects resulting from employing the tactic. Our definitions of the situation often conflict based on multiple worldviews and prescriptions to remedy undesirable conditions vary according to our values.

- **Conflicts over general management strategies and specific tactics are likely to emerge in natural resource policy processes.**

Since policy and management practices are partially grounded in our values and worldviews, there is no single correct answer to a problematic natural resource situation. Multiple definitions of the problem (including a definition that the situation is not problematic) and various evaluations of the desirability of its condition lead to a complex social context in which natural resource policy is embedded.

Given the multiple and distinct set of worldviews present on fire recovery issues on the WNF and on nature, in general, it is logical to assume these situations are prone to conflict. The tensions from durable and distinct values lead to incompatible evaluations of the natural resource situation. Conflicts are likely to emerge as these incompatibilities surface in discussions concerning natural resource policy and the specific tactics implemented through management decisions.

- **Improving problematic policy situations includes facilitating value and world-view differences, which can draw from integrative conflict management.**

Recalling the previous discussion on conflict management in chapter 2, helpful insights are available to facilitate problematic conflict situations. If the decision making process includes activities associated with management rather than conflict resolution, the focus is shifted from solving problems to improving situations. This is important since value-laden issues vary by the subjective meanings attached to them. Hence, there are no correct or absolutely objective solutions; our perceived solutions are relative to the subjective lenses through which we see the world.

Conflict resolution implies that these differences are resolvable — that we can determine, decide, separate and solve differences or incompatibilities. But if our world-views are rooted in durable values, it is unlikely that a resolution of differences is possible. Conflict management provides another perspective that includes resolution, but also allows for managed unresolved situations. Working through on-going conflict involves improving situations, which might include: moving beyond tangible issues and short term outcomes to relationships among parties, incorporating long term visions, factoring in intangible issues, pursuing the process in multiple forums, resolving episodic disputes, acquiring new knowledge, and increasing the potential to learn.

An important component of conflict management is that conflict need not be negative. Positive effects can result from disagreements. Increasing the awareness of problems, developing incentives to change situations, encouraging personal development through self-awareness and confidence, creating innovative ideas, and stimulating people's involvement can be derived from positive conflict (Tjosvold, 1991). Situations

can be improved by understanding dynamics conflict and exploring potential benefits that supersede incompatibilities.

IMPLICATIONS FOR NATURAL RESOURCE POLICY

Natural resource issues have been and will continue to be contentious. Human dependence, use and enjoyment of the environment is a constant. However, the manners in which these relationships with the environment, especially regarding public lands, ought to occur is central to natural resource policy. Implications, developed from this study, address value and worldview differences in the broader context of natural resource policy.

- **Natural resource professionals need to be aware and responsive to multiple worldviews, since value-laden conflicts are inevitable and on-going in policy processes.**

Not only do legal mandates require public involvement in natural resource management on federal lands, but the public is interested and affected by decisions surrounding these resources. The presence of multiple worldviews establishes the concept of multiple publics, rather than a single, consistent public. Hence, interacting with the public actually encounters diverse perceptions of the issues, understandings of the situation, responses to management strategies, styles of inquiry and learning, tactics to advocate their ideologies, norms traditionally associated with public participation, and relationships with natural resource professionals.

Fostering respect for this inevitable diversity requires an awareness of and responsiveness to multiple worldviews. Incorporating this respect into practices is a challenging task, but not an impossible one. Soft systems methodology provides a theoretical framework to understand the complexity, subjectivity, and diversity that people bring to situations (Checkland and Scholes, 1990). By exposing systems of interrelationships, its goal is to seek changes that are systemically feasible and culturally desirable.

Furthermore, tactics associated with integrative negotiation encourage collaborative conflict management efforts (Table 7). Gray (1989) defines collaboration as "a process through which parties who see different aspects of the problem can constructively explore their differences and search for solutions that go beyond their own limited vision of what is possible" (p. 5). Diversity in knowledge, perception, skills and abilities are assets to collaborative problem solving and conflict management. To accommodate multiple worldviews, public participation design needs to be innovative, flexible and open to diversity so that constructive conflict management can develop.

Multiple methods of public involvement complement the multiple worldviews and diversity people inevitably bring to natural resource policy processes. Natural resource professionals can focus on facilitating differences to encourage constructive conflict and generate creative policy options.

TABLE 7. TACTICS ASSOCIATED WITH INTEGRATIVE NEGOTIATION

Tactic	Explanation
Expanding the pie	Redefine the issues in the conflict so that more material is negotiable.
Non-specific compensation	One party receives their objectives while the other party is compensated for yielding or accommodating.
Log rolling	Parties identify more than one issue in conflict and then identify priorities. Assuming priorities are different, the parties "trade off" these issues so each receives their top priority.
Cost cutting	When people experience conflict, any particular solution may involve costs (inconveniences, suffering, harm, loss of reputation, etc.). By mutual agreement, a settlement might be found whereby one party achieves their objectives and the other party gains at reduced costs.
Bridging	Parties understand one another's interests and invent new options that meet them.
Fractionating	Large or multiple issues can be broken up into smaller concerns.
Alternation	If the conflict involves limited resources, parties do not give up their preferred outcome, but agree to gain it at a different time.
Unlinking	Issues are divided as in fractionating, but then parties identify interests and positions they are willing to concede.
Intangible issue conversion	Intangible issues (reputation, power, trust, justice, etc.) are gained from conceding positions or tangible issues.

(Adapted from Walker, 1994; Pruitt and Rubin, 1986)

- **Managing value-laden conflict requires moving beyond distributive resolutions of resource allocation issues.**

Traditional disputes have often focused on the allocation of resources and land use or the authority to make decisions about allocation (Wondolleck, 1988). Attempts to resolve these disputes have taken many routes, including: establishing governmental agencies and public land designations, laws and regulations to guide management practices, appeals and litigation when practices do not meet legal requirements, political campaigns to change policies, and direct assaults to prevent practices from being implemented.

Resource allocation is tied to the limited quantity of land, water, air, minerals and species available. And, in the context of resource scarcity, the ability to satisfy basic demands people place on the environment is directly linked to important resource allocation problems. However, this research has attempted to present other factors that complicate the allocation issue of natural resource policy. Worldviews shape our perceptions of the environment, human relationships with the environment, and appropriate management to accommodate these relationships. Therefore, our fundamental beliefs of resource scarcity and the desirability of a particular allocation scheme varies with the values we place on the environment and the worldview through which we understand the situation. Though more subtle than tangible factors of the biophysical environment, worldviews are significant and influential factors in natural resource policy.

In the case of the WNF fires, there are distinct worldviews present at the community-level, which differentiate appropriate management directions. Due to the

unresolvable conflict grounded in these worldviews, conflict management that stresses integrative methods can contribute to improvements in the fire recovery efforts.

- **Constructive conflict responses can generate positive effects in many aspects of the policy process.**

In the context of natural resource policy, this study suggests that where there is human interaction, there is also an added complexity of worldview differences. Encouraging resource managers and decision makers to respond to this complexity motivates the need for constructive and adaptive approaches that accommodate diverse values and worldviews embedded in on-going conflict. Positive results may include: improving social relationships among parties; increasing shared knowledge and learning through collaboration; developing creative and innovative management strategies; and enhancing social acceptability of natural resource policies.

REFERENCES

- American Society for Training and Development. 1986. Surveys From Start to Finish. December Issue 612.
- Augoustinos, Martha and Iain Walker. 1995. Social Cognition: An Integrated Introduction. London: Sage Publications.
- Beebe, James. 1987. Rapid Appraisal: The Evolution of the Concept and the Definitions of Issues *in* Proceedings of the 1985 International Conference on Rapid Rural Appraisal. Khon Kaen University, Thailand.
- Brunson, Mark W. 1993. "Socially Acceptable" Forestry: What Does It Imply for Ecosystem Management? *Western Journal of Applied Forestry*. 8(4): 116-119.
- Chambers, Robert. 1987. Shortcut Methods in Social Information Gathering for Rural Development Projects *in* Proceedings of the 1985 International Conference on Rapid Rural Appraisal. Khon Kaen University, Thailand.
- Checkland, Peter and Jim Scholes. 1990. Soft Systems Methodology in Action. Chichester: John Wiley and Sons.
- Crowfoot, James E. and Julia M. Wondolleck. 1990. Environmental Disputes: Community Involvement in Conflict Resolution. Washington, DC: Island Press.
- Deutsch, M. 1973. The Resolution of Conflict: Constructive and Destructive Processes. New Haven: Yale.
- Dey, Ian. 1993. Qualitative Data Analysis: A User-friendly Guide for Social Scientists. London: Routledge.
- Dillman, Don A. 1978. Mail and Telephone Surveys: The Total Design Method. New York: Wiley.
- Douglas, Mary. 1978. Cultural Bias. London: Royal Anthropological Institute of Great Britain and Ireland. Occasional Paper no. 34.
- Douglas, Mary (ed.). 1982. Essays in the Sociology of Perception. London: Routledge & Kegan Paul.
- Everett, Richard L., (comp.). 1994. Restoration of Stressed Sites, and Processes. PNW-GTR-330. Portland, OR: USDA Forest Service, Pacific Northwest Research Station.

- Fletcher, Garth J. O. 1984. Psychology and Common Sense. *American Psychologist*. 39(3): 203-213.
- Foddy, William. 1993. *Constructing Questions for Interviews and Questionnaires*. Cambridge: Cambridge University Press.
- Gale, Richard P. and Sheila M. Cordray. 1991. What Should Forests Sustain? Eight Answers. *Journal of Forestry*. May: 31-36.
- Gibbs, Christopher J. N. 1987. Rapid Rural Appraisal: An Overview of Concepts and Applications *in* Proceedings of the 1985 International Conference on Rapid Rural Appraisal. Khon Kaen University, Thailand.
- Glaser, Barney G. and Anselm L. Strauss. 1967. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. New York: Aldine Publishing Company.
- Grandstaff, Terry B. and Somluckrat W. Grandstaff. 1987. A Conceptual Basis for Methodological Development in Rapid Rural Appraisal *in* Proceedings of the 1985 International Conference on Rapid Rural Appraisal. Khon Kaen University, Thailand.
- Gray, Barbara. 1989. *Collaborating: Finding Common Ground for Multiparty Problems*. San Francisco: Jossey-Bass Publishers.
- Gross, Jonathan L. and Steve Rayner. 1985. *Measuring Culture: A Paradigm for the Analysis of Social Organization*. New York: Columbia University Press.
- Hechter, Michael. 1993. Values Research in the Social and Behavioral Sciences *in* Hechter, Michael, Lynn Nadal and Richard E. (eds.) 1993. *The Origins of Values*. New York: Aldine De Gruyter.
- Hewstone, Miles. 1989. *Causal Attribution: From Cognitive Processes to Collective Beliefs*. Oxford: Basil Blackwell.
- Hocker, Joyce L. and William W. Wilmot. 1991, Third ed. *Interpersonal Conflict*. Dubuque, IA: Wm. C. Brown Publishers.
- Holling, C. S. (ed.) 1978. *Adaptive Environmental Assessment and Management*. Chichester: John Wiley & Sons.
- Holling, C. S. 1986. The Resilience of Terrestrial Ecosystems: Local Surprise and Global Change *in* Clark, William C. and R. E. Munn (eds.). *Sustainable Development of the Biosphere*. Cambridge: Cambridge University Press.

- Keltner, John W. 1987. *Mediation: Toward a Civilized System of Dispute Resolution*. Annandale, VA: Speech Communication Association.
- Kolb, David A. 1976. *Learning Style Inventory Technical Manual*. Boston: McBer.
- Labovitz, Sanford and Robert Hagedorn. 1981. *Introduction to Social Research*. New York: McGraw-Hill Book Co.
- Lewicki, Roy J. and Joseph A. Litterer. 1985. *Negotiation*. Burr Ridge, IL: Irwin.
- Littlejohn, Stephen W., Jonathan Shailor and W. Barnett Pearce. 1994. *The Deep Structure of Reality in Mediation* in Folger, Joseph P. and Tricia S. Jones (eds.). 1994. *New Directions in Mediation: Communication Research and Perspectives*. Thousand Oaks: Sage Publications.
- Lofland, John and Lyn H. Lofland. 1984. *A Guide to Qualitative Observation and Analysis*. Belmont, CA: Wadsworth Publishing Co.
- Lofland, John. 1995. *Analytic Ethnography: Features, Failings, and Futures*. *Journal of Contemporary Ethnography*. 24(1): 30-67.
- Magill, Arthur W. 1991. *Barriers to Effective Public Interaction*. *Journal of Forestry*. Oct: 16-18.
- McCracken, Grant. 1988. *The Long Interview*. Newbury Park: Sage Publications.
- McIntosh, Bruce A., James R. Sedell, Jeanette E. Smith, Robert C. Wissmar, Sharon E. Clarke, Gordon H. Reeves, and Lisa A. Brown. 1994. *Management History of Eastside Ecosystems: Changes in Fish Habitat Over 50 Years, 1935 to 1992*. PNW-GTR-321. Portland, OR: USDA Forest Service Pacific Northwest Research Station.
- Mendez, Sandra Rodriguez. 1995. *Smoke on the Hill: A Comparative Study of Wildfire and Two Forest Communities*. Master of Science Thesis, Washington State University, Pullman, WA.
- Miles, Matthew B. and A. Michael Huberman. 1994. *Qualitative Data Analysis: An Expanded Sourcebook*. Thousand Oaks: Sage Publications.
- Mitchell, Richard G., Jr. 1993. *Secrecy and Fieldwork*. Newbury Park: Sage Publications.
- Morgan, David L. 1988. *Focus Groups as Qualitative Research*. Newbury Park: Sage Publications.

- Moscovici, Serge. 1988. Notes Towards a Description of Social Representations. *European Journal of Social Psychology*. 18: 211-250.
- Myers, I. B. and M. H. McCaulley. 1985. *Manual: A Guide to the Development and Use of the Myers-Briggs Type Indicator*. Palo Alto, CA: Consulting Psychologists Press.
- Nunney, D. N. 1978. Cognitive Style Mapping. *Training and Development Journal*, 32(9): 50-57.
- Oliver, Chadwick D., Larry L. Irvin, and Walter H. Knapp. 1994. *Eastside Forest Management Practices: Historical Overview, Extent of Their Applications, and Their Effects on Sustainability of Ecosystems*. PNW-GTR-324. Portland, OR: USDA Forest Service Pacific Northwest Research Station.
- Oppenheim, A. N. 1992. *Questionnaire Design, Interviewing and Attitude Measurement*. London: Pinter Publishers.
- Perry, William G., Jr. 1970. *Forms of Intellectual and Ethical Development in the College Years: A Scheme*. New York: Holt, Rinehart and Winston, Inc.
- Pruitt, Dean G. and Jeffrey Z. Rubin. 1986. *Social Conflict: Escalation, Stalemate, and Settlement*. New York: McGraw-Hill, Inc.
- Pyne, Steven J. 1982. *Fire in America: A Cultural History of Wildland and Rural Fire*. Princeton: Princeton University Press.
- Quigley, Thomas A. 1992. *Forest Health in the Blue Mountains: Social and Economic Perspectives*. PNW-GTR-296. Portland, OR: USDA Forest Service Pacific Northwest Research Station.
- Rokeach, Milton. 1973. *The Nature of Human Values*. London: The Free Press.
- Schwarz, Michiel and Michael Thompson. 1990. *Divided We Stand: Redefining Politics, Technology and Social Choice*. New York: Harvester Wheatsheaf.
- Shearman, Richard. 1990. The Meaning and Ethics of Sustainability. *Environmental Management*. 14(1): 1-8.
- Strauss, Anselm and Juliet Corbin. 1990. *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*. Newbury Park: Sage Publications.
- Thompson, Michael, Richard Ellis and Aaron Wildavsky. 1990. *Cultural Theory*. Boulder: Westview Press.

- Thompson, Michael. 1982. A Three Dimensional Model *in* Douglas, Mary (ed.). 1982. Essays in the Sociology of Perception. London: Routledge & Kegan Paul.
- Tjosvold, Dean. 1991. The Conflict-Positive Organization. Reading, MA: Addison-Wesley Publishing Company.
- Walker, Gregg B. 1994. Bargaining and Negotiation Processes. Comm 542 Class Notes, Winter Term, Oregon State University.
- Warren, Debra D. 1995. Production, Prices, Employment, and Trade in the Northwest Forest Industries, Fourth Quarter 1994. PNW-RB-209. USDA Forest Service Pacific Northwest Research Station.
- Warren, Debra D. 1990. Production, Prices, Employment, and Trade in the Northwest Forest Industries, Third Quarter 1989. PNW-RB-172. USDA Forest Service Pacific Northwest Research Station.
- Wehr, P. 1979. Conflict Regulation. Boulder, CO: Westview.
- Wenatchee National Forest. 1994. Fire Information Sheet. Sept. 12.
- White, Harrison C. 1993. Values Come in Styles, Which Mate to Change *in* Hechter, Michael, Lynn Nadal and Richard E. (eds.) 1993. The Origins of Values. New York: Aldine De Gruyter.
- Wildavsky, Aaron. 1993. On the Social Construction of Distinctions: Risk, Rape, Public Goods, and Altruism *in* Hechter, Michael, Lynn Nadal and Richard E. (eds.) 1993. The Origins of Values. New York: Aldine De Gruyter.
- Wilson, Kathleen and George E. B. Morren, Jr. 1990. Systems Approaches for Improvement in Agriculture and Resource Management. New York: Macmillan Publishing Co.
- Wissmar, Robert C., Jeanette E. Smith, Bruce A. McIntosh, Hiram W. Li, Gordon H. Reeves, and James R. Sedell. 1994. Ecological Health of River Basins in Forested Regions of Eastern Washington and Oregon. PNW-GTR-326. Portland, OR: USDA Forest Service Pacific Northwest Research Station.
- Wondolleck, Julia M. 1988. Public Lands Conflict and Resolution: Managing National Forest Disputes. New York: Plenum Press.

APPENDICES

APPENDIX I. SUMMARY OF FIRE STATISTICS

Fire	Location	Acreage burned	Fire suppression cost
Tyee Creek	18 mi. northwest of Entiat	135,170	\$43,357,169
Hatchery Creek Complex	10 mi. northwest of Leavenworth in Tumwater Canyon	43,463	\$23,853,538
Rat Creek ¹	4 mi. west of the Leavenworth National Fish Hatchery in Icicle Canyon	— ²	— ²
Round Mountain	Nason Ridge near Lake Wenatchee	3,231	\$2,393,000
Total		181,864	\$69,603,707

¹The Rat Creek fire was actually human caused and not a product of lightening strikes. It quickly spread and joined with the Hatchery Creek fire to form the Hatchery Creek Complex.

²The Rat Creek fire comprised 24,371 acres of the Hatchery Creek Complex. Acreage and fire suppression costs were reported as totals for the Complex.

APPENDIX 2. SUBJECT DISTRIBUTION BY COMMUNITY AND STAKEHOLDER GROUP¹

Stakeholder Group	Community		
	A	B	C
fire threatened residents	8	10	9
flood threatened residents	3	4	0
civic concerns	4	2	6
tourism business	6	5	5
forest products industry	5	4	1
recreation providers	3	0	2
political activists	8	4	6
special forest products representatives	1	0	0
agricultural labor	0	1	2
state & federal agency employees	1	1	0
non-industrial private forest land owners	1	0	0
fishers & hunters	0	1	0
farmers & ranchers	1	0	1
orchardists	2	2	2
school representatives	2	1	1
county agency employees	0	2	0
social service providers	0	2	0
media representatives	1	0	2
Total	46	39	37

¹Subjects were often members of more than one stakeholder group. Researchers noted subjects' primary stake in local national forest issues to assure data represented a diverse spectrum of interests and resource use.

APPENDIX 3. WENATCHEE NATIONAL FOREST FIRE RECOVERY INTERVIEW GUIDE***Connections to the Land***

- 1.1 How are you connected to the Wenatchee National Forest? What activities on the WNF have an influence in your life?
- 1.2 Were you familiar with the areas that burned this summer? What were the negative effects? What were the positive effects?
- 1.3 How will outcomes of forest management decisions about the burned areas affect you?
- 1.4 How are you associated to others involved in forest management? Are there others with similar interests? With different interest?

Managing for Future Fires

- 2.1 What role should fire plan in managing the WNF? Should there be more or less prescribed burning? Are wildfires acceptable? Should the WNF prevent a repeat of this summer's fires?
- 2.2 Can anything be done about the potential for fire? What role should the WNF take in preventing fires? What forest practices? Is there public support for these practices?
- 2.3 Have your opinions about how the WNF manages its lands for fire changed?
- 2.4 How do we move forward from this summer's fires? What is the desired future condition of these forests?

APPENDIX 3. (continued)***Issues of Fire Recovery***

- 3.1 Are there problems with the burned forest? What are they? How should they be managed?
- 3.2 What would happen to the burned lands if managers did nothing? How would the land respond? Is this an acceptable option?
- 3.3 What is an appropriate time horizon for planning?
- 3.4 Are you concerned about the possibility of new problems because of the fires? Will floods or erosion be a threat?
- 3.5 What if anything should be done about private lands that burned?
- 3.6 Do we know enough about forests and fires to avoid new long term problems? How much information is available to you?

Attitudes Toward the Forest Service

- 4.1 What experiences have you had with the WNF?
- 4.2 Have you been involved in any public involvement, response or planning?
- 4.3 Which aspects of WNF management affect you? Have they been helpful or hindering?
- 4.4 Are your views of the local RD similar or different from the SO, region or agency?
- 4.5 How would you describe the relationship between the FS and the community? Can the WNF RDs respond to local needs?
- 4.6 Who should be involved in making decisions about the burned lands? Can the local people influence WNF management decisions? How important is your voice? Do you wish to be more involved?
- 4.7 How do you view the FS: servants to the public, stewards of the land, other?

APPENDIX 3. (continued)***Demographics***

Name _____

Community _____ Tenure in the Community _____

Date of Birth _____ Place of Birth _____

First Family Member to Settle in Area _____ Date _____

Occupation _____

Ever Worked for a Land Management Agency? _____

If yes, which one(s)? _____

In what capacity? _____

Education (last year completed) _____

Ethnicity (optional):

African-American _____

Asian _____

Caucasian _____

Hispanic-American _____

Hispanic (other) _____

Native American _____

Other _____