A Social Assessment of Ecosystem Health: Public Perspectives on Pacific Northwest Forests

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EXECUTIVE SUMMARY

Introduction and Study Objectives

This report provides a detailed summary of public opinion research conducted in 2001-2002 throughout Oregon and Washington by forest social scientists at Oregon State University. Changes in forest conditions in the region have prompted the U.S. Forest Service and the Bureau of Land Management to target the health of ecosystems in an effort to learn more about cause and effect relationships, develop plans for restoring conditions, and communicate with citizens about treatment alternatives and potential outcomes. Because of the risk and uncertainty citizens associate with the concept of ecosystem health, part of the planning task also involves identifying the range of public concerns. Researchers used social assessment techniques to develop a more thorough understanding of citizen perceptions on the factors related to maintaining and restoring forest health.

The Forest Service Region 6 Ecosystem Health Team has undertaken a strategy to promote healthy ecosystems while sustaining local communities therein. The team recognizes that collaboration and partnerships with local stakeholders are fundamental for achieving a balance between social, economic, and ecological factors (Ecosystem Health Team 1998). One of the central components of the strategy calls for a regional public communication process that actively includes citizens. The study described in this report was specifically designed to assist this effort. In the exploratory phase, researchers conducted focus groups in 14 communities throughout Oregon and Washington; this was followed by a mail survey of 949 households (482 completed questionnaires for a 51% response) that involved a more targeted line of inquiry. Specific study objectives were to:

- examine public awareness and understanding of ecosystem health and citizens' perceptions of healthy forests,
- identify citizens' concerns about ecosystem health and the factors that they consider to be at risk,
- identify preferred forms of information exchange, sources of credible information, and which delivery systems are most useful,
- examine preferences for treatment alternatives, and
- examine the public's relationship with forest agencies and measure public confidence in resource managers for effective implementation of forest practices.
- describe and compare the socio-demographic characteristics of the study population with particular attention to geographic and urban/rural context,

Key Findings

Findings help expose the complexity of the ecosystem health issue and reinforce the importance of a sound communication process. Overall, respondents demonstrated a high level of awareness of forest conditions in the region but also that they posses a low level of understanding about causal components and treatment alternatives. Notable findings include:

- There is considerable public awareness of forestlands; most residents indicated they pay attention to local forest conditions and are concerned about their management.

- There is a general perception that forests in the Pacific Northwest are healthy (rated as such by more than two-thirds of the respondents). However, these beliefs are not universal. Eastside forests were singled out as being at greater risk and as a group rural residents saw more forest health problems than urban residents.

- Although citizens were familiar with many of the terms and current issues surrounding ecosystem health, specific knowledge about forest systems was considerably lower. For example, a good deal of uncertainty and a number of misperceptions exist about sources of erosion and the alteration of streams in forests, insect and infestation problems, the cause of wildfires and the influence of long-term fire suppression on forest conditions, and the regeneration of important species such as Douglas-fir and ponderosa pine. Rural residents were better informed than their urban counterparts, but the differences were not dramatic.

- Aesthetic conditions were the most highly rated indicators of healthy forests: presence of green trees, abundance of wildlife, low levels of disease and infestation, and trees of various sizes all were deemed important by over 90% of respondents. Substantially high ratings for other indicators such as opportunities for recreation and stable rural communities demonstrate additional public expectations.

- Respondents are worried about potential threats to forest health; ten items on a list of 14 generated concern among a majority of participants. Among the greatest risks identified were insect and disease outbreaks, over-harvesting, industrial pollution, and urban sprawl.

- There is no clear public consensus about the potential threats of fire and harvesting. Most respondents (70%) agreed that wildfire is a concern, but half also rated fire suppression as a threat. Similarly, 82% were concerned about over-harvesting while half said too little harvesting puts the forest at risk.

- Overall, there is strong support for more management intervention with 87% of all respondents agreeing about the need for long-term active management to maintain forest health. About the same number specifically supported the use of thinning treatments in overstocked stands. However, views on how to maintain a healthy forest were more diverse suggesting a good deal of uncertainty about managing these settings. About half the participants found thinning healthy forests acceptable while over one-third supported the alternative of letting nature take its course.

- In ratings of methods the Forest Service uses to provide information, citizens generally preferred more interactive forms of information exchange such as conversations with agency personnel, interpretive information at visitor centers, and guided field trips. The latter two scored particularly high in the trustworthiness

category. However, two other interactive formats—public meetings and planning workshops—received especially low ratings.

- Although many citizens have had no contact with agency managers, a majority was able to provide opinions about their communications with personnel. Few believe that managers do a good job of explaining agency actions nor do they think that public input has much bearing on the formation of management plans. A majority of respondents feel that federal agencies need to make major changes including having scientists take a more active role in forest management decisions.

- Public trust in the Forest Service and the BLM was mixed. Overall, only about half the respondents said they trusted the agencies to make good management decisions. However, when asked specifically about the ability of the two agencies to use thinning and prescribed fire to maintain public forests, about two-thirds of the participants expressed confidence in federal managers. Along with other study results, these findings suggest that even in a climate of general distrust, many citizens seem willing to lend support to targeted programs for managing ecosystem health.

- Some expected differences in participant groups emerged while others failed to materialize. In the case of geographic location, very few significant differences were found in responses from residents west and east of the Cascade Range. However, several important differences were recorded among urban and rural participants. Overall, more people in the rural group were knowledgeable about forest systems and recognized that overcrowded stands were a threat to forests than did urban residents. Rural participants were also more critical of agency practices. More urban residents believed that forests are healthier, over-harvesting is a threat to forests, and that scientists should have a more active role in decision-making.

Summary of Conclusions

We find that people who participate in focus groups and survey research are usually more attentive to the specific issue than others in the general population (Shindler and Brunson 2001). Although respondents do not always typify the general population, these individuals often are more active in the political process of decision-making. In crafting a communication strategy, it is particularly useful to know how these first-responders think about ecosystem health. This also helps agency communication specialists in designing different outreach methods for various segments of the public. The concluding recommendations provide additional insights on how the agency can engage the range of constituents to build lasting solutions for forest ecosystem health.

Build Literacy among Stakeholders

Findings suggest that citizens possess a high level of awareness of forest conditions but have a low level of understanding about the how these conditions evolved and the treatment alternatives available. If citizens are to have a real ability to participate in and

support management actions, they must have a capacity for participation. As the major steward of federal forests, the primary responsibility for developing the public's capacity to assess the consequences of choices falls to the Forest Service. The first task will be to develop a common understanding about forest health, including the message that conditions in many areas require management action.

Recognizing that "the public" is diverse (i.e., urban and rural with various levels of awareness, knowledge, and interests), the most effective communication program will involve a multi-layered strategy. The first layer should be broad-based for developing awareness among the general population; this typically includes "bulk" formats for information dissemination such as the popular media (public service spots, newspapers), brochures and videos at visitor centers, and so forth. The second layer involves more targeted outreach in forest communities to address specific concerns in these locales. Communication formats will vary from setting to setting (e.g., school education programs, field trips to affected sites, demonstration projects), but all have a common ingredient: personnel in lead roles need to be credible, trusted local individuals who can engage community members in discussions of problems that are relevant to their immediate concerns.

The third layer of communication is at the ground level. This should involve hands-on cooperative projects where the agency and citizens work together to solve local problems. A number of effective partnerships have already been forged in forest communities from which to guide future efforts. Common ingredients include committed agency and community members, the inclusion of scientists and technical specialists, and experimentation with practices that allow for evaluation of treatments and outcomes prior to broad-scale application.

Address Uncertainty and Risk

Ecosystem health involves much uncertainty about how systems work as well as concerns about risks associated with practices to maintain or restore forest conditions. As the public becomes more aware of forest conditions and also expect to have a role in the planning process, agencies will need to help citizens sort through the ambiguities of ecosystem health. Public concerns often center on how serious, certain, and soon the risks will be as well as how sure resource professionals are that a potential solution will be effective. Addressing local conditions and including communities in the process is essential. Forest conditions and practices are more meaningful when people can equate them to local problems that affect their livelihood and their quality of life. One approach is to establish experimental areas where personnel and residents cooperatively plan and execute forest health activities. At these sites agency members would provide leadership, develop common objectives for learning how to manage healthy forests, and build on the long, slow process of establishing greater trust among forest communities. Ultimately, this will mean that agency personnel will need greater flexibility to take risks and experiment with new ideas.

Focus on Situational Context and Site-specific Conditions

There is little doubt that the Forest Service should respond to large-scale problems across the entire region. However, any communication strategy must recognize that conditions and practices that are acceptable in one situation may not necessarily be acceptable in another. Promotion of broad, regional policies can become a source of frustration for citizens and a loss of agency credibility in communities. Because Oregon and Washington are diverse landscapes with different land use and management histories, personnel must consider projects and approaches aimed at local problems. Greater public acceptance of programs to treat forest health is likely to come in familiar settings where people have a genuine stake in the outcomes. By acknowledging variations in community characteristics, stakeholders will gain a better understanding of the complexities of ecosystem health and learn to trust the process.

Concentrate on Agency-Public Interactions along with Information Provision

An essential finding from this study, as well as other recent research in the region (e.g., Shindler and Toman 2002), involves the relationship between federal agencies and citizens. This is the single area in greatest need of improvement and the success of any communication strategy will hinge on the agency's ability to adequately address the public interaction issue. In previous communications, the tendency for resource professionals has been to confuse the provision of information with public understanding and eventual support for management programs. Although information is an essential component of a communication strategy, it is insufficient for changing how people respond to forest agencies.

The common thread that runs through all aspects of forest management is the importance of trustworthy relations among stakeholders. However meritorious a plan may be, it really makes little difference unless people trust one another. Thus, the process of how people come to understand forest conditions also needs to be an integral part of an agency communication plan. Education is more likely to occur in the context of a personal connection to a particular setting or resource problem, including opportunities for citizens to be involved in plans and outcomes. A comprehensive strategy will not only focus on the types of information disseminated, but also on how and why it is communicated.

INTRODUCTION

The concept of ecosystem health is complex, particularly with regard to public forests where numerous values are at stake. Ecologists have learned a great deal in recent years and can describe relative forest conditions, identify the biological factors that are likely to be at risk, and suggest which management activities can be used to improve conditions or achieve particular results. Deciding among the alternatives is more difficult. Everyone wants healthy ecosystems, but how to achieve them is less clear. There are varying levels of understanding about the concept among stakeholders (e.g., managers, scientists, citizens, politicians) and reaching agreement involves reconciling diverse opinions, anxieties, and values about forest management. This report is intended to help clarify some of the uncertainty surrounding ecosystem health by describing public perspectives of forest conditions in the Pacific Northwest as well as citizens' preferences for treatment alternatives. Information derives from a survey of Oregon and Washington residents undertaken by researchers in the College of Forestry at Oregon State University in cooperation with the U.S. Forest Service Region 6 Ecosystem Health Team. A primary purpose of this project is to provide contextual details that will help guide a public communication strategy for restoring and maintaining ecosystem health.

Background

The condition of America's forests has come to the forefront of public lands management in recent years. Resource professionals and scientists are concerned about the health of these ecosystems, particularly in the west where insect and disease infestations are now common and large-scale wildfire events occur with increasing regularity. Researchers are beginning to more fully understand the long-term effects of both natural occurrences and human manipulation of forests, but this information has been slow to emerge in restoration plans or to be implemented in on-the-ground projects such as thinning or prescribed fire programs. One reason for this situation is a legitimate concern that the general public has little understanding of the factors affecting ecosystem health. A disparity in both

knowledge and awareness of ecosystem conditions can make gaining broad-scale acceptance of certain practices difficult, especially where public perceptions are at odds with treatment alternatives.

Citizen acceptance of federal forest practices is an essential ingredient for program implementation. Although an agency plan may be scientifically valid, if the public perceives the activity as risky—or is uncertain about the outcomes—then managers can find it difficult to proceed. This is particularly evident where ecosystem management "solutions" involve intentionally igniting fires in forests or using various forms of thinning, which much of the public essentially recognizes as harvesting. Conversely, citizens can view a management option as preferable when, in reality, its application might be of limited use or best suited to specific situations (e.g., understory mowing for fuel reduction). Right or wrong, public judgment about what is good or bad, acceptable or unacceptable, involves a range of influences. These often derive from the experiences of citizens, the previous actions of the management agency, and the context within which programs are planned and implemented (Shindler and Toman 2002). Communicating a scientifically sound program to citizens is important, but any attempt to forge an ecosystem health initiative will also need to account for public perspectives of forest conditions and practices.

Region Six's Ecosystem Health Team responded to these concerns by launching a plan to promote healthy watersheds while sustaining local communities. The team recognizes that collaboration and partnerships with local stakeholders are fundamental for achieving a balance between social, economic, and ecological factors. Thus, the planning strategy seeks to develop a common vision for ecosystem health, to identify and mobilize resources to achieve desired conditions, and to improve organizational and partner understanding of the program and resulting actions (Ecosystem Health Team 1998). A central component of the plan calls for a regional public communication process to promote effective communication and involvement with citizens.

Despite the important role the public will ultimately play in plans for improving ecosystem health, comparatively little is known about how citizens might react to such an initiative.

Thus, the agency asked social scientists in the Department of Forest Resources at Oregon State University to examine public knowledge, attitudes, and opinions of ecosystem health throughout communities in Oregon and Washington. Together, agency and research personnel agreed on a research agenda that would: 1) examine citizen understanding of forest ecology and ecosystem health, 2) assess public perceptions of healthy forests and identify concerns about risks to them, 3) compare the relevant characteristics of various publics (e.g., rural/urban) in the two states, 4) identify the usefulness and credibility of public information sources, 5) examine preferences for different treatment alternatives, and 6) explore the public's relationship with the Forest Service for planning and project implementation.

This study was conducted over twelve months in 2001-2002 and used both qualitative interviews and quantitative survey research to assess the opinions of project participants. The following report provides an overview of the management context for this research, outlines the study objectives and methods used, presents key findings from both the focus group interviews and the citizen survey, and concludes with a set of management implications.

Management Context

The forest ecosystems of the Pacific Northwest show evidence of a wide range of historical variability. A century ago, the forests west of the Cascade Mountains in Oregon and Washington were mixed stands of older growth with Douglas fir the dominant species (Franklin and Dyrness 1973). To the east, open stands of mature ponderosa pine covered most of the mountainous areas (Langston 1995). In both regions, however, ambitious timber harvesting displaced late successional forests at an accelerated rate (Jaindl et al. 1996). In addition, fire was viewed as a major threat to all forests and its suppression was one of the main objectives among federal forest agencies for much of the 20th century (Agee 1990, Mutch et al. 1993). Over time, ecological changes in forest conditions resulted in altered species composition, soil characteristics, and fire regimes (Langston 1995). Promotion of productive single species stands with an effectual fire suppression policy created forests with short-term ecological problems (e.g., widespread insect and

disease damage, catastrophic wildfire) as well as long-term ecosystem change (e.g., altered hydrological features, reduced species habitat). Concurrently, agencies were faced with an increasingly cynical and distrustful public, many of whom were dissatisfied with the bureaucracy in general and others who specifically targeted Forest Service management policies (primarily harvesting practices).

In recent years, the regional management context for federal forests has shifted. For a variety of reasons (e.g., endangered species listings, market shifts, automation, public influences), resource professionals face new challenges about how to best manage public lands for multiple uses ranging from timber outputs to biodiversity. In the early 1990s the Forest Service adopted an ecosystem management strategy that focused on sustainable approaches including an emphasis on landscape level management. Efforts to develop a more comprehensive view of forest ecosystems were institutionalized through a large-scale planning process resulting in the Northwest Forest Plan (1994). Subsequent initiatives have begun to specifically target the health of ecosystems, including the efficacy of procedures and practices for restoring forest conditions.

Managing for Natural Conditions

Policies that call for the restoration and maintenance of ecosystem health require management plans to guide specific actions. Many resource professionals have translated the restoration idea into managing for natural conditions, and this has become a common goal of forest management agencies today. However, efforts to maintain or achieve natural conditions are confounded by a wide range of perceptions about what "natural conditions" might be (see Shindler et al. 2002*a*). After nearly 300 years of manipulation, what Americans perceive to be natural about their forests is not necessarily what is natural. Perhaps the most classic example comes from public perceptions that have been altered by long-held Forest Service policies about extinguishing all fires. Fire suppression has changed forests in all western states, creating severe consequences for forest health. But for generations Smokey Bear decreed that suppressing any forest fire was normal and a good thing. Now foresters tell people that such stands are not natural and that managers need to intervene in order to return "the balance of nature."

The real issue here is the extent of our agreement and understanding about natural conditions and setting objectives for forest health. Some recent attempts have been made to pinpoint one historical era (e.g., pre-Euro-American settlement or turn-of-the-20th-century forests) on which to base or standardize ecosystem management. But any such thinking that attempts to hold up one picture of a natural forest from a by-gone era tends to discount the influence of human ecology. As Williams and Stewart (1998) have argued, forest ecosystems are largely social constructs; we ascribe positive attributes about healthy forests based on what society thinks they should look like. If this is true, the problem then becomes one of agreeing on what our "natural" forests should resemble—what the Forest Service calls desired future conditions—and on which essential ecological components their management should be based.

In efforts to move the concept toward practice, forest managers are now attempting to mimic natural conditions and improve forest health. Sometimes this involves techniques from restoration ecology such as reintroducing fire or using silvicultural treatments that look like small, natural disturbances (e.g., Mutch et al. 1993). Preliminary research suggests that public reaction to such treatments is generally favorable (Brunson and Shelby 1992, Ribe 1989), particularly when the impacts are short-term or result in visually attractive conditions. Thus far, aesthetic considerations have been the essential criteria used to judge public acceptance of forest practices. But given the complexity of the forest health problem and that broad-scale agreement does not exist, additional factors that influence opinions about appropriate forms of management for achieving desired conditions need to be explored. For example, does knowledge of forest ecology lead people to consider more holistic solutions to ecosystem health as opposed to mere judgments of scenic conditions (i.e., what "looks good")? How do perceptions of risk and the uncertainty of new (or different) treatment alternatives influence public opinion? Are people willing to support more active management programs if they result in healthier, more natural forests? And to what extend are trustworthy relations between managers and local citizens a factor in forest agencies actually being able to implement projects? Realistically, ecosystem health solutions will involve increased management of forests in the future. Science can tell us what the forest can provide, but society has to decide what it

should provide, given the possibilities (Kolb et al. 1994). Understanding the range of factors that influence public judgments is an essential step to reaching agreement about how fast and how far agency activities should proceed.

Managing in the public spotlight

Ultimately, decisions about forest conditions and practices are subject to public scrutiny. We often talk about "the public" as it were some homogeneous, single unit. But while there are concerns and values all Americans share, our society is complex and highly differentiated, particularly over questions about natural resource issues. Thus, we acknowledge that there are multiple "publics," and in agency interactions with them awareness is needed of what is shared, what is not, and what is important to the respective interests.

Researchers often look for differentiating factors to explain public opinion about natural resource issues. Typically, these involve socio-demographic characteristics such as age, gender, education, economic dependence, place of residence, and so on. For example, higher levels of education are usually associated with more knowledge about natural resource problems and also greater support for management practices to solve them. Place of residence is another key characteristic because it is often assumed that urban populations are more concerned about protecting environmental quality than rural residents (e.g., Tremblay and Dunlap 1978). The assumption is that rural communities—particularly in the Pacific Northwest—are more economically dependent upon the local resource base and therefore are usually more supportive (and comfortable) with the manipulation of forests and the extraction of products. A similar inference in the study area involves the westside/eastside dichotomy; certain (more urban, more liberal) attributes are usually associated with communities west of the Cascade Range. Other complicating factors involve the fact that most management practices are implemented in (rural) forest communities while vocal opposition frequently stems from urban-based groups and organizations.

However, the line that separates urban and rural views may not be so clear. For instance, the average American has much greater mobility these days and many are choosing to live in rural settings regardless of how they derive their income. In addition, many retiring urban dwellers are migrating to smaller, more remote communities for the environmental amenities they provide. It is probably fair to say that the traditional urban/rural distinctions are becoming blurred, or at least more difficult to identify. Given agency interest is developing a communication strategy for ecosystem health, the dynamics of the urban/rural population split in Oregon and Washington are of particular interest in this study. In our analysis, we focused on these specific characteristics whenever appropriate and highlighted differences in findings when they exist.

It is also appropriate and useful to look for commonalities across populations. For example, our recent research (Shindler et. al. 2002*a*) on public acceptance of management practices and conditions indicates that many similarities exist among citizen perspectives regardless of the resource issue or geographic region. From the outset, it was likely that this study would reveal certain similarities across identifiable "publics" as well as situationally specific differences. We were able to identify common concerns about ecosystem health and also evaluate the context in which unique findings occur. This type of information can help in the formation of more general outreach plans aimed at wide, regional audiences as well as the development of more specific communications that target local audiences or distinct groups.

Objectives

Over the last three years, substantial research has been directed at the problem of wildland fire and hazardous fuel conditions. The primary driver, of course, has been the outbreak of catastrophic forest fires in 2000 and 2002, particularly in the western U.S. However, the larger research question involves the overall health of our forest ecosystems and the ecological conditions that management agencies should promote for these settings. Previously, we described the tension involved in the implementation of such ideas. The adoption of any set of management policies will hinge not only on sound science and favorable economics, but also on public acceptance. If an agency operates with little or no

understanding of public concerns, knowledge, and beliefs, it is less likely to receive public support for its management decisions.

Thus, the purpose of this study was to examine public awareness and knowledge about the concept of ecosystem health and to survey their opinions about prospective management practices. Specific project objectives were:

- to describe and compare the socio demographic characteristics of the study population with particular attention to geographic and urban/rural context,
- to examine public awareness and understanding of ecosystem health and citizens' perceptions of healthy forests,
- to identify citizens' concerns about ecosystem health and the factors that they consider to be at risk,
- to identify preferred forms of information exchange, sources of credible information, and which delivery systems are most useful,
- to examine preferences for treatment alternatives, and
- to examine the public's relationship with forest agencies and measure public confidence in resource managers for effective implementation of forest practices.

RESEARCH DESIGN

In order to effectively assess regional public opinion of ecosystem health we employed a multi-method approach that included focus group interviews, a mail survey, and an extensive review of the research literature. Given the complexity of the ecosystem health concept, the use of multiple methods helps avoid bias and provides insights that would often be missed if only one method was used (Egan et al. 1995). This approach helped guide a comprehensive research design by integrating the strengths of each method to more effectively capture useful information (Babbie 2001).

Focus Groups

When little research exists on a relatively new topic, focus groups can be particularly useful in helping identify important areas of interest and concern among the public. The qualitative nature of this form of inquiry often provides useful insights that can then be used to develop more quantitative measures such as formal survey instruments. During the spring of 2001, focus group discussions were conducted in 14 locations throughout Oregon and Washington. The discussions were designed to enlist the help of individuals familiar with natural resource issues in the Pacific Northwest to identify various perspectives on ecosystem health including existing forest conditions, definitions and indicators of forest health, risks to healthy forests, and an appropriate role for citizens in addressing problems.

Focus group participants were selected by convenience sample (i.e., people who were known to be active in natural resource discussions in the various communities). Participants included private landowners, members of local groups (industry, environmental organizations, and watershed councils), university extension agents, and several state and federal resource agency personnel. All focus group discussions were tape-recorded with participant consent. In total, 54 individuals participated in the following communities: Corvallis, Hood River, Lebanon, Portland, Redmond, Roseburg, and Tillamook in Oregon; and Ellensburg, Hoodsport, Port Townsend, Seattle, Wenatchee,

White Salmon and Yakima in Washington. The tape recordings were selectively transcribed and manually analyzed for emergent themes. A summary of findings is presented in the following chapter.

Mail Survey

Development of the survey instrument was based on objectives expressed in meetings with the Region 6 Ecosystem Health Team, key themes identified in focus group discussions, and a review of research literature. Draft questionnaires were reviewed and refined by research colleagues at Oregon State University. The final questionnaire was prepared for printing and distribution in the fall of 2001.

The survey was administered to a stratified random sample of 949 households throughout Oregon and Washington using standard Dillman (1978) mailing procedures. Rural communities were oversampled to separately provide for an accurate assessment of rural perspectives and also to insure sufficient numbers were available for comparative purposes. Overall, 482 questionnaires were completed and returned for a 51% response rate. Market research analysts consider both this number of respondents and this rate of return sufficient to make inferences about the general population (Lehman 1989).

For purposes of this analysis, respondents who live in towns of 25,000 or more were operationally defined as the urban subgroup while those residing in areas smaller than 25,000 were placed in the rural category. Sample sizes are almost identical (240 urban, 242 rural). When significant differences ($p<.05$) exist between these two subgroups for survey items, they are reported in the findings section and discussed as appropriate. Additional tests also were run for significant differences between respondents who live on the west and east sides of the Cascades. Because so few differences were recorded comparative statistics for these subgroups are not reported in the tables.

FINDINGS: FOCUS GROUP DISCUSSIONS

This section summarizes findings from the focus groups and interviews conducted throughout Oregon and Washington in the spring of 2001. This form of research is exploratory in nature, thus the questions used in the focus groups were designed to guide an open discussion about various aspects of ecosystem health. The intent was to elicit opinions and responses so that we might learn how citizens and agency members think about the topic. Depending on the interests of the group and the direction of conversation, not all questions were covered in every session. These findings are organized by question. A brief summary of participant views is provided for each. Selected quotes have been inserted in appropriate locations or follow summaries to help illustrate key points in the discussion.

What do you think about the condition of forests in Oregon and Washington?

Views on the condition of forests varied. While many people seemed to think forests are in relatively good shape ("...best they've been in 60 years," "moderately good condition"), others think they are in poor shape and are "a disaster waiting to happen." To some extent, the split appears to be related to the contrast between forest conditions on the westside (better) and eastside (worse) of the Cascades, however, there was not always a clear distinction. Participants from the Olympic Peninsula classified the forests as recovering from an extended period of heavy extraction. A representative of the environmental community in Redmond held similar beliefs, stating that our forests are currently "resting."

Many who believe forests are in poor condition, specifically cited concerns about stocking levels, fuel loads, and fire danger often related to insect/disease epidemics and the lack of management activity (thinning, salvage, etc.).

- "They've been hands off in the last several years, any type of silvicultural activity has been prevented and a lot of reproduction has come in...here on the eastside we have stands that are over crowded, diseased, and insect infected that pose quite a problem with catastrophic fire."

- "There's a terrific amount of fuel load…all kinds of downed timber from storms where they had blowdown. There's big beautiful logs stacked up on big beautiful logs…it's great for wilderness but when that catches on fire, which it will eventually do, it worries me because it's a horrible loss."
- "I'm thinking of what's up there on Santiam Pass…all those poor old dead trees, thousands of acres that are infected with different beetles and so forth…they've got a terrible infestation up there."
- "What we see today is largely and most significantly the result of the exclusion of fire."

A few private landowners were concerned that the Forest Service was trying to hide the real condition of the forest. "They're [the Forest Service] doing kind of an outside dress up on thousands and thousands of acres because they're tired of hearing people ask the question: what's wrong with the forest? This is like an old growth tree, it looks great on the outside, but the inside could be just as rotten as rotten can get."

Others were concerned about the intensity of logging and the number and size of clear cuts and their impacts on forest health. Related to this, some were concerned about the effect of the "tree farm" philosophy on forest health (lack of structural complexity, lack of diversity, and use of monocultures). "I think we have been subject to over-harvesting and an over-emphasis on even age methods in all forest types. We're suffering a hangover from the application of agricultural principles without an adequate realization of the ecological principles involved." Others recognized the issues associated with industrial forestry, but were not concerned about them. "I think industrial forest land is in good shape, but it's also getting younger…the rotations are getting shorter. That's a subjective thing, some people might think that's poor shape, I don't happen to think so." Other participants found it hard to generalize about forest conditions in Oregon and Washington.

- "I think it's hard to generalize and I don't like generalizing because we make it this big scare tactic…'oh, everything is going to burn up.'"
- "I think you really need to look at each individual area to get a good perspective on this."
- "The condition of forests relates directly to which forests you're talking about, there's no general comment you can make…."
- "I think that federal forest land is a real mix. In some parts of the state it's in pretty good shape; in other parts it's a disaster, an absolute disaster, and it's going

to go up in smoke. It's just a matter of time and I think they're [the Forest Service] pretty directionless, and I'm not sure that's going to improve anytime soon."

How do you define forest health? How would you describe a healthy forest or what are the key indicators that a forest is not in good shape?

Most participants believed that forest health is a very subjective term that can mean different things to different people. Others did not like the use of the term for this very reason. Many concluded that its definition depends on the goals of the landowner. Several stressed that we need to define what is "healthy."

- "A forest and a watershed are healthy when they meet the expectations, objectives, uses, desires, wants, hopes of the people."
- "I think when you're talking about and using the term health you need to define your term so people know what you're talking about."
- "You can't talk about forest health without defining forest health in the beginning, it's become quite a political football word."

Once people were able to get past the ambiguity of the term forest health and began talking about indicators of healthy forests, they tended to come down on either the side of utilitarian uses of forests or that of more holistic management. Participants who favored utilitarian uses usually focused on the health of the trees. They described a healthy forest as "good sound trees," "vigorously growing trees," and a young forest ("A healthy forest to me is a young forest."). They often related health to the occurrence or absence of insect and disease outbreaks. Many expressed that old growth forests are among the most unhealthy forests because they are no longer productive; the trees are over-maturing or dying, not growing.

Those with a more holistic perspective seemed to look at more than just the trees. They considered a broader range of ecosystem components and cycles.

- "A healthy forest should be able to support timber, wildlife, water, recreation."
- "To me a healthy forest is one that has all the components it needs to function on its own…."
- "To my mind it's that all the pieces are there, all the cogs of the wheel are there, it's functioning. If you're missing major pieces like old growth, some of the animals,

fungi, all that stuff, then it's going to be kind of off balance…it's not going to be operating as it should."

Many participants equated forest health with old growth characteristics, structural complexity, and species diversity. One individual stressed that "even aged stands and monocultures are a crop, not a forest" and that "forest health is not this notion of the thrifty, quick growing trees with the healthy crown…lollipop trees like we all used to draw in grade school." Resiliency and sustainability of the system are two of the main concerns among those who share the more holistic perspective.

- "I think that a healthy forest is one that is resilient to disturbance."
- "…it should be able to absorb change and continue to grow and function and it should have all the flora and fauna that it needs to function."
- "…stability doesn't mean it never changes, it's one that can adapt and be resilient to outside forces."
- "We can maintain forest conditions so they are resilient to various forces internal and external and adapt to the impacts."

These participants expressed that pockets of unhealthy forest are a natural part of the ecosystem as long as the ecosystem is still functioning within the natural range of historic variability. "Healthy forests and unhealthy forests are part of that system. The forest has disturbance whether it be from a forest fire or from an insect infestation or root rot. The growing and dying are part of the system."

What do you think of the term forest health?

Several of the participants strongly disliked the use of the word health to describe forest conditions. As mentioned previously, they thought the term was too ambiguous and subjective.

- "Health is in the eye of the beholder."
- "Some people's health is somebody else's moving wreck."
- "Let's find a better way to describe the condition of the forest."
- "It's such a nice term that people have perverted it to use as a suitcase word to include whatever they want to talk about."
- "It would be nice if the academics in their infinite wisdom would figure out a better word or set of words to use because health is a useless term."

Two members of the environmental community saw the term forest health as a very negative term and associated it with logging. One commented that health was a term used intentionally to make people think they were talking about the same thing when they really were not. Both seemed to feel that agencies and industry used the term forest health to convince the public that more logging was necessary.

- "I think it's become a buzzword of the timber industry. It was created and is being used to convince the American public that more manipulation is necessary with the prime tool being the chainsaw."
- "It seems to be more a term to justify a particular course of action [logging], rather than to describe a particular condition of the forest."

Other participants thought we lacked a good system to judge health or to establish a useful definition for the concept. "The problem with the term is that forest health is a concept in people's minds, it has nothing to do with the forest. It's something that people bring with them, and any discussion is meaningless unless you start out realizing that." Several people were concerned with the generic use of the term. They thought it would be necessary to come up with different definitions of forest health for each area, region, or forest type.

One respondent was also concerned that the term health could lead to polarization because it implies good or bad; a forest is either healthy or unhealthy. A few individuals did not think that health accurately portrayed the complexity of the issue. "I don't remember hearing that term [health] at all in forestry school. I think it's a product of the media and the need to simplify."

Most participants stressed the need to use words that people understand and suggested we could improve communication by using precise and specific terms and by explaining them. There was some disagreement over whether to use technical terms and then explain them or to attempt to get technical concepts across in everyday language. Much of this discussion was related to participant beliefs that the general public does not understand most natural resource issues. Two forestry professionals gave their personal views:

- "I think we need to learn to communicate in very specific terms, even if it means people feeling that we're talking down to them. I don't think we're doing them a service by using 'health', 'ecosystem', or 'old growth' because there are far too many definitions."
- "The problem with being super precise, we found in writing forest practices law, is when you use the technically precise term accepted by the scientific community then the average lay people…have no idea what you're talking about."

The terms *dynamics*, *structure* or *structure-based management*, and *ecological health* were suggested as possible replacements for forest health. Despite their dislike for the term, most respondents seemed to agree that we need a common basis of understanding in order to tackle the problems.

Are healthy and sustainable the same thing in relation to forests?

Most people thought that health and sustainability were basically the same thing or at least were very interconnected.

- "I don't think you can have sustainability without health."
- "In order to maintain sustainability you have to have health."
- "There really isn't any important difference that I see between health and sustainability."

However, a few participants did not see them as linked. One participant commented that a tree farm could be sustainable yet not be considered a healthy forest. Another stated that a truly healthy forest did not necessarily yield to human interest nor had to be harvested. Others seemed to think that one of the terms was more easily defined, or at least had a narrower focus.

- "I think it is different because sustainability means different things to different people, it can move around and health, you know when something is healthy, you may not know why, but you know when it is or when it isn't."

- "...sustainability has a much more narrow scope in terms of what you're talking about...it's a more concrete concept."

Others mentioned that it depended on what was trying to be sustained, and that sustainability was another one of those words with multiple meanings: "I don't think there's any term that's more nebulous than sustainability...it depends on a lot of things; it

depends on your time horizon and on how you measure it." In general, most participants tended to associate sustainability with sustainable harvest or use of the resource

What are your main concerns regarding forests and forest health?

Participant comments were divided into ecological and social concerns, with the latter drawing most of the attention.

Ecological concerns

The most frequently mentioned ecological concerns had to do with overstocking, fuel loading, and fire danger. People were extremely concerned about overcrowded stands and dead and down wood, particularly because of below average precipitation the past winter and the likelihood of a very dry summer. Several people mentioned concerns about insects and disease, including spruce budworm, Swiss needle cast, and bark beetles. Private landowners in Lebanon were particularly concerned that the insect infestation east of the Cascades would spread west to their land.

- "I guess what bothers me the most about government management of their forests is all these bugs and stuff. They're sitting right up at the top of the mountain (near Hoodoo) and if you get a good strong east wind when those things are hatching you know whose trees they are going to be in next...they're going to be here in our trees."

Others participants were concerned about fragmentation and the general disruption of ecosystem functions. They expressed that forests have lost their resiliency to disturbance due to intense use over the past 50 to 100 years and as a result are unable to "bounce back" as they once could. One participant worried that the "islands" that are left are not sufficient or connected well enough to support plant and animal populations.

- "There are so many uses of the forest now and it is not functioning as a natural ecosystem on the large scale."

Similarly, people were concerned that the forests lacked diversity and that we are losing native species and changing the species composition due to replanting a single species, lack of natural fire, loss and degradation of habitat, and weed infestations. Additional

concerns included water quality, soil quality, the number of roads, and loss of old growth stands.

Social concerns

Overall, participants were much more concerned about people and community issues relating to forests than about ecological aspects. This was a time in the discussions when an overflow of concerns—often emotional ones—occurred. One of the biggest was that the general public does not appear to understand forest health issues; the public is "too disconnected from the land" to really understand the nature of the problem. In particular, participants lamented that the public does not realize that fire suppression led to current forest conditions.

- "They [the public] don't understand the system well enough to know what's healthy and what's not."
- "There is a vast difference between thinking you know what it is like to live in the woods [when you live in the city] and actually living out here and walking the ground everyday, noticing what is happening and feeling it and breathing it…a huge difference."

Many participants felt the public has been misled by the media and is only exposed to sensationalized, "hot button" issues. They were also concerned that the public often based their opinions on "snapshots in time" or glimpses of the forest as they drive by. Several participants were concerned that people do not understand the time scale on which forests operate. They stressed that trees grow back after harvest and that while clear cuts may be ugly for 5 to 10 years, they are beautiful growing forests for the next 50 years.

Other participants were concerned about how the political cycle affects management on federal lands. They commented that management seems to change every 4 to 8 years with a new administration, but that forests work on 50 to 100 year cycles.

- "...it changes from administration to administration. Clinton changed it from the way it was, then Bush came along and he'll change it. Then after Bush goes there's somebody else…trees take hundreds of years to grow, you can't keep changing your mind."

At the same time, woodlot owners in Redmond and Corvallis were concerned with society's need for short-term fulfillment.

- "What's fueling our concerns is people's ideas about forests and the longevity of forests. We're in a McDonald's mentality; if its not ready and waiting while we're here, it's not worthwhile. People don't have an appreciation for the time that's involved with a forest."
- "It's hard to convince the public, especially a dot-com generation that has a business plan for 5 years, that you're trying to go out and plant trees that their children might utilize."

Many participants believed in a need for more public education about forests, forestry practices, and desired conditions. Some mentioned that educating people in urban areas was particularly important. One participant stressed the need to educate kids in elementary and high school so they will be informed adults and will understand these complex resource issues better than their parents do.

- "I think education is the term...we need to get enough people going on these tours put on by the agencies and educating people why we do it, the practical reasons we're doing it, not the emotional reasons."

There was also considerable discussion about decision-making. People seemed very concerned that society is not making reasonable decisions about our natural resources. Many believed the public makes judgments based on emotions and aesthetics (scenery) rather than knowledge, science, or any experience on the land.

- "We aren't thinking about this reasonably. We're making our decisions about what to do with the forests emotionally."
- "We have a lot of people who are forming their opinions based on what they see and what they hear, not based on being on the land."
- "The biggest problem I see with forest health is people; people that are not from this area making decisions without actually being on forest land."
- "My concern is that the decisions are not science based, that they are politically based. I know we live in the real world, but in my opinion decisions should be science based."

This idea of reasonable and rational decision-making was a key issue because many people felt that the decisions society makes now will have a big impact on the future of forests and forest health. Terms like "intelligence" and "balance" were commonplace.

- "My thinking on the conditions of public forests today is that we're at a crossroads, and if we don't make some intelligent decisions we're going to be in the worst kind of forest health condition that we can possibly imagine."

- "We're going to have to make some intelligent management decisions that are more far reaching than what we have going for us today."
- "To me that means we have to reach some sort of a balance; there has to be land we set aside for protection and land we set aside for consumption."
- "As a professional I cringe every time I hear 'either/or', we've either got to have owls or we've got to have management…to subscribe to the idea that it's either/or is not acceptable to me, we've got to get beyond this and start working for common solutions that solve these problems."
- "Society now has removed itself from the rural lifestyle and they look at the forest in a different light...we're taking more into account now than just forests and that's a good thing. You gotta change with the times, but I still think there's a balance and the question we have to come to grips with is what is that amount."

There was also some discussion among the participants about economic and environmental tradeoffs. This was often closely tied to concerns about consumption patterns. Societal consumption patterns and supply and demand came up in five of the meetings. Participants were concerned that the U.S. is importing timber and wood products from other parts of the world. Many thought we are adopting a "colonial and imperialist" attitudeand were concerned about "exporting our demand" to other countries and thus "sacrificing other places in the world to satisfy our desires." Most thought the public did not recognize the connection between consumption patterns and the amount of timber harvested. One participant remarked, "It always surprises me when someone can sit in a 5000 square foot home and complain that their view contains a clear cut." Many participants believe that society needs to either cut back on consumption or allow more logging.

Many people, especially woodlot owners, were concerned with economics and the expense of practicing sustainable management. Small landowners in particular were concerned about increasing regulations imposing on their ability to manage the land and harvest trees.

- "Right now, the markets are such that you can't do the sustainable logging practice and make it pay."
- "Indeed we can grow wood, but we're not being allowed to grow wood because in order to grow wood you also have to be allowed to harvest it."
- "We are concerned about ever increasing regulations that tie our hands so we can't manage the way we are learning everyday to manage."

Closely related to the concerns about the expense of managing and increased regulation was a concern about private landowners selling out and subdividing their land for development.

- "Quite a number of small woodland people are selling out. They can't afford to follow the rules and regulations and that effects forest health. When they change it from forest to some other use, it affects the whole forest system."
- "One of my main concerns is that smaller parcels are being sold to people who live far away and don't have a lot of knowledge on what really makes a healthy forest."
- "In Washington State there's 60,000 acres of forest and farm land every year that's going into pavement, parking lots, that sort of thing...it has to have an impact."

Others were more concerned about economics on public land. They recognized that restoration and maintenance are expensive activities that produce very little financial gain and were concerned that the society would not be willing to spend the money needed.

- "We've tried to do this before [improve stands] and we've always run out of money. I can't think of anything more expensive than removing all the little trees that really have no value and leaving the big trees. The public will only support that for so long."
- "Congressmen are only interested in new projects, they like to start new things and hate like hell to put up money for old things that have no publicity value."

Many participants were also concerned about logging. As might be expected, some were concerned that too much logging was still taking place, while others felt that logging was acceptable but that better planning and implementation was needed so it would have less of an impact. Alternatively, others were concerned that National Forests were being "locked up." A small woodlot owner in Lebanon was particularly concerned that resources were being wasted and that trees were just being left to die. Many were concerned about the future health of the forests. They were afraid that without harvest and/or management, the forests would turn into overcrowded, disease and insect infested tinderboxes.

- "My main concern is the swing of the pendulum that we're experiencing now in that forests are going from a place of natural resource production and extraction to a place of worship where there is no resource management."

Recreation was much less of a concern, but it was mentioned in several discussions. A few people were concerned about the increased pressure for recreation and its possible impact on forest health. They were also concerned about the conflict between those that want the

National Forests to be their playgrounds and those that want them to remain "pristine." Additionally, people cited overuse of trails as a serious concern in two of the focus group meetings.

Lastly, some participants were concerned about how polarized society has become; when in fact, everyone is in this together.

- "People are really disagreeing to the point where they won't even come around a table like this one to talk about the issues and to understand each others perspectives."

One participant commented that local community work was the key to depolarizing society because then people see each other as people and not just opposing forces. The Wenatchee group expressed similar views. Participants from Wenatchee were part of the Entiat Watershed Planning Group who have worked to build positive relations among the members of the local community. Several were concerned about what would happen if they lose that sense of community and trust. One individual noted that "The concern is, if we lose that [working relationship/trust] I think we've set ourselves back 25-50 years because I don't think we'll get it back...we'll go back to everybody doing their own thing. And when there is conflict, it will be intense conflict."

Who or what influences your opinions about forest health?

Not surprisingly, personal and professional experience were the first and the most frequently mentioned influences. Most participants have been closely involved with forestry for a number of years and value the knowledge gained from living near forests or working on the land. Several mentioned that simply walking in the woods greatly influenced their views on forests and forest health; "...having a personal history with the land means a lot."

Almost everyone also valued the experience and knowledge of others...agency personnel, extension foresters, other landowners, university faculty, and friends involved in forestry.

- "The people that are actually doing it influence me the most."

- "Extension foresters...they're not out their drumming up business or anything, they're telling you the way things really are."

Interestingly, another group of people frequently mentioned were "old timers." Participants said they liked to learn from the successes and failures of people that had been around for many years. Residents who have lived in the same area for a long time often have substantial local knowledge about the conditions of their area.

- "I really like to going to the old timers, so they can tell me what they've seen in their life. It's really rich and it's probably not valued much in the scientific community, but it's pretty neat stuff."

Perhaps surprisingly, most participants were also influenced by scientific research findings presented in reports, journals, newsletters, conferences, field tours, and meetings. However, a few participants seemed somewhat leery of academic research, stating that sometimes it was based too much on theory and not enough on practice. Others mentioned that it was important to know the source of the research and who was funding it in order to determine if the research was biased.

Most participants were especially critical of mass media sources such as reporting on television and in newspapers; however, many seemed to think that the general public is heavily influenced by what they see, hear, or read in the popular media. Many participants worried that the media does not portray the whole picture on any given issue very well. Many thought reports were sensationalized and only dealt with highly controversial issues. One individual stated, "...in some of the stuff I've been involved with 60% of what they reported was wrong, so I have to assume that's true of everything." The television commercials put out by the various timber companies came up in three of the meetings. Although several small woodlot owners thought the commercials were useful, many resource managers as well as lay people thought they were more propaganda than anything else.

Do we (scientists, managers, and society) know enough to restore or maintain forest health?

Participants were split over how much we know; however, most agreed that we need to take action based on what we know today and continue to learn from our successes and mistakes. One participant compared forestry to medicine, stating that we will never know everything and that we "practice" forestry just as doctors practice medicine. Others saw some difficulty in applying what information we do have.

- "My belief is that forestry is not an exact science and never has been. Forestry 20 years ago is not the same as forestry today and it won't be the same 20 years from now. The key is continuing to learn and adapt and change as we get new science."
- "I think we have a lot of knowledge that we're not able to utilize because of certain political agendas."
- "Our shortcomings are not in having scientific knowledge or an ability to manage, our shortcomings are in communicating this to the people who make the decisions for the long run."
- "The interesting thing is that we look at something and then start explaining it and rationalizing it before we even know what we're looking at. People are so management oriented. If there is any kind of problem in the forest, it's that we've created so much instability. Without ever waiting to see what the processes are we reach in and do something else, so we don't really have any equilibrium standard to look at."

Overall, most participants believed that despite our lack of knowledge, we still need to "make decisions with the best available information and learn from what happens." They understood that the forest was complex and that we would never know everything and could not let our lack of knowledge paralyze society to inaction.

Is there a role for the public in the forest health issue?

Many participants seemed frustrated with the public and the public involvement process. These individuals usually were private landowners or agency personnel. Their frustration stemmed in a large part from a belief that the public really does not understand natural resource issues and that people from "faraway who never leave the pavement" are making laws that affect their land and their livelihood. Several expressed concerns that the public often does not understand the implications of how they vote on various natural resource

measures. One participant stressed that the public's role was to educate themselves about these issues.

- "I'm a little tired of listening to the public because that public is so far removed from the land that they don't have a concept and until they are willing to come out and get dirty and understand what is happening I personally am tired of listening."
- "Professionalism has been removed from forestry and public involvement inserted...I think there's too much public involvement and professionalism has been taken away."

Many respondents seemed to think the role of the public should be restricted to voting on measures and electing legislative representatives. A few also stressed that the public should go through the proper legislative channels to achieve policy change. Most participants did not want the public to have any more power or control than they already have. While they did not think the public had a role on private lands, some realized that ultimately the public controlled the rules and regulations through their vote.

A smaller portion of participants felt that public involvement was a very important component in effectively managing forest lands.

- "...because it is public land, we do and should have a say in what happens on the forest."
- "The public's role is to shape what society wants from the forest."

One individual affiliated with an environmental education group commented that people should "quit complaining and take an active role" in resource issues. However, another member of the environmental community expressed concern about the time it takes to get involved.

What type or role, if any, should logging, thinning, natural and prescribed fire play in maintaining or restoring forest health? Is active management a legitimate way to achieve forest health?

Almost all participants believed that some type of management is essential to achieving and maintaining forest health. Several stated that it was the only way to achieve management objectives, regardless of what those objectives were. Others commented that humans have taken many stands outside their historic range of variability, so now we have to manage these stands because they can no longer follow their natural growth trajectory.

- "It is probably the only way you can reach your objectives, whether your objectives are for later successional type forest or whether they're for even-age plantations. The fact is that most of our lands here already reflect the hand of man."
- "...if you're going to keep it healthy, you have to go in there and keep it healthy."
- "...if they're not where you want them to be, you almost have to manage them."
- "What we have in many cases are not natural forests. If we had natural forests without a lot of intervention and we allowed natural processes to work—fire, floods, insects—and we didn't extract products, didn't have all these stands that had been clear cut and regenerated, then natural processes might be fine. But that's not the conditions we have. People are not going to be happy with just allowing the forest to go natural."

Many participants related management to fuels reduction programs that aim to decrease wildfire danger.

- "I think you have no choice. You have to manage every stand now; people are not going to put up with a stand replacement fire coming close to their home. So either you introduce fire when it's the proper time or you go in and remove wood so you don't have the problem. There's no choice, you have to do something."

Most people believed that harvesting is part of a healthy forest and that stopping harvests only exacerbates forest health problems. However, several people who thought logging had a place in restoring and maintaining forest health also felt that it had to be done in a more thoughtful manner than in the past.

- "There's an overwhelming feeling that logging is going to play a role in forest health, especially on the eastside. But the problem that we see is that in order to do a lot of logging you have to make it worthwhile to the logging companies by putting in bigger trees. I think that destroys the whole purpose of managing the forest for ecosystem health."
- "Yes, I think it can work on a limited scale and in very site-specific conditions, but not a blanket prescription on an entire forest or an entire region as an excuse to get the volume out."

However, the use of prescribed fire as a management tool was slightly more controversial. While many people thought that fire should be reintroduced into most systems, most did not believe it was politically or socially possible. Most participants believed forests would need silvicultural manipulation in order to mimic natural fire disturbances and that prescribed fire should be used on a small scale.

- "Reintroducing prescribed fire at any functional scale in my own opinion is likely a pipedream and it has to do with human safety costs and risk."

- "Fire is not the solution, we can't use fire in the same way it existed in the past, it's just not going to work."

One participant spoke up that the best policy was simply to leave forests alone and that nature knows best. However, most of the other participants were concerned about a do-nothing policy and thought it would lead to greater forest health problems. They were concerned that "letting nature take its course" might be a common preference among the public and worried about what future forest conditions would be like if agencies followed a no-management option. One individual commented, "we need to have a dialogue with folks who believe the answer is to do nothing." Many participants were also concerned that in response to past logging practices, the public has taken away the tools managers use and they are left with no way to take care of forest problems.

- "I'm afraid we'll back off and let nature take its course, and that's a foolish thing to do now that we're here. It may have worked when we weren't at this point."
- "Many people think, if I don't do anything it's better, things just evolve to a higher and purer state if I just don't touch it…that's just not reality."
- "There are certain groups of people who don't like how the forest was being managed in the past. Forest management has always been a contentious issue, but the response to that was to take away all of the tools that the people who are managing the forests had at their disposal and now we're in this situation where they've lost their ability to respond to this situation."

FINDINGS: CITIZEN SURVEY

This section provides results from administration of the citizen survey to 482 residents in Washington and Oregon. Design and development of the mail questionnaire derive from research objectives expressed in meeting with the Region 6 Ecosystem Health team, important themes identified in focus group discussions, and a review of the research literature. Tables and figures are intended to summarize the data and in some cases information has been consolidated for presentation purposes (e.g., *agree* and *strongly agree* responses have been combined into a single *agree* category).

From the outset, there was a concern about geographic location having a strong influence on citizen responses, particularly knowledge level and preference for certain practices. To determine if either an eastside/westside or an urban/rural bias was present in the findings, significance tests were run for key variables. In the case of participants living east or west of the Cascades, so little variation in responses existed that there was no reason to split them into subgroups in the tables. They are treated as a single group. However, numerous differences (significant at $p<.05$) were recorded among urban and rural residents; these are reported in the tables and discussed wherever appropriate.

Respondent Characteristics

The descriptive characteristics shown in Table 1 help provide a composite picture of survey respondents. This information will be used later in this section to identify similarities and differences in the way various segments of the population respond to resource conditions and management practices.

Several findings seem particularly noteworthy because of potential influences on knowledge levels and citizens' orientation toward resource management policies. Overall, the sample is dominated by males; traditionally, this segment of our population has been

Table 1: Respondent Profile

	Overall	Urban	Rural
Sample size	482	240	242
Mean age	55	53	56
Gender (%)			
Female	21	26	17
Male	79	74	83
Education ** (%)			
Some high school	4	2	6
High school graduate/GED	34	30	38
Two year college degree	20	20	20
Bachelor's degree	17	20	13
Some graduate school	8	6	11
Graduate/professional degree	17	22	12
Household income (%)			
Less than $20,000	10	9	12
$20,001 - $30,000	10	8	13
$30,001 - $50,000	26	24	27
$50,001 - $70,000	21	20	23
$70,001 - $100,000	21	25	17
More than $100,000	11	14	9
Occupations from which household derives its income (%) (could select more than one)			
Timber **	20	14	25
Farming *	13	10	16
Ranching **	8	4	11
Tourism/recreation	8	7	9
Hydro-electric	6	5	6
Special forest products	6	5	7
Fishing	5	5	6
Mining	2	1	3
Other	28	31	26
Membership in public land issue organizations (%) (could select more than one)			
Environmental organization **	9	14	5
Fish/wildlife group	8	6	10
Recreation organization	8	9	6
Farm/range land group *	3	1	5
Forest industry organization	3	2	3
Watershed council	2	1	2

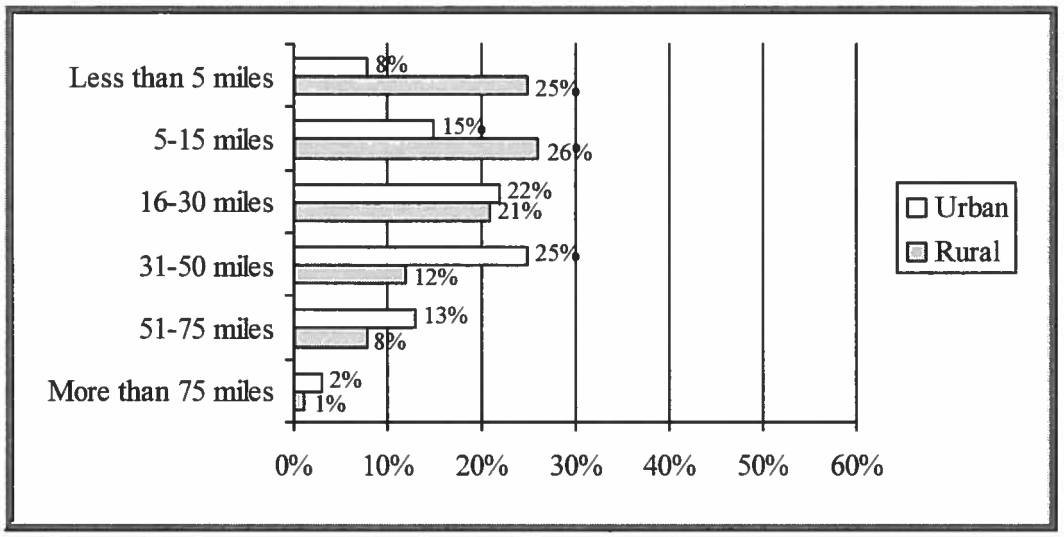
Urban/rural responses are significantly different at *p<.05, **p<.01.

more supportive of management practices than their female counterparts. Two urban/rural differences could also be important. Significantly more urban residents (48%) have completed a college (bachelor's or graduate) degree, while many more rural residents (52%) derive their income from traditional natural resource occupations such as forestry, farming, and ranching.

Proximity and use of federal forest lands

Survey participants were asked to indicate the proximity of their residence to a National Forest or lands managed by the Bureau of Land Management (Figure 1). As expected, rural respondents live much closer to federally managed lands; over half (51%) live within 15 miles.

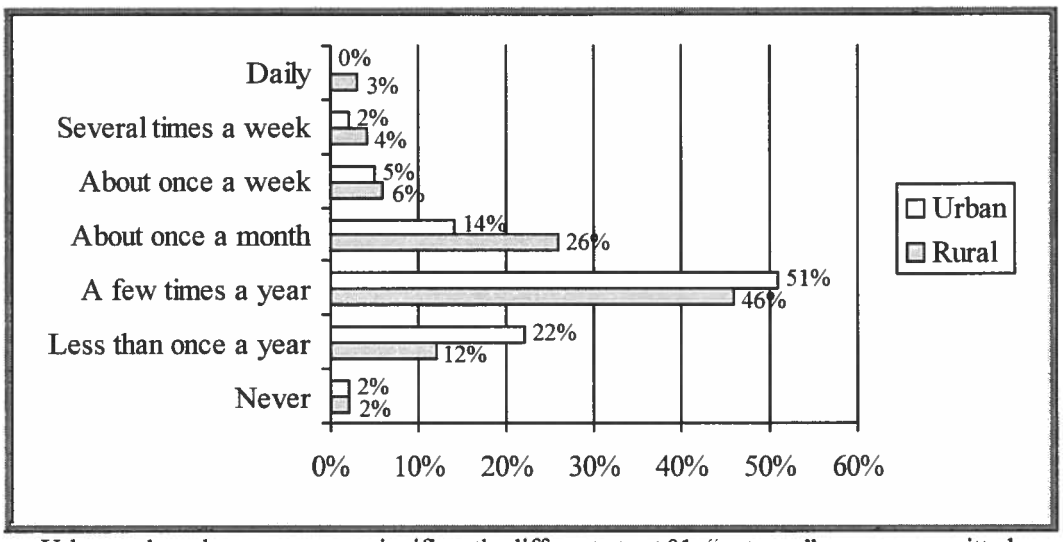
Figure 1: Primary Residence Proximity to Federally Managed Lands



Urban and rural responses are significantly different at $p<.01$; "not sure" responses omitted.

Also as anticipated, rural residents spend more time on federal forest lands (Figure 2). More than one-third (39%) visit at least monthly, compared to only 21% of the urban group. Other recent studies in the region indicate that proximity and use also indicate a familiarity of forests and an interest in forest management activities (Shindler and Toman 2002).

Figure 2: Visitation Rates to Federally Managed Lands

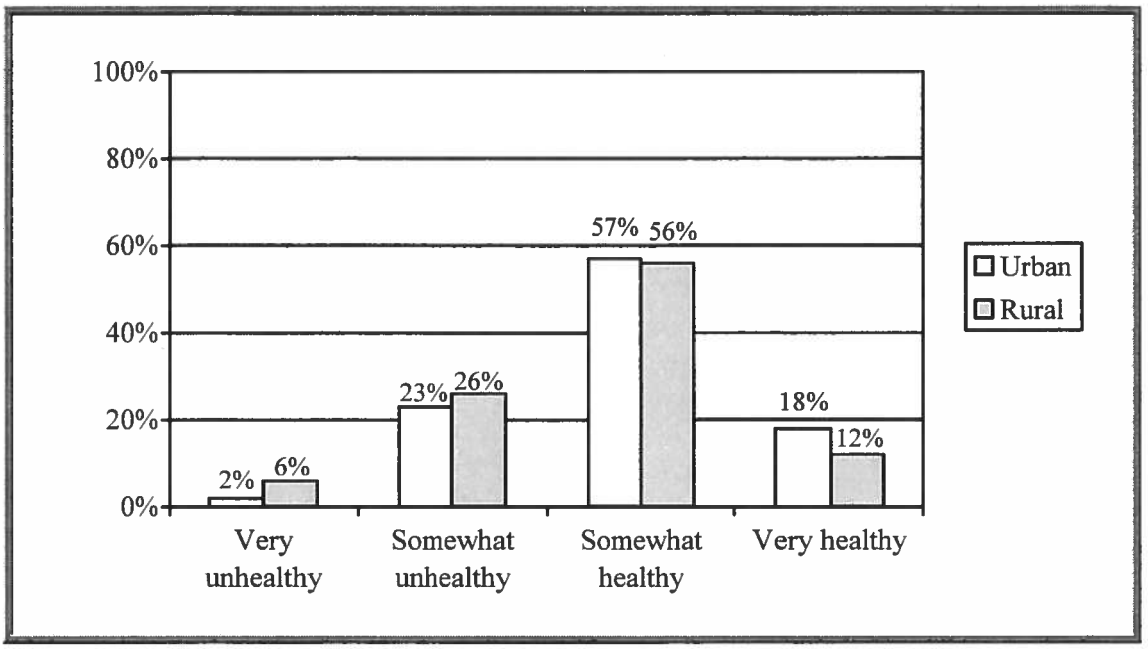


Urban and rural responses are significantly different at p<.01; "not sure" responses omitted.

Perceptions of Forest Health

Overall, most respondents believe that forests in the region are reasonably healthy (Figure 3). However, slightly more urban respondents have this point of view than their rural counterparts. Alternatively, at least one-fourth of each group believes that unhealthy conditions exist. These figures compare favorably with a recent study in the Blue Mountains' communities of eastern Oregon and Washington where a majority (51%) of residents rated forests there as unhealthy (Shindler and Toman 2002).

Figure 3: Forest Conditions in the Pacific Northwest

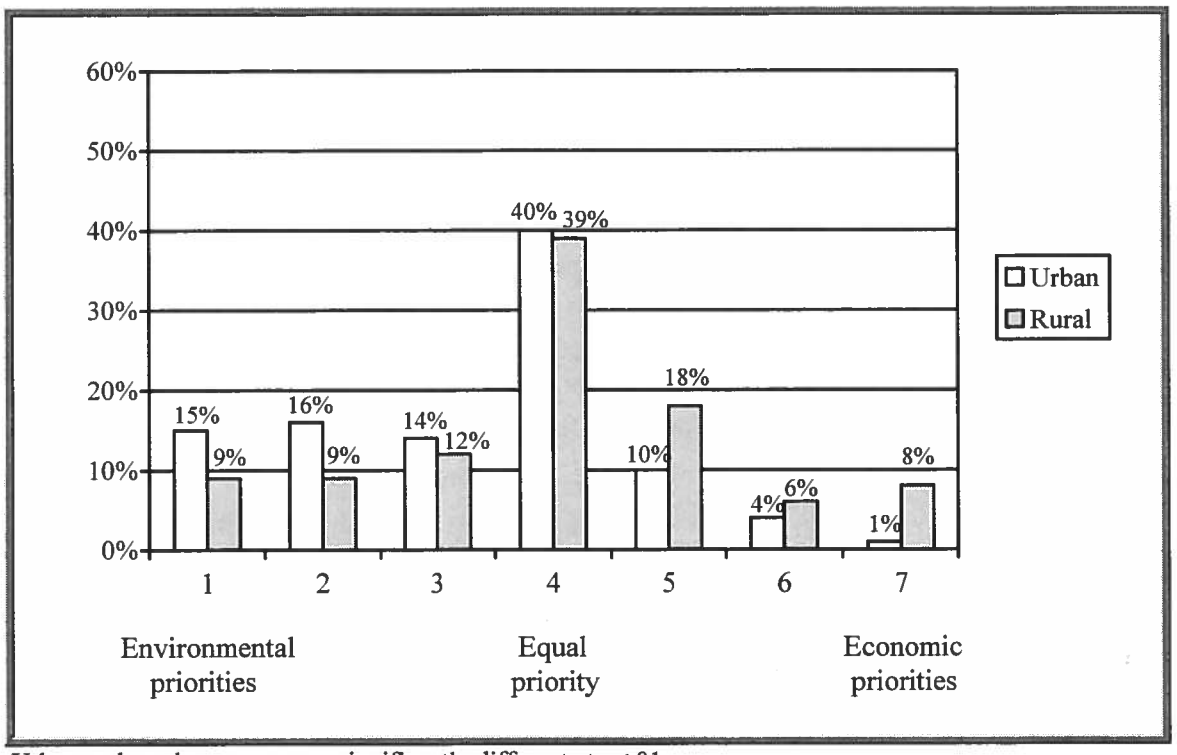


Urban and rural responses are significantly different at $p<.05$.

Policy Orientation

Most natural resource issues involve difficult management choices that often necessitate prioritizing between natural environmental conditions and economic considerations. Peoples' core beliefs, or values, play an important role in making these determinations. Respondents were asked to identify their personal policy (value) orientation on a seven-point scale where "1" indicates the highest priority should be given to natural environmental conditions even if there are negative economic consequences, and "7" which indicates highest priority for economic considerations even if there are negative environmental consequences (Figure 4).

Figure 4: Environmental and Economic Priorities



Urban and rural responses are significantly different at $p<.01$.

In looking at the total response, most participants favored a balanced set of priorities for managing natural resources with a leaning toward protection of environmental conditions. Overall, these ratings are almost identical when the same question was asked of Oregonians almost a decade ago (Shindler et al. 1993). Among the subgroups, anticipated differences emerged. Interestingly, the rural group was about equally divided in its support for environmental policies (30% total) versus economic ones (32%). The real difference was in the urban ratings where 45% favored the environment and only 15% selected economic priorities. This seems to partially confirm previous studies where urban residents typically give greater consideration to environmental concerns (e.g., Jones and Dunlap 1992, Lowe and Pinhey 1982). The lack of a clear consensus among rural residents, where we might expect support for policies to maintain local economies, may be an indication a shifting population base (and value orientations) in these communities.

Knowledge Measures

The objective for this part of the survey was to capture information that would enable us to identify how well respondents understand ecological concepts and forest processes. Following methods used in previous environmental research (e.g., Jacobson and Marynowski 1997, Pierce et al. 1989) three measures were devised to help determine familiarity with technical forestry terms, general ecological knowledge, and forest systems. Findings for each measure are described here. A composite "knowledge score" was also computed and used later in this section to look for associations between knowledge of natural resources and other socio-demographic variables.

The first measure involved familiarity with terms used by resource professionals in descriptions of forest conditions. Respondents were given twelve terms and asked whether they knew the meaning of each, had only heard the term but didn't know the meaning, or if they had never heard it (Table 2). In general, this self-assessment suggests that respondents are fairly knowledgeable about the list of natural resource terms; more than three-quarters said they knew the meaning of eight of the twelve. Conversely, a majority did not know about three items (habitat fragmentation, riparian area, and forest succession). Perhaps owing to their proximity to and use of forests, more rural respondents expressed greater of knowledge of several key terms.

Table 2: Knowledge of Forestry Terms

Term	Know Meaning of Term (%)	Heard, but Don't Know Meaning (%)	Never Heard of Term (%)
Threatened and endangered species	97	1	2
Native vegetation	95	4	1
Watershed	92	6	2
Snag *	85	10	5
Exotic species	83	14	3
Large woody debris *	80	10	10
Ecosystem management	78	18	5
Ecological restoration	75	20	5
Biodiversity	59	23	17
Habitat fragmentation	45	33	23
Riparian area *	44	24	32
Forest succession *	43	37	20

*Significantly more rural respondents knew the meaning of this term at $p<.05$.

The second measure involved general ecological knowledge in which participants were asked to respond to a series of statements and select the best answer or indicate when they were not sure about an answer (Table 3). On the whole, participants were less certain about these items than the forestry terms. Few knew the primary source of erosion; there appears to be a common misconception that soil erosion is primarily caused by clear cut harvesting and not forest roads, which confirms other studies from the region (Shindler et al. 2002*b*, Shindler and Wright 2000). Overall, only about half correctly identified that streams are most altered in urban areas. Although no other notable misconception is apparent, respondents expressed considerable uncertainty about three of the four questions.

Table 3: Knowledge of General Ecological Concepts

Statement		Answer Choices				
		Most Correct				
Today the primary source of forest land erosion is…		Roads	clear cuts	forest fires	natural geologic activity	not sure
	Urban (%)	10	50	10	5	24
	Rural (%)	11	40	18	7	24
Streams and streamside areas are most altered in…*		urban areas	farm land	forest land	range land	not sure
	Urban (%)	46	11	7	4	32
	Rural (%)	57	7	7	6	23
Insect and disease outbreaks are more likely to damage trees under which forest condition?*		over-crowded	old growth	clear cut	selectively thinned	not sure
	Urban (%)	50	10	3	3	33
	Rural (%)	62	11	2	0	25
The most common reason plant and animal species become extinct is…**		habitat loss	competition	natural disasters	predation	not sure
	Urban (%)	72	7	3	1	16
	Rural (%)	59	16	6	3	16

Urban and rural responses significantly different at *p<.05, **p<.01.

Only the last item regarding plant and animal extinction garnered less than 23% *not sure* answers from either subgroup. As before, rural residents demonstrated slightly better knowledge in this section of the survey; their scores were better on two items, while the urban group scored higher on one.

A third measure focused on aspects of forest systems and processes (Table 4). Participants were asked if statements were *generally true* or *generally false*; a *not sure* response was also provided. Most all respondents knew that dead and dying trees are a natural component of forest systems, streambank vegetation improves water quality, and that trees

Table 4: Knowledge of Forest Systems

Statement		Answer Choices		
		Most Correct		
Some dead and dying trees are a natural component of forest systems.		Generally true	Generally false	Not sure
	Urban (%)	96	2	3
	Rural (%)	95	2	4
Vegetation along stream banks improves water quality.		Generally true	Generally false	Not sure
	Urban (%)	81	4	15
	Rural (%)	88	3	9
Large trees and logs in streams are a barrier to fish and should be removed when possible.		Generally false	Generally true	Not sure
	Urban (%)	76	10	14
	Rural (%)	79	12	10
Many forests in the region are susceptible to severe wildfire primarily because of long-term fire suppression activity.		Generally true	Generally false	Not sure
	Urban (%)	50	17	33
	Rural (%)	49	21	29
Currently, humans cause most forest fires in Oregon and Washington.		Generally false	Generally true	Not sure
	Urban (%)	46	33	22
	Rural (%)	51	27	22
Both Douglas-fir and ponderosa pine trees regenerate better in open, sunny areas then in shaded ones. *		Generally true	Generally false	Not sure
	Urban (%)	36	14	51
	Rural (%)	46	15	39

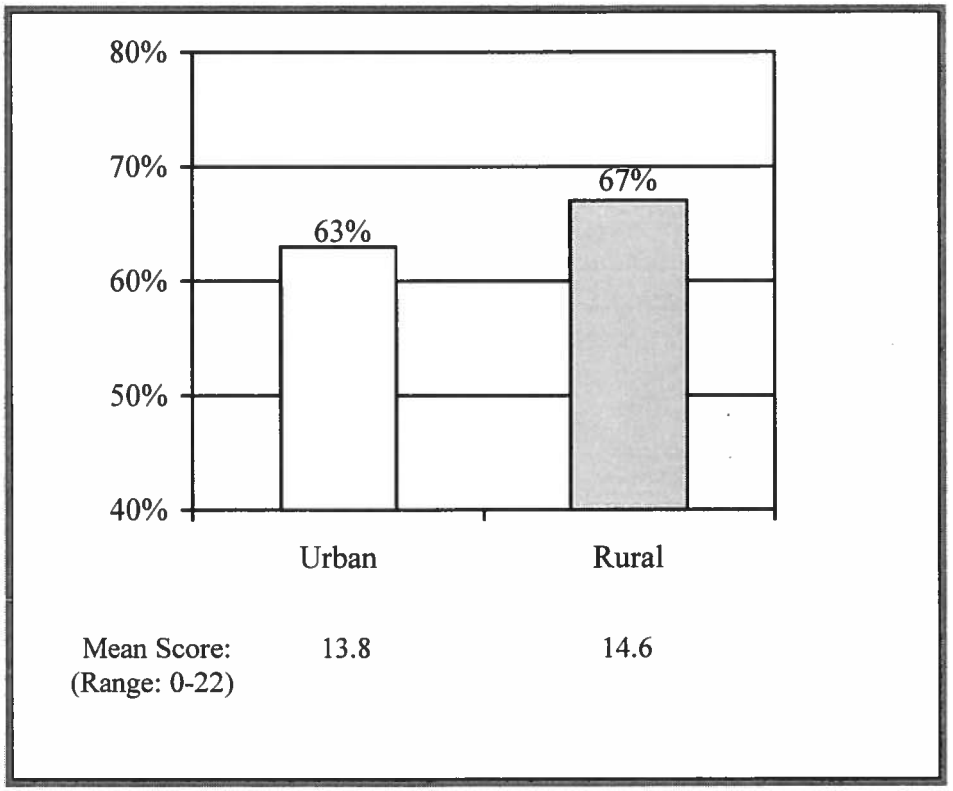
Urban and rural responses are significantly different at *p<.05.

and logs are not a barrier to fish. The other three items were more difficult: the susceptibility of forests to wildfire because of fire-suppression activities, the cause of most

forest fires in the region, and optimal conditions for regeneration of Douglas-fir and ponderosa pine. In each case, a majority of respondents were misinformed or uncertain about these processes. As for subgroup differences, only one is evident; rural residents were slightly better informed about the regeneration issue.

Finally, all three measures were used to assess the respondents' general knowledge of natural resource issues. An additive index was compiled using all 22 items from Tables 2, 3, and 4 (correct answers scored 1; incorrect and not sure responses scored 0). Figure 5 displays the percentage of correct answers and mean scores for the urban and rural subgroups. In this assessment, rural residents had a significantly higher "knowledge score."

Figure 5: Composite Knowledge Scores



Urban and rural scores are significantly different at $p<.05$.

Indicators of Forest Health

Perceptions and value orientations play a big role in people's judgments about forest conditions. In an effort to determine some level of agreement about what makes for a healthy forest, we asked respondents their opinion about 17 different components that might be used as indicators of forest health. The items subsequently were categorized into ecological and social components and arranged in Table 5.

Overall, ecological components were considered much more important as indicators of a healthy forest. Other studies have reached similar conclusions (Hull et al. 2001, Patel et al. 1999), although none have incorporated as many indicators in their assessment. As anticipated, most respondents selected *green trees, an abundance of wildlife* and *plants, low levels of disease, trees of various sizes* and *species, unaltered streams, snags and decaying logs, old-growth,* and *naturally occurring fire* as components of healthy forests. Many indicators were overwhelming selections with over 80% of the response. Of the five social components, only two—*opportunities for recreation* and *stable rural communities*—were selected by the majority of participants.

It is interesting that several items received little recognition as forest health indicators. Notable are *a high number of trees*, which suggests people recognize the density problems that exist in many forests. Also in this group is *lack of human intervention* which seems to indicate most people understand the need for management activity.

A few differences among subgroups also emerged. More urban residents selected *naturally occurring fire* and *closing public access roads* and fewer selected *regular economic returns by logging.* Contrary to what the name implies, it is likely that more rural residents live at the "wildland-urban interface" and see natural fire as a threat to personal property. Similarly, rural residents are more likely to want to protect their access to forest roads rather than closing them. Finally, logging has always been much more important in rural areas, and in these settings a healthy forest (that includes harvesting) is also likely to be interpreted as contributing to community health.

Table 5: Indicators of Forest Health

	Part of a Healthy Forest?	Yes (%)	No (%)	Not Sure (%)
Ecological Components	Presence of green trees	97	1	2
	Abundance of wildlife	93	3	4
	Low levels of disease and infestation	91	4	5
	Trees of various sizes	90	3	7
	Abundance and variety of plants	88	3	9
	Unaltered streams	87	5	9
	Variety of tree species	85	5	11
	Snags and decaying logs	79	12	9
	Old growth trees	68	18	14
	Naturally occurring fire *	57	21	22
	High number of trees	29	44	27
	Abundance of exotic plants	24	45	31
Social Components	Opportunities for recreation	70	16	15
	Stable rural communities	55	18	27
	Regular economic returns by logging **	46	31	23
	Lack of human intervention	26	49	25
	Closing public access roads *	22	53	25

*Significantly more urban respondents thought this was part of a healthy forest at $p<.05$.
**Significantly more rural respondents thought this was part of a healthy forest at $p<.01$.

Information Sources

Information can play an important role in the formation of attitudes and judgments about ecosystem health. Citizens obtain information about the environment and forests from a variety of sources. Respondents were asked about a number of information providers and whether they provide understandable, trustworthy, and useful information. First, we asked participants to rate eight general sources of public information; these findings are reported in Table 6. Using the same criteria, we then asked them to rate seven different information formats that are often used by federal forest agencies. These findings are reported later in Table 7.

General Sources

To distinguish from agency sources, the information providers in Table 6 are referred to as general sources. The first column shows the percentage of respondents who were unfamiliar with the particular information provider and therefore had no basis for opinion about the other categories. Subsequent columns reflect responses from remaining participants.

Responses in all three categories are quite mixed. Although a majority of respondents judged each information source as *easy to understand,* environmental and industry groups as well as university researchers were less understandable than the other providers. Ratings of *trustworthiness* were considerably lower across the board with the exception of family and friends, university researchers, and extension agents who all received high credibility scores. Trust in environmental and forest industry groups seems substantially low. Even our mass media outlets (TV, radio, newspapers, internet) did not receive much in the way of user confidence.

The last two columns indicate each source's *level of usefulness*. For reporting purposes, the 4-point rating scale (none, slight, moderate, high) was collapsed into two columns (moderate/high, slight/none). Overall, the most useful information sources were newspapers/magazines, university researchers, and TV/radio programs. Particularly low ratings were given to environmental and forest industry groups and the internet.

Table 6: Perceptions of Eight General Information Sources

Information Source	No Opinion (%)	Easy to Understand[a] (%)	Trust-worthy[a] (%)	Level of Usefulness[a]	
				Moderate/High (%)	Slight/None (%)
TV/radio programs	11	86	49*	63	37
Newspapers/magazines	12	84	53*	69	31
Environmental groups	15	52*	25*	34*	66
Forest industry groups	21	64	44	47**	53
Family and friends	21	89	77	52	48
University researchers	24	58	84	67	33
Extension agents	36*	76	82	56	44
Internet	40	70	50	42*	58

[a]Percentages reflect responses from those who had an opinion about the specific information source. Scores reported for *easy to understand* and *trustworthy* are "yes" responses from a yes/no scale.
*Significantly more urban respondents marked this category at $p \leq .05$.
**Significantly more rural respondents marked this category at $p < .05$.

As for subgroup differences, urban residents rated TV/radio, newspapers/magazines, and environmental groups as more trustworthy. They also ranked the internet and environmental groups as more useful sources of information than did rural residents who rated forest industry groups more highly.

Several findings are of interest. First, the traditional mass media outlets were among the most useful and easiest to understand although they were not rated in the top tier of trustworthiness. Second, university researchers and extension agents were rated as highly trusted and moderately useful sources of information, perhaps because they are seen as less biased than other providers. Third, at least in terms of this study, interest groups (environmental, forest industry) seem to be relatively poor places for dispensing information. Finally, although use of the internet continues to expand rapidly, it still is has some limitations as a credible, useful source of information about natural resource issues.

Agency Programs

In recent years, the Forest Service and the BLM have used a variety of formats to communicate information to their publics. This study allowed us to ask citizens about the effectiveness of these activities. Table 7 presents findings in the same format used for the general sources above.

The *no basis for opinion* column depicts a wide range of variation in how familiar people are with agency programs. Most all respondents have been to visitor centers while only half were able to make judgments about agency planning workshops. As before, the subsequent columns depict responses from those who have been exposed to a particular information source.

All seven agency programs were rated as *easy to understand* by a majority of participants. However, there is clearly some differentiation between formats with interpretive information, brochures, and guided field trips the most highly rated. Public meetings and planning workshops were less so. Overall, scores for *trustworthiness* were also quite good as more than three-fourths of those responding gave a vote of confidence to most formats. Again, public meetings and planning workshops were rated slightly lower.

Five information programs received strong *usefulness* scores from a majority of respondents; visitor centers, brochures, and guided field trips were the most highly rated. However, well over half the participants felt that public meetings and planning workshops were of little or no use.

As for subgroup differences, not many emerged. Fewer urban residents had conversations with agency personnel or received newsletters. Interestingly, they also rated these two sources as less trustworthy.

Taken together, these data are comparable to recent surveys conducted in the Blue Mountains (Shindler and Toman 2002), central Oregon (Brunson and Shindler 2002), and elsewhere in the west (Force and Williams 1989). Informal methods of communication

Table 7: Assessment of Agency Information and Outreach Programs

Information Program	No Opinion (%)	Easy to Understand[a] (%)	Trust-worthy[a] (%)	Level of Usefulness[a]	
				Moderate/High (%)	Slight/None (%)
Interpretive info. at visitor centers	16	97	91	73	27
Brochures	29	90	78	63*	37
Conversations with agency personnel	37*	81	75*	59	41
Newsletters	37*	84	75*	53	47
Guided field trips	38	94	89	63	37
Public meetings	40	59	59	44	56
Planning workshops	50	66	70	39	61

[a]Percentages reflect responses from those who had an opinion about the specific information source. Scores reported for *easy to understand* and *trustworthy* are "yes" responses from a yes/no scale.
*Significantly more urban respondents marked this category at p≤.05.

that require little interaction—such as interpretive information, brochures, and newsletters—were readily accessible to most participants and scored well for ease, credibility, and usefulness. Two more interactive formats—conversations with personnel and guided field trips—were also highly rated. As in other studies, meetings and workshops were less effective; not only do fewer people access these forums, but their level of usefulness appears suspect. Many participants view these public meetings as one-way forms of communication ("we are talked at") rather than meaningful and interactive settings for exchanging ideas (Cortner et al. 1998, Shindler et al. 2002*a*).

Threats to Healthy Forests

Perceived threats to forests can help shape public sentiment about management practices used for maintaining and restoring healthy forest conditions. We asked participants about their views on 16 potential threats to forest health using a four-point scale (*strongly agree,*

agree, disagree, strongly disagree) and a *no opinion* category. Agree responses were collapsed into a single category and reported in Table 8 along with the no opinion responses. This latter group was included to help identify where uncertainties or lack of understanding exist.

Respondents had little difficulty in identifying a number of threats. A top tier of concerns included insect and disease outbreaks, over-harvesting, industrial pollution, and urban sprawl. A second level included five others: conversion of forest land, over-crowed stands, two forms of recreation impacts, and wildfires. Several more—exotic species, road building, and too little harvesting—were also considered threats by a majority of respondents. Only one—too much public involvement—generated little concern. It is interesting that fire suppression and too little harvesting received substantial recognition as potential threats given the high ratings also received by wildfires and over-harvesting. Taken together this seems to suggest that people are concerned about these two issues and probably are uncertain about the best courses of action. Any management response is likely to be scrutinized closely by citizens and will need to adequately address their concerns. Similarly, the public seems uncertain about forest fragmentation. Almost as many who saw this as a threat selected the *no opinion* option. This makes sense as the term *habitat fragmentation* was one of the least familiar to respondents among the knowledge measures.

Subgroup differences also emerged from the data. Urban residents were more concerned about *over-harvesting*, *recreation impacts*, *road building*, and *fire suppression.* On the other hand, rural respondents were more sensitive to *insects and disease*, the threat of *over-crowded stands*, and *too little harvesting*; this group was also more concerned about *lands being set aside* and *removed from management.*

Table 8: Potential Threats to Forests

Threat to Forest Health?	Agree/Strongly Agree (%)	No Opinion (%)
Insect and disease outbreaks**	90	4
Over-harvesting*	82	4
Industrial pollution	81	7
Urban sprawl	81	7
Conversion of forest land to other uses	73	9
Over-crowded stands of trees**	73	12
Too many recreationists in some areas*	73	5
Impacts from motorized recreation*	72	5
Wildfires	70	4
Invasion of exotic species	63	22
Road building in forests*	54	7
Too little harvesting**	52	9
Fire suppression*	48	18
Too many areas being set aside and "locked up" from management**	48	20
Too much forest fragmentation	43	42
Too much public involvement in decisions*	29	10

*Significantly higher levels of agreement among urban respondents at $p<.05$.
**Significantly higher levels of agreement among rural respondents at $p<.05$.

Treatment Preferences based on Forest Condition

In this phase of research we attempted something new in an effort to assess if the public feels different treatment alternatives are more acceptable for different forest conditions. We described three separate forest settings that might be present in Pacific Northwest forests and then asked participants to judge (*yes* or *no*) the acceptability of ten management practices for restoring or sustaining forest conditions. The three settings were described as follows:

1) ***A depleted or cut-over forest***: one where most trees have been removed by wildfire or clear cutting.

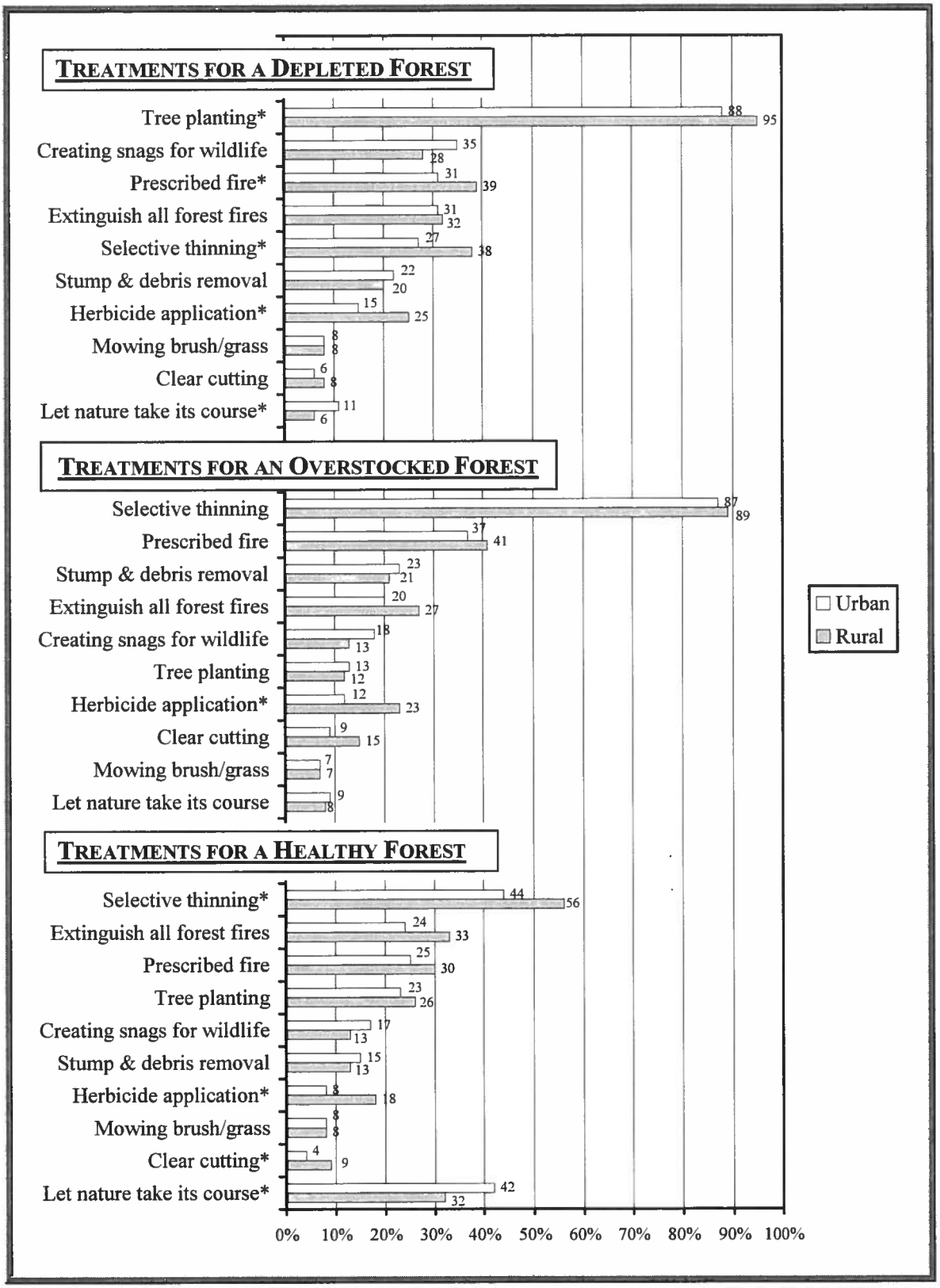
2) ***An overstocked forest***: one with dense stands of trees where tree growth and other vegetation is inhibited. May be subject to disease and insect infestation as well as wildfire.

3) ***A healthy, high-quality forest***: one with sufficient numbers of green trees and plants, native wildlife habitat, stable soil, little disease or insect damage, and opportunities for recreation.

Responses are reported in Figure 6 by forest setting and for the urban and rural subgroups. For the *depleted forest* the overwhelming preference was to plant new trees. Each of the other alternatives received fairly low to modest levels of support, except for mowing and clear cutting which were generally viewed as inappropriate. Noteworthy is the low level of support for "letting nature take its course," suggesting an awareness of the need for active management programs to restore forests in this condition.

By a substantial margin, the most preferred treatment option for the *overstocked forest* was selective thinning. Although the use of prescribed fire received moderate support, it appears respondents saw such a strong need for the thinning option that other treatments were either deemed unnecessary, inappropriate, or premature. Again, participants clearly determined that management action was preferable to no action (letting nature take its course).

Figure 6: Acceptance Ratings for Treatment Alternatives



*Urban and rural responses were significantly different at p≤.05.

Although the primary treatment preferences were fairly unanimous for the two previous forest types, respondent choices for the *healthy forest* were more mixed, or perhaps less certain. Selective thinning was still acceptable to about half the participants, but other interventions (e.g., extinguish forest fires, use prescribed fire) received a lukewarm response. Even tree planting and snag creation did not generate much support. Besides thinning, only the no treatment option (let nature take its course) resonated with more than a third of respondents overall. On the whole, such scores suggest that a good deal of uncertainty exists about how forests achieve a healthy state as well as what, if any, management action is necessary to sustain these conditions.

As for subgroup comparisons, rural residents seem more comfortable with management intervention than the urban participants. For example, they are generally more supportive of selective thinning and herbicide use. It is interesting that the two groups were in almost complete agreement about how to manage the *overstocked forest,* a good omen given the amount of land coverage currently in this condition. Differences of opinion really only surfaced in the other two settings, where the use of selective thinning and letting nature take its course are likely to be the contentious issues.

Opinions about Federal Forest Lands

In the survey we noted that managing federal forests often involves difficult choices. We asked participants to consider their experiences and interactions with public forest management situations and express their level of agreement using a five-point scale (*strongly agree, agree, neutral, disagree, strongly disagree*). The scale was consolidated into *agree* and *disagree* categories for presentation purposes with a *no opinion* option provided. Responses are displayed in Table 9.

Most all participants agreed that sustaining healthy forests requires long-term active management. A majority also agreed with a role for science in forest management; most felt that experimentation is appropriate on selected sites and that scientists should be more active in decision-making Just over half felt that federal forest agencies need major changes; although we did not ask what these should include, responses to the remaining

Table 9: Experiences and Interactions with Federal Forest Lands

Statement	Agree (%)	Disagree (%)	No Opinion (%)
Sustaining healthy forests requires long-term active management.	87	4	4
Scientific experimentation is appropriate on selected forest lands.	68	7	9
Scientists should take a more active role in forest management decisions.*	56	12	9
Federal forest management agencies need major changes, not just minor adjustments.**	51	9	21
Most federal forest agency communications (meetings, reports, etc.) are not user-friendly.	36	9	33
Federal forest managers are open to public input and use it to shape forest management decisions and plans.*	25	37	18
Much of federal forest land is over- crowded with too many trees.**	32	35	16
Federal forest managers do a good job of explaining their management activities.	13	36	25

Neutral responses omitted.
*More urban respondents agreed with statement at $p<.01$, excluding "no opinion" responses .
**More rural respondents agreed with statement at $p<.01$, excluding "no opinion" responses.

statements provide some clues. About one-third agreed that agency communications are not user friendly. However, almost the same number had no basis for an opinion about the matter indicating there is a substantial segment of this population who have not had specific contact with the agencies through meetings or written reports. On the other hand, more people disagreed than agreed with the statement "federal forest managers are open to public input and use it to shape management decisions and plans." A similar response was given about forest managers doing a good job of explaining their management activities.

We also attempted to get the public's perspective on whether forests are over-crowded with too many trees. The response was about equally split among agreement, disagreement, and no opinion.

As for subgroup differences, urban residents feel more strongly about scientists taking an active role in decisions and that federal foresters use public input to shape management plans. Conversely, rural respondents see more need for agency change and also believe that over-crowded conditions exist on federal forest land.

Trust in State and Federal Agencies

In order to adequately implement policies for ecosystem health, it is important that trustworthy relations exist between forest agencies and their publics. We asked respondents about their level of trust in the region's primary natural resource institutions to contribute to good decisions for maintaining and restoring forest conditions. A four-point scale (*full, moderate, limited, none*) was used that also included a *no opinion* option for those who had no basis for a judgment (Table 10).

At the state level, only respondents who were residents of the same state as the institution were included for analysis. In sum, the four state resource organizations received modest ratings with Oregon faring somewhat better than Washington. Overall about 60% of respondents trust both the Oregon Department of Forestry and Oregon State University. Approximately half the Washington respondents felt the same about their counterpart institutions. In particular, two ratings stand out. Over one-third of respondents appear to distrust the Washington Department of Natural Resources, while a substantially high number of individuals were unable to offer an opinion about their state universities. We have little light to shed on the figure for the Washington DNR since it was not the focus of this study, but the lack of opinion about universities is not unusual given that most people have little contact with research personnel in these institutions.

For federal agencies, trust levels are somewhat lower. Overall, only the Fish and Wildlife Service and the Forest Service received ratings greater than 50% and the BLM was well below that level. Substantial numbers of respondents expressed distrust toward each

Table 10: Trust in Natural Resource Institutions

Natural Resource Institution	Full/Moderate Trust		Limited/No Trust		No Opinion	
	Urban (%)	Rural (%)	Urban (%)	Rural (%)	Urban (%)	Rural (%)
State Level						
Oregon Department of Forestry (n=204)	65	57	18	28	17	15
Oregon State University (n=206)	62	57	10	15	28	28
University of Washington (n=234)	53	49	14	19	33	32
Washington Department of Natural Resources (n=236)	49	48	34	37	17	15
Federal Level						
U.S. Fish & Wildlife Service *	56	45	28	43	16	12
U.S. Forest Service *	54	50	31	40	15	10
National Marine Fisheries Service **	45	35	29	44	26	22
Bureau of Land Management	44	41	41	45	15	14

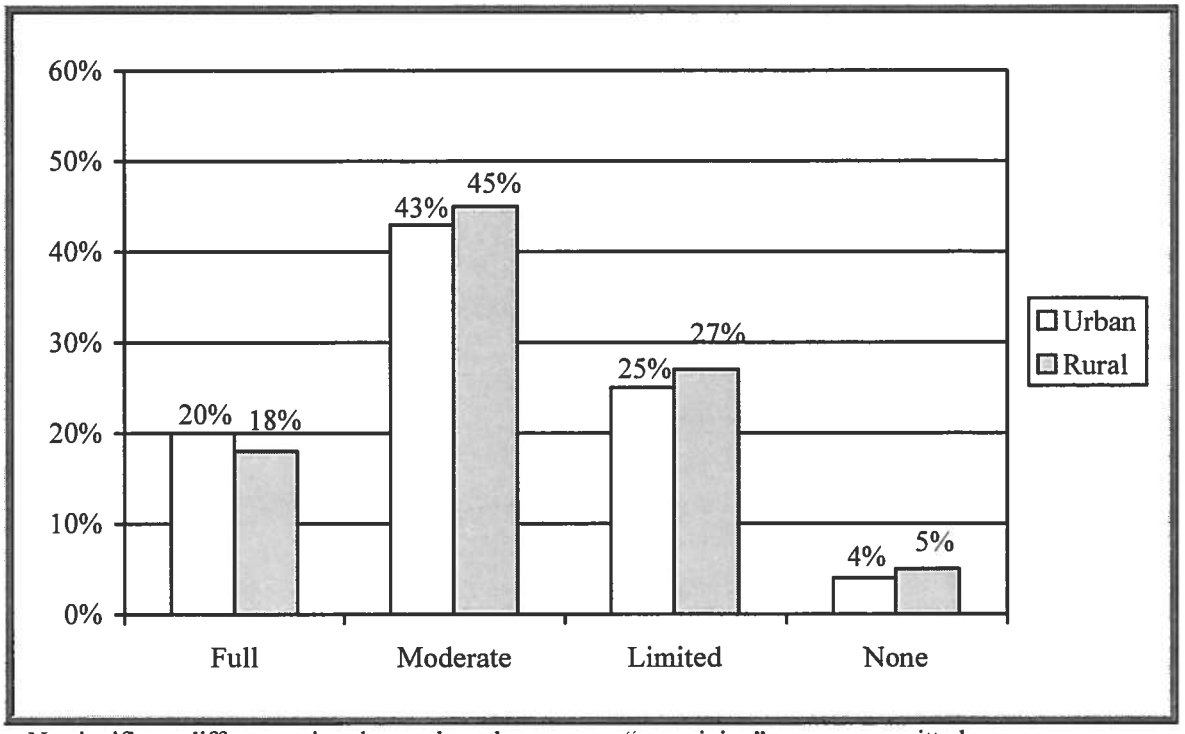
Urban and rural responses are significantly different at *p≤.05, **p<.01.

agency, particularly rural residents who were consistently in the 40% range in saying they had limited or no trust in these organizations. One explanation for these figures is the frustration evident in many communities about the lack of management activity on surrounding forest lands (Shindler and Toman 2002).

To follow up on these ratings, we asked participants about the trustworthiness of managers at the federal level to implement specific treatments. The question asked "how much confidence do you have in federal agencies such as the Forest Service and the BLM to use practices like tree thinning and prescribed fire to maintain public forests in Oregon and Washington?" Responses (Figure 7) indicate higher levels of support for agency efforts;

overall, about two-thirds of respondents expressed (*full* or *moderate*) confidence in federal personnel to use these practices.

Figure 7: Confidence in Federal Agencies to Use Thinning and Prescribed Fire



No significant differences in urban and rural responses; "no opinion" responses omitted.

Socio-demographic Characteristics as Influences on Public Opinion

Public attitudes about natural resource issues are often associated with socio-demographic characteristics (Steel et al. 1997, Acury 1990). We used correlation analysis to test the strength and direction of associations between certain participant characteristics and their knowledge of forest conditions as well as their attitudes toward federal forest agencies (Table 11). For example, we can test whether beliefs about forest health are associated with formal education or knowledge levels and if the association is direct (more education leads to increased support for treatments) or inverse (more education leads to decreased support).

Correlation coefficients range from 1 to –1; the size of the coefficient indicates the strength of the correlation. A coefficient of 1 indicates the strongest possible direct relationship between variables, a coefficient of –1 indicates the strongest possible inverse relationship, and value of 0 indicates no linear relationship between the variables (Freedman et al. 1998).

Table 11: Bivariate Correlations Between Socio demographic Characteristics and Selected Opinion Measure

Opinion Measure	Education	Age	Gender female=0 male=1	Natural Resource Knowledge	Residence urban=0 rural=1	Timber Livelihood
Believe that forests are healthy	-.116*	-.026	-.039	-.212**	-.120*	-.100**
Have confidence in Forest Service and BLM to use thinning and prescribed fire	-.032	.061	.051	-.050	-.040	-.095*
Express trust in …						
BLM	-.124**	.011	-.071	-.182**	-.054	-.022
Forest Service	-.030	.022	-.011	-.194**	-.124*	-.056
Agree that federal managers are open to public input	.080	.034	-.001	-.082	-.175**	-.109*
Believe that forest managers do a good job of explaining management activities	-.008	.083	-.025	-.132*	-.080	.004
Agree that active management is required for healthy forests	-.034	.001	.009	.109*	.015	.082

*Significant at p<.05, **significant at p<.01

Education

In natural resource studies formal education level is often one of the demographic characteristics found to influence pubic opinion. In this case, there was an inverse

relationship between education and beliefs about forest health and trust in the BLM. In other words, the more formal education a participant has the less likely they are to believe that Pacific Northwest forests are healthy and they tend to have less trust in the BLM.

Age and Gender

Although age and gender are often associated with opinions about natural resource issues (younger and female cohorts often are found to be more sensitive to environmental causes), no associations were found between these participant characteristics and the opinion measures studied here.

Natural Resource Knowledge

We created a variable called natural resource knowledge by using a composite score from the three knowledge measures presented previously in Tables 2, 3, and 4. Numerous recent studies have found that ecological knowledge is a good predictor of support for forest practices (e.g., Steel et al. 1997), particularly management activities such as fuels reduction strategies aimed at treating wildland fire conditions (Shelby and Speaker 1990). In this study, several inverse correlations and one direct correlation emerged.
First, knowledge is associated with beliefs about forest health. The more knowledge an individual possesses about natural resources the less likely they are to believe that forests in the region are healthy. This makes sense in that greater public awareness and understanding would prompt citizens to pay attention to and be more critical in their judgments of forest conditions. Second, those with greater knowledge tend to have less trust in both the BLM and the Forest Service. Perhaps those with more knowledge and who view the forests as unhealthy are also more skeptical about what they see as a lack of response on the part of the federal agencies for "fixing" the problem.

A similar inverse correlation was found for opinions about whether managers do a good job of explaining management activities. In this case, higher levels of knowledge equated to less positive opinions about how well managers perform this aspect of their job. Again, it appears that expectations for managers to act are higher among more knowledgeable citizens. Finally, there was a direct association between participants with greater resource

knowledge and agreement that active management is required to restore and maintain healthy forests. This is a positive sign in that the more people understand about forest conditions the more likely they are to support specific management programs.

Residence

The urban/rural demographic also had a significant role in two opinion measures. Urban residents tended to believe that forests were healthier than did their rural counterparts. They also agreed more frequently that forest managers are open to public input.

Economic Livelihood

How people derive their personal income is also associated with several measures. Those dependent on the timber industry tend to believe that forests are less healthy than other respondents. This probably reflects the greater attention these individuals give to forest conditions. They also have less confidence in the BLM and Forest Service to use thinning and prescribed fire to maintain public forests and are less likely to agree that federal agency managers are open to citizen input in decision-making. It may be safe to assume that those in the timber industry have been less patient with the pace and direction of federal forest policies about harvesting.

RESEARCH HIGHLIGHTS

The purpose of this study was to help clarify the uncertainty surrounding ecosystem health by examining public perspectives of forest conditions in Oregon and Washington. Developing a better understanding of citizen awareness and knowledge about forest conditions as well as their preferences for various treatment alternatives will help guide a public communication strategy for restoring and maintaining ecosystem health. From the outset our research objectives were to: (a) examine citizen awareness and understanding of ecosystem health, (b) identify perceptions of healthy forests as well as public concerns about risks to them, (c) compare the relevant characteristics of urban and rural residents in the two states, (d) identify the credibility and usefulness of public information sources, (e) examine preferences for treatment alternatives, and (f) explore the public's relationship with the Forest Service for planning and project implementation. The following is a summary of key findings to help provide relevance for the data and to put the study results in management context. A number of important points are highlighted for easy reference and more thoughtful comparison among objectives.

Public Awareness and Knowledge about Forest Ecosystems

- Overall, the findings indicate considerable public awareness of forest lands. As anticipated, rural residents live closer to National Forests and visit them more frequently, but almost half the urban residents also live within 30 miles and visit with regularity (three-fourths visit at least several times each year). As with other recent studies in the region (Shindler and Toman 2002, Brunson and Shindler 2002), this level of familiarity suggests that residents pay attention to local forests, have an interest in how they are managed, and may engage in forest planning or decision processes.

- There is a general perception that Pacific Northwest forests are healthy, although a substantial number of respondents (one-fourth) also rated conditions as "somewhat

unhealthy." Because the findings are from a single point in time, we are unable to determine which direction people feel the forests are moving, toward greater stability or toward less healthy conditions. It may be too early to tell whether recent restoration efforts, such as those currently underway in the Blue Mountains Demonstration Area, have been effective. We can draw clues from the focus groups; these participants were contacted because they are familiar with both the region's forests and emerging natural resource issues. These groups voiced greater concern about forest conditions on the east side of the Cascades. In any case, the quantitative findings provide a useful perspective for monitoring public perspectives of forest health.

- As might be expected with a general population survey, knowledge of forest ecological features was mixed. Most respondents claimed to know about many forestry terms, which is not unusual given the amount of media coverage and agency communication devoted to these topics in the Pacific Northwest. However, far fewer participants were less certain about several important ecological concepts within forest systems. Considerable misperception or uncertainty exists about sources of forestland erosion, the alteration of streams, insect and infestation problems, the influence of long-term fire suppression on forest fire conditions, and the regeneration of important species like Douglas-fir and ponderosa pine. Generally, rural residents demonstrated better knowledge than their urban counterparts, but the differences were not dramatic. Other socio-demographic associations help shed light on certain publics. For example, participants with greater education and higher incomes, who are younger, and who are male tend to be more knowledgeable about forest conditions. In sum, this type of information can be useful to resource professionals in helping them focus the discussion on essential problems where gaps in public understanding may exist.

Indicators of Healthy Forests

When asked an open-ended question about indicators of forest health, our focus groups participants were somewhat vague in their descriptions. Most declared that a great deal of

subjectivity exists about the term *forest health,* suggesting that it can mean different things to different people and that it often depends on the landowner. They tended to talk in abstract concepts (e.g., "a healthy forest has all the components it needs to function on its own," and "a forest should be able to absorb change and continue to grow and function"). These discussions emphasize just how difficult the topic is for most people to pin down. On balance, our survey respondents had it a bit easier. They were provided a list of 17 specific (potential) indicators to check-off *yes* or *no*. Overall they shared a good deal of agreement—more than two-thirds selected ten items as indicators of a healthy forest. While this information is useful for initiating discussion among citizens and managers, we believe some caution is required in interpreting these findings.

- The most highly rated items (presence of green trees, abundance of wildlife, low levels of disease and infestation, trees of various sizes) all received a response of 90% or higher. These generally are indicators of aesthetic conditions that are easy to agree on; they simply are desired conditions that would generate little dispute in management plans. Indeed, other research teams (Hull et al. 2001, Patel et al. 1999) report similar results from opinion surveys. It is the next tier of indicators that are more problematic. For example, an abundance and variety of plants, variety of tree species, snags and decaying logs, and old-growth were all selected by strong margins. While these conditions are appropriate (and desirable) in many forest settings, this is not the case for all settings. Managers and communities will need to focus on local conditions. This points out the importance of factoring in the specific forest and management context in which decisions are made. If managing for forest health is adopted as a broad-scale policy, it cannot come as a blanket prescription imposed from the top down—much as the Northwest Forest Plan has been imposed on managers in Washington and Oregon (Stankey and Shindler 1997). A prescriptive, one-size-fits-all list of forest health indicators would only become a source of frustration—and a reason for loss of agency credibility—in forest communities.

- Participants appear to recognize that density problems exist in forests. Few people believe that a large number of trees is an indicator of a healthy forest health or that

management intervention is particularly detrimental. Both judgments seem to support increased agency activity for restoring forest conditions.

- It is noteworthy that opportunities for recreation is among the indicators that were highly rated. This seems to follow trends indicating that people expect much more from forests than commodities or scenery. Recreation opportunities seem compatible with many other indicators considered to be part of a healthy forest and, at the same time, implies that the public also will be present in the forest to judge for themselves how well resource professionals are delivering on management objectives. This form of public oversight is most likely to play out in "special places," locations that people are familiar with and, in many cases, where they have developed long-term attachments. When citizens care deeply about a particular place, they also are more active in decisions about its management. This can be either an advantage or a hindrance for managers, depending on how they choose to involve constituents. A cautionary note comes from the finding about public access; few respondents saw closing forest roads as a necessary part of a healthy forest. Insuring access for recreation purposes could be a point of debate, particularly in rural communities where residents traditionally have had considerable freedom to use forest roads.

- Somewhat of a surprise was the majority of participants who also felt that stable rural communities were an indicator of forest health. It is easy to view this as regional support for the protection of traditional rural lifestyles and related forms of earning a livelihood (usually by resource extraction). Although there certainly is a mystique associated with this way of life, the face of rural communities in the northwest is changing rapidly. Stable rural communities are now likely to include recreation and tourism as major economic influences as well as other shifts in how people derive their income (e.g., investments, transfer payments, property management) or why they choose to live in particular places (such as amenities or retirement). Not only will each of these factors contribute to the stability of communities, they also will certainly influence residents' views of what constitutes a healthy forest.

Threats to Forest Health

Overall, respondents seem particularly worried about threats to forest health. Substantial majorities agreed that ten items from a prepared list of 14 potential threats were a risk to forests; two others were selected by nearly half (48%) of the participants.

- The single, universal concern was over insects and disease. Almost in equal numbers, participants seem to support the use of thinning as a responsible approach for treating threatened forests. Although the match between problem and potential solution appears obvious, managers will still need to exercise care in moving forward. First and foremost, they should recognize high levels of public awareness of the problem and the opportunity that exists for gaining citizen support of thinning programs. The cautionary message here is that not everyone will agree—some will accuse the agencies of using the threat of insect and disease as "just another excuse to harvest"—while others will not be sure they can trust the agencies to do what they say. And now that the Bush administration has entered the picture and promised more harvesting on public lands to help forestall another severe fire year in the northwest, additional opposition has emerged. The upshot is that, more than ever, agency managers must operate under a scrutinizing public eye. Regardless of the mandate that may exist for thinning programs, a prudent course of action will need to include considerable community education and outreach. Until then, many citizens will be withholding judgment until they see just how these management programs are carried out.

- As with the focus groups, many of the survey participants' concerns were over problems caused by too much management or other forms of human intervention. Several of these (industrial pollution, urban sprawl, conversion of forest land to other uses) are what Jamieson (1994) referred to as creeping environmental phenomena, problems that are largely imposed on forests from the outside and involve policy decisions far beyond the borders of traditional resource agency management. The level of complexity brought on by a growing population is enormous. Yet these observations by our survey participants serve to point out that

agencies like the Forest Service will need to be more prominent in the larger political arena if they are to be effective protectors of forest health.

- It is fairly clear that the public is conflicted about threats from wildfire and the utility of fire suppression. Most everyone can agree (70% in this survey) that wildfire is a concern, but almost half also listed fire suppression as a threat. Results on the knowledge section of the survey indicate a good deal of uncertainty exists about the relationship between the two. While many studies show an increase in citizen awareness and understanding of wildfire overall, it appears there is still considerable need for public education programs.

- A similar conflict seems to exist over the harvesting issue. Both over-harvesting and too little harvesting were recognized as threats by the majority of participants. It is likely that situational context plays a substantial role in these judgments; that is, where and to what extent harvesting occurs is of primary importance to citizens. This view appears to be supported by the high number of people who also think over-crowded stands present a threat to forest health. People will be more likely to support harvesting as a responsible option if they can connect the treatment with a perceived problem area.

- Most rural residents seem to be ready allies in the movement to restore ecosystem health. They were much quicker to agree that insect/disease outbreaks and over crowded stands are threats to forests. Similarly they voiced greater concern about too little harvesting taking place and "locking up" lands from management. Given that most management treatments are implemented near forest communities, there appears to be a considerable base of support present in these areas for practices to restore forest health. Successful community coalitions—particularly partnerships where citizens take on a share of work to protect their own property—have begun to spring up throughout Oregon and Washington. These grass-roots efforts are often time-consuming enterprises, but the critical mass of knowledgeable, supportive individuals that emerge in such places over time may be one of the most effective means for restoring forest conditions.

Information Sources and the Effectiveness of Delivery Systems

A central purpose of this study is to provide information that will assist in development of a public communication strategy for ecosystem health. We queried respondents about a number of information providers as well as specific forms of communication carried out by the Forest Service. Three components were measured—whether the message format is *easy to understand*, is *trustworthy*, and is *useful* overall. In the past, the public has turned largely to agency professionals for information about forest conditions, especially fire and fuel management (Shelby and Speaker 1990). However, recent longitudinal evidence from the Blue Mountains indicates the public is paying less attention to Forest Service information in favor of other providers such as forest industry groups (see Shindler and Toman 2002). There is insufficient data to determine if this is the case region-wide, but other findings help provide a basis for developing a communication strategy.

- Popular media outlets (i.e., TV, radio, and newspapers) are the most widely accessed information providers and are considered moderately useful sources for information about natural resources. On the other hand, these providers were not considered particularly trustworthy. From an agency perspective these outlets may be more useful for reaching large audiences with general information such as notification of upcoming meetings or announcements about specific events such as the opening of a new recreation facility.

- University researchers and extension agents were viewed as both highly trustworthy and useful sources of information. However, fewer individuals have access to these providers and in the case of scientists, the public finds it more difficult to understand their information. In any case, citizens usually view these professionals as unbiased sources of objective information (Soden 1995). It is likely that researchers and extension agents are most effective when they are in direct ("in person") contact with citizens; thus, the extent to which they can be utilized in meetings, tours, and workshops could increase the credibility and overall effectiveness of these forums.

- Interest groups received particularly low scores as information providers. Perhaps people have difficulty trusting groups that are perceived as having special interests, or whose activities appear to be on the "other side." There seems to be some evidence of this situation in that environmental groups were favored more in urban areas while industry groups received higher ratings in rural settings. One approach taken by natural resource agencies recently has been to cooperate with various organizations in projects and information dissemination. To be successful, these "partnering" efforts need to consider how to effectively target particular audiences.

- Although gaining in use and popularity, the internet currently is not an important source of natural resource information for most citizens. Similar to this study, research in forest communities repeatedly has shown that the internet is far down (often last) on the list of places people access to acquire this type of information, particularly details about policy and management issues such as ecosystem health (Shindler and Toman 2002, Brunson and Shindler 2002). The probable exception for agency purposes is information about recreation sites and reservations.

- Regarding specific Forest Service information sources, a substantial number of citizens are simply unfamiliar with most formats currently in use. This was expected given that many people do not have access (or the need) to attend public meetings or have a conversation with an agency member. In any case, findings in this section provide a useful starting point for determining how and where to invest scarce resources to best communicate with the public. For example, some of the same skills (if not funding levels) are required to produce interpretive information, brochures, and internet web sites; however, public access of each is uneven and usefulness ratings among people who are familiar with them is different. Alternatively, almost 40% of those surveyed had no opinion about guided field trips, but this form of information exchange was rated especially trustworthy and had one of the highest usefulness scores.

- Considerable research indicates that interactive forms of communication—as opposed to static one-way messages such as brochures, newsletters, or written reports—are considered to be more effective by citizens (e.g., Cortner et al. 1998, Force and Williams 1989). In this study, results were mixed with brochures and newsletters ranking at about the same level of usefulness as visitor centers, conversations with agency personnel, and field trips to forest sites. The primary difference is that encounters at visitor centers and with personnel on guided field trips are viewed as particularly trustworthy forms of communication. A similar view was shared by focus group participants when describing who influenced their opinions about forest health. Personal interactions with resource professionals ("the people who are actually doing it") were highly regarded as a method for learning about forest conditions.

- In the particular case of visitor centers, high ratings suggest that the Forest Service provides credible interpretive information with language that is crafted for clarity and convenience. It is noteworthy that visitor centers are the most frequent point of contact between citizens and the Forest Service. The public typically visits these sites during their leisure or vacation time, when they may be more receptive to softer messages about places they care deeply about. High trustworthiness ratings for these sites are most likely attributable to information delivered by naturalists or interpreters who are seen as competent and approachable.

- As in other recent studies, one of the most striking findings here is how ineffective public meetings and workshops seem to be. Only about half of our respondents were familiar with these forums and of these individuals, most rated them of little or no use. They seem to agree with citizens in virtually every region throughout the U.S. who have been critical of the way the Forest Service conducts this form of public outreach (Cortner at al. 1998, Shindler et al. 2002*a*). Many individuals complain of being "talked at" rather than included in any substantive or meaningful way, and believe that agency priorities are often set by national agendas rather than targeting local issues. Given that numerous stakeholders share the responsibility for forest health—particularly when unhealthy conditions

result in high fire danger—community meetings are an important focus for resource agencies. They can be useful forums for disseminating information, for fostering a better understanding of conditions and causes, and in developing a community's capacity to respond to identified threats. Depending on the attention given to the design and process elements of public meetings, these settings can be either detrimental to public relations or highly useful forms of community outreach.

Treatment Preferences by Forest Condition

We attempted something new by asking people to differentiate between various forest conditions (*depleted, overstocked,* and *healthy)* and tell us what forms of management were acceptable for each setting. Participants had little difficulty expressing their overwhelming choice for the depleted forest (tree planting) and the overstocked forest (selective thinning); on the other hand, agreement about treatment alternatives for the healthy forest was more diverse. The positive agreement shown in the first two cases is useful in itself; however, it is apparent that this level of inquiry is merely a starting point and that sorting out public preferences for long-term decision-making will require much greater insight. Several key observations can be made from the findings.

- There is strong public recognition that active management is appropriate in certain forest situations. The high acceptance of thinning programs for overstocked stands should be good news for federal managers in that much of our forestland is currently in this condition. The biggest caveat for moving forward with thinning projects (as well as any additional treatment) is likely to be agreement on what constitutes an overstocked forest. Support for more active management is already present in many rural communities.

- The importance of environmental context cannot be overemphasized. In this study, people have demonstrated the ability to differentiate between settings. Because much is at stake in most forest communities, managers will need to help citizens understand the rationale for treatments in specific locations as well

as the potential outcomes of different alternatives. The extent to which a particular practice will affect personal property, alter traditional community economies, or change unique places can hold considerable contextual importance for those involved. And when given the opportunity to see for themselves how different practices play out on familiar landscapes, citizens throughout the region have been able to make substantive contributions and lend support to planning activities (Reed 1996, Shindler et al. 2002*a*). Alternatively, failure to consider fully the desired conditions for particular settings and the perceived risks associated with different alternatives hinders citizen acceptance of management plans.

- The disparity of views about how to manage healthy forests suggests a good deal of uncertainty over what contributes to forest health as well as what is required to maintain these conditions. Because managing forest ecosystems implies much uncertainty, public perceptions quickly turn to questions about the risks involved. Logically, the greater the risk—and tinkering with healthy forests carries considerable risk potential—the less acceptable management intervention becomes. Public understanding seems essential to addressing uncertainty and risk. Improved understanding will involve providing alternatives to compare, making sure that people possess adequate knowledge of these alternatives, and that a mechanism (system or process) is in place to evaluate effectiveness once treatments are applied. Numerous demonstration sites have begun to spring up on National Forests throughout the region and this is a positive step. However, they typically involve "problem" stands and management "solutions." We should also consider places where healthy conditions exist and the public can have a role in monitoring a range of treatments and in evaluating the outcomes.

Opinions of Federal Forest Management

In this section we measured public opinions about various aspects of federal forest management. Overall, the findings indicate that respondents desire active, science-based

management of forests by agencies that are receptive to and inclusive of public input. In some cases—particularly regarding their communications with managers—participants were critical of these interactions.

- Responses throughout this survey indicate both an awareness of the need for management action to restore forest conditions and support for specific treatments (i.e., selective thinning) to accomplish these objectives. This also includes a role for scientists in experimentation and decision-making. This latter point is reinforced by a companion study of key publics in Oregon and Washington who overwhelmingly supported the view that "scientists should work closely with managers and others to integrate scientific results into management decisions" (Lach et al., In Press) over lesser roles for scientists. Data from our study suggest an explanation for such responses. For example, a good deal of uncertainty surrounds the forest health issue and citizens are looking for accurate, credible information about the options. At least among this sample, university researchers are viewed as trustworthy, useful sources of information that could help clarify the choices ahead. One might also construe these findings to suggest that citizens would like to see a science component more frequently included in their interactions with agency personnel, which they currently view as in need of improvement.

- Rural respondents appear more skeptical, if not cynical, about agency management activities. The group was surer about their responses (they had considerably fewer "no basis for opinion" answers and indicated more strongly that forest management agencies need major changes). This sentiment might be attributable to feelings of exclusion from consideration and involvement in agency decisions over local resources, as was the case in several other regional studies including the Blue Mountains (Shindler and Toman 2002) and the Adaptive Management Areas of Oregon and Washington (Stankey and Shindler 1997). The rural respondents were not as insistent about elevating the role of science in forest management decisions; however, most of them did feel there was a legitimate place for science in forest practices.

- Urban respondents were generally more positive and less critical of federal forest managers but desire more science considerations in management. But there was also a larger percentage who chose either the neutral or the no basis for opinion responses, indicating less contact with agency managers than their rural counterparts. This suggests there is considerable room for communications that target urban audiences about forest health problems. One method for consideration comes from Brunson and others (1997) who found that urban residents in Oregon and Washington preferred informational forums that included university researchers along with management personnel.

- Several additional points are clear regarding public attitudes about federal agency communications. It is important to recognize that many citizens have had no experience or contact with agencies and have not yet formed an opinion about communication with resource professionals. However, among those who have, few believe that managers do a very good job of explaining their actions nor do they think that public input has much bearing on the formation of management plans. While these findings are from one point in time, warning signs are evident. For example, longitudinal analysis from the Blue Mountains (Shindler and Toman 2002) indicates that one of the most substantial changes in public attitudes between 1996 and 2000 is in how citizens view their relationship with federal forest managers. Fewer Blue Mountains residents now pay attention to information from the Forest Service, fewer believe the agency does a good job of providing information, and fewer believe the Forest Service is open to public input and uses it to make decisions. Findings from both studies indicate a need for more inclusive, more open planning processes where citizens can clearly see a legitimate role for themselves. A big factor in turning around public attitudes is the need for trustworthy relations among stakeholders.

Trust and Confidence in Forest Agencies

As in other areas of the country where natural resources are of primary importance, trust in forest agencies is a central concern in the Pacific Northwest. We know from recent studies

that trust in the Forest Service is eroding in some rural communities (see Shindler and Toman 2002). In this survey we asked the trust question two different ways to help us further differentiate among opinions.

- Participants rated various state and federal institutions regarding the level of trust they have in the agencies to make "good decisions for maintaining and restoring forest conditions." As expected from previous studies, ratings were modest. Barely a majority demonstrated trust in the Forest Service and less did so for the BLM. As we have discussed elsewhere (Shindler et al. 2002*a*), it is likely these sentiments are influenced by general public dissatisfaction with national politics and Forest Service/BLM policies on a broad level. Overall, many Americans are frustrated with big government, big business, and the politics that surround these institutions. Although trust in agency personnel at the local level (Ranger District) is typically higher in opinion polls, achieving a simple majority rating on a trust scale is insufficient for gaining public acceptance of agency programs. When well over one-third of all citizens indicate limited or no trust in federal forest managers (which is routinely the case these days in public opinion surveys, and is the case here), there is considerable need to build better relations at the regional scale and in local communities.

- Our second form of inquiry asked a more focused question: "How much confidence do you have in the Forest Service and the BLM to use tree thinning and prescribed fire to maintain public forests in Oregon and Washington?" In this case, responses were more positive. There was a higher level of public trust in managers to implement these specific practices, more people were certain in their response (far fewer chose the "no opinion" option), and urban and rural residents were uniform in their opinions (no significant differences). These findings can be considered along with other results from this study that indicate strong beliefs about the need for more active management and public preferences for thinning programs. Taken together, these suggest that even in a climate of overall distrust of government (including the Forest Service and the BLM), citizens seem willing to lend support to targeted programs for managing ecosystem health. Their

support will not be carte blanche, instead it is likely the public will monitor agency decisions and watch to see how well these programs are implemented. And it is likely that their judgments will be based on how well citizens are integrated into project planning in local communities.

CONCLUSIONS

Generalizing these Findings

Public acceptance and support of programs is an essential component of every resource management issue facing public agencies today. How the public perceives ecosystem health and potential management strategies is no exception. However, previous to this study there has been little social assessment about the subject. It would be useful if we could predict how relevant findings from this sample are to the broader population. Current research on wildland fire management may provide some insights. Two comprehensive studies of forest communities (Shindler et al. 2002*a*, Winter et al. 2002) indicate there are a number of similarities among the factors that influence public judgments about fuel treatments in fire-prone areas despite geographic and economic differences across the communities. Initially this suggests that findings from this study may be particularly useful throughout Oregon and Washington where resource professionals are attempting to implement similar practices to combat similar problems.

However, another recent study demonstrates the complexity of these issues. Shindler and Brunson (2001) conducted a national opinion survey of over 1700 households regarding public awareness of wildland fire and preferences for various fuel management practices. The survey included a followup with non-responders to check for response bias. The researchers found that individuals who participated in the survey were far more attentive to fire management issues and were more knowledgeable about key elements such as ecosystem management and prescribed fire than the non-responders. These participants also believed that public forestlands were less healthy than the non-respondent group and were more supportive of the use of prescribed fire. All this suggests that the respondents to our ecosystem health survey may also be more aware and more knowledgeable than the general population.

On balance, is the sum of these research outcomes good or bad? It may be useful to look at this question from the perspective of managers who are attempting to implement practices in forest communities to improve ecosystem health. For most of the public, when a forest practice occurs "somewhere else," it may be a non-issue or at least have little impact on their daily lives. People usually respond to changes in forest conditions based on a familiar place or specific circumstances. An initial implication is that those who are directly affected by a proposed practice will be the first to judge it. The strength of these judgments is shaped by the personal relevance of the situation and, if strong enough, is often the reason why individuals become active in the political process of decision-making. In the case of this study and our sample, it seems that knowing how these first-responders think about ecosystem health is particularly useful. These are the individuals who are more likely to pay attention to agency strategies as well as engage resource professionals in deliberations about management practices. They are also more likely to exercise their political will to either oppose or support such measures.

High Awareness – Low Level of Understanding

It seems fair to assess this respondent group as having a high level of awareness of forest health in the region but also possessing a low level of understanding about causal components and treatment alternatives. It is likely that awareness will continue to grow as conditions worsen, the popular media covers the issue, urban dwellers migrate to forest communities, recreation opportunities expand in these areas, and so on. This is no guarantee, however, that understanding will commensurately increase.

In order to for a community-based communication strategy to be successful, citizens must possess a capacity for participation. They do not come with a ready-made ability to participate in constructive, well-reasoned discussion. As the major steward of public forest lands, the primary responsibility for developing this capacity falls to the Forest Service. The discussion is much more useful when people understand something substantive about the relevant science, the economics, and the interests that are at stake in the ecosystem

health problem. Perhaps the best-known example that has led to misunderstanding of ecological processes and consequences is the lesson that every child has learned from Smokey Bear: that *only you* can prevent forest fires. Part of the problem is that for years this message was the only thing that most people knew about fire. Only recently, as people have gained more perspective on current forest conditions and how they evolved, has there been a broader public acceptance of more liberal management policies. As in the fire management issue, the Forest Service will need to contribute to developing the competence of the public so together they can engage solutions for restoring forest health.

Communication Strategies

This study was designed in support of the Forest Service's interest to develop a region-wide communication strategy for ecosystem health. This section highlights several key suggestions for guiding such a strategy. However, we first turn to a cautionary comment from a workshop on the problems and prospects of organizing a Forest Service public education program:

> Public agencies often feel that their job is to develop information and deliver it to policymakers and the public. But facts do not speak for themselves. They must be appreciated and interpreted. Generally, programs that provide information are not very successful in improving understanding or changing behavior. Serious thought must be given to what it means to educate both the public and the policymaking community, as opposed to delivering brochures and reports. People respond to stories, analogies, examples, and so on. Education is more likely to occur in the context of a personal relationship than in anonymous information provision (Jamieson, 1994 p.26).

The tendency for natural resource professionals is to confuse information provision with public understanding and eventual support for practices. This is a mistake. Although information and knowledge are essential components of any public communication strategy, these alone are insufficient to produce change in the way citizens respond to forest agencies. Communicating with citizens also has a lot to do with feelings, attitudes, and establishing a meaningful context for messages. And communication is much more meaningful when it is personalized. Thus, the process of how people come to understand forest conditions and support policies for ecosystem health also needs to be an integral part

of an outreach plan. A comprehensive strategy will not only focus on the types of information disseminated, but also on how and why it is communicated. The following suggestions are based on results of this study and related research.

Address Uncertainty and Risk

Ecosystem health involves much uncertainty about how systems work as well as a degree of risk associated with practices to maintain or restore forest conditions. Public perceptions and a basic level of understanding seem essential to addressing risk. For citizens, problems are often cast in terms of how serious, certain, and soon the risk will be as well as how sure we are that a potential solution will be effective. Logically, the greater the risk and the less certain we are about outcomes, the less acceptable a practice will be.

This means that forest agencies must be more forthcoming about difficult decisions and the choices involved. In the past, resource professionals have usually preferred one-way forms of communication that have allowed them to control the flow and content of information. Now, when citizens are more aware of resource conditions and expect to have a role in the planning process, agencies will need to help people sort through the ambiguities of ecosystem health. This will involve having alternatives to compare and being sure that citizens possess adequate understanding of the alternatives. Public opinion is much more useful when people have some insight to more than one side of the question (Ehrenhaldt 1994). Merely asking citizens if they want wildfires suppressed (or bark beetle diseases eradicated or fewer dead trees in their local forest) does little to bring agencies closer to solving forest health concerns; one could easily predict the response to such questions. Instead, people need more pieces to the puzzle. Resource conditions and practices are more meaningful when people can equate them to local problems such as a familiar tree species in trouble or a recognizable place (e.g., a recreation site or forestland bordering a residential development) in need of restoration. These problems become "real" and are genuine social concerns because they affect peoples' livelihood and their quality of life.

Ultimately, this will mean that forest agencies will need to allow greater flexibility for personnel to take risks and experiment with new ideas. These actions will be most

effective if they play out publicly and collectively. Ecosystem experimentation must include places where people can come together to learn about the uncertainties of forest health, to understand the risks involved, and weigh the tradeoffs of different alternatives (Shindler et al. 2002*a*). One approach could be to designate experimental communities in National Forests that function as places where personnel and citizens cooperatively plan and carry out these activities. These should not be replicas of the largely failed adaptive management areas, places that received far too little agency direction, support, and latitude to try new things (Stankey et al. 2002). Instead, they should become sites where agency members provide leadership and establish a common ground for learning how to manage for ecosystem health. Alternatives to designating specific experimental sites may be preferable in some locations. For example, ecosystem health projects can be established much along the lines of those beginning to spring up in the Blue Mountains Demonstration Area that are targeting fuel reduction. These projects also serve the goal of restoring healthy forests while enhancing the economic and social well-being of local communities.

Build Literacy among Stakeholders

This study has identified both a high level of public awareness of forest conditions and a fairly low level understanding about how these conditions evolved and the treatment alternatives available. Given these circumstances, the Forest Service's intent to develop a communication strategy for addressing these gaps is right on-target. If citizens are to have a real ability to participate in and support management actions, they must possess a capacity for participation. The first hurdle is developing some common understanding about forest health, including the message that conditions in many areas require management action. Thus, a strategy will need to structure information provision in such a way that provides for a broad-scale, common understanding of environmental complexities. Ultimately, this approach will need to include known causes and effects, consequences of choices, and resulting long-term ramifications (Stankey 1995). Given that the public(s) the agency is attempting to reach is diverse (e.g., urban and rural, various levels of knowledge and interest, different geographic concerns), this can be accomplished most effectively through a multi-layered strategy to public outreach.

The first layer would be broad-based for developing awareness among the general population. At this umbrella level, information dissemination typically involve "bulk" formats for reaching large audiences such as television public service spots, Sunday supplements in newspapers, the Smokey Bear campaign, brochures and videos at visitor centers, and so forth. These forms of information are not intended to change anyone's mind about an issue; instead, they aim to raise awareness about a problem and plant seeds of recognition should individuals encounter a situation to become more engaged in the subject of ecosystem health in the course of their daily lives.

The second (sub)layer is a more targeted outreach that seeks to penetrate communities and the specific concerns that reside in particular locales. This approach recognizes that different problems—health as well as social—exist in different settings whether they are inter-city, at the urban-forest interface, on the westside or eastside, in coastal or in rangeland communities. Each area has a different potential for forest health problems (e.g., Swiss needlecast, spruce budworm, bark beetle, Pandora moth, drought) as well as a different capacity to respond to these problems. Communication styles will vary from setting to setting, but they will have a common ingredient. The information provider needs to be a credible, trusted local source. In rural areas this may be agency personnel at the ranger district or the state extension agent. It might include members of the timber industry, watershed councils, friends groups, or local educators. In more urban settings other players in addition to agency personnel may also emerge. This might include university faculty and researchers or environmental groups. In any case, it is likely to require multiple partners carrying a similar message. And it is the agency's role to organize these efforts.

Which communication tools are likely to be the most effective in these local settings? Research indicates that interactive approaches are much favored over one-way forms of communication (Winter et al. 2002, Cortner et al. 1998). These could involve school educational programs, guided field trips to affected sites, demonstration projects, or discussion among managers and local residents. Planning workshops and public meetings have proven effective only when they go beyond the National Environmental Policy Act (NEPA) format and allow realistic opportunities for residents to be involved in a

meaningful way. When plans are largely an internal function, they provide for little participation on the part of citizens and fail to achieve increased public understanding of conditions and consequences. Where genuine participation is incorporated, greater commitment is generated among citizens for the proposed management action and in the process by which it was developed.

The third layer of public outreach is at the ground level. These involve hands-on, cooperative projects where the agency and communities work together to learn about and solve local problems. Many good examples are beginning to spring up—most around fuel reduction programs—such as the Heritage Demonstration Project in the Metolius Basin and a thinning project surrounding the Black Butte Resort, both initiated by personnel on the Sisters Ranger District. There are other positive examples throughout Oregon and Washington and they all have at least one thing in common. They provide citizens an opportunity to discuss forest conditions with resource professionals—district rangers, fire managers, technical specialists, and scientists—and then allow for the evaluation of real-life treatments (and results) prior to broad-scale application of projects.

Focus on Situational Context and Site-specific Conditions

The importance of contextual considerations is in acknowledging that conditions and practices that are acceptable in one situation will not necessarily be acceptable in another. It is easy to understand this in terms of forest ecosystems; we live in a region where coastal, mountain, and high desert systems mean that different health concerns are present in different areas. However, while local forest conditions are important to residents, they are not the only contextual considerations managers need to account for. For local citizens, the extent to which an agency program will affect their personal property, alter traditional community economies, or change unique places can be of equal importance (Shindler 2000). For example, while generally acceptable, the use of prescribed fire has consequences for a particular segment of a community when it is in their backyard or affects their air quality. Similarly, thinning programs can mean additional employment for some while being a perceived threat to viewsheds for others. Although these treatments may be proven management practices, the failure of managers to consider fully the social

risks and desired conditions of these strategies hinders the agency's ability to achieve broad support.

In local communities, there is often a reluctance to accept any new (or different) forest practice simply because there is little experience on which to judge it. Most often, it is the uncertainty that gets people excited. As "solutions" are found in one area, it will be important to recognize that practices and conditions acceptable in one situation will not necessarily be acceptable in another. Research has repeatedly demonstrated that the public's acceptance of resource policies is linked to the quality of the decision-making procedures, with opportunities for their participation being a necessary central component (e.g., Lawrence et al. 1997, Tuler and Webler 1999). Greater public acceptance of programs to treat forest health will come from resource professionals' ability to help citizens understand the rationale, research questions, and consequences of forest practices—and these are much more likely to occur in familiar settings where people have a genuine stake in the outcomes.

In resolving the ecosystem health issue, certainly the Forest Service needs to respond to large-scale problems across the entire region. But there is danger in promoting one-size-fits-all policies; when managers neglect (or simply overlook) contextual concerns, it can become a source of frustration and a loss of professional credibility in communities. In addition to a region-wide program, there is merit to thinking small and long-term. Given the many ecological and social contexts it must engage, the agency will frequently find itself in uncharted waters. It is better to put many small boats out to sea than a single Titanic (Jamieson 1994). Consider diverse projects and approaches aimed at local problems. Some projects will not work. But in the meantime, the agency is respecting variations in the biological, social, and economic characteristics of particular places and stakeholders are learning to trust the process.

Just as managers need to consider the context of places and practices, they also should consider the appropriateness of the communication tools available to them. This study has shown that the public responds better to different information formats, suggesting that managers might select among the options depending on the situation and the particular

stage of public outreach. For example, under the multi-layer approach, different communication methods are better suited for each phase—awareness development, community outreach, or for hands-on projects at the ground level. Over the last two years we have conducted ten additional public opinion surveys nationwide regarding forest conditions and citizens have rated agency information programs, just as in this study. Table 12 uses findings from all eleven studies to show composite ratings for each

Table 12: Ratings of Agency Information and Outreach Programs

Communication Format	Rating[a] of Program Objectives			
	Accessibility[b]	Understandability	Trustworthiness	Usefulness
School educational programs	Medium	High	High	Medium
Conversations with agency personnel	Medium	High	High	Medium
Interpretive centers	High	High	High	High
Guided field trips	Low	High	High	Medium
Planning workshops	Medium	Medium	Medium	Low
Public meetings	Low	Medium	Medium	Low
Brochures	Medium	High	High	Medium
Newsletters	Medium	High	High	Medium
TV public service messages	High	High	High	Medium
Smokey Bear message	High	High	High	Medium
Informational videos	Low	High	Medium	Low
Environmental impact statements	Medium	Low	Low	Low
Internet sites	Low	Medium	Medium	Low
Special newspaper sections	Medium	High	High	Medium
Research reports	Medium	Medium	High	Medium

[a]Ratings based on composite scores from this study and ten other recent research studies by Shindler and associates (see Appendix B for complete list).
[b]Accessibility ratings indicate relative number of people who have experience with a particular communication format. Ratings for the last three columns derive from respondents who have had experience with the communication format.

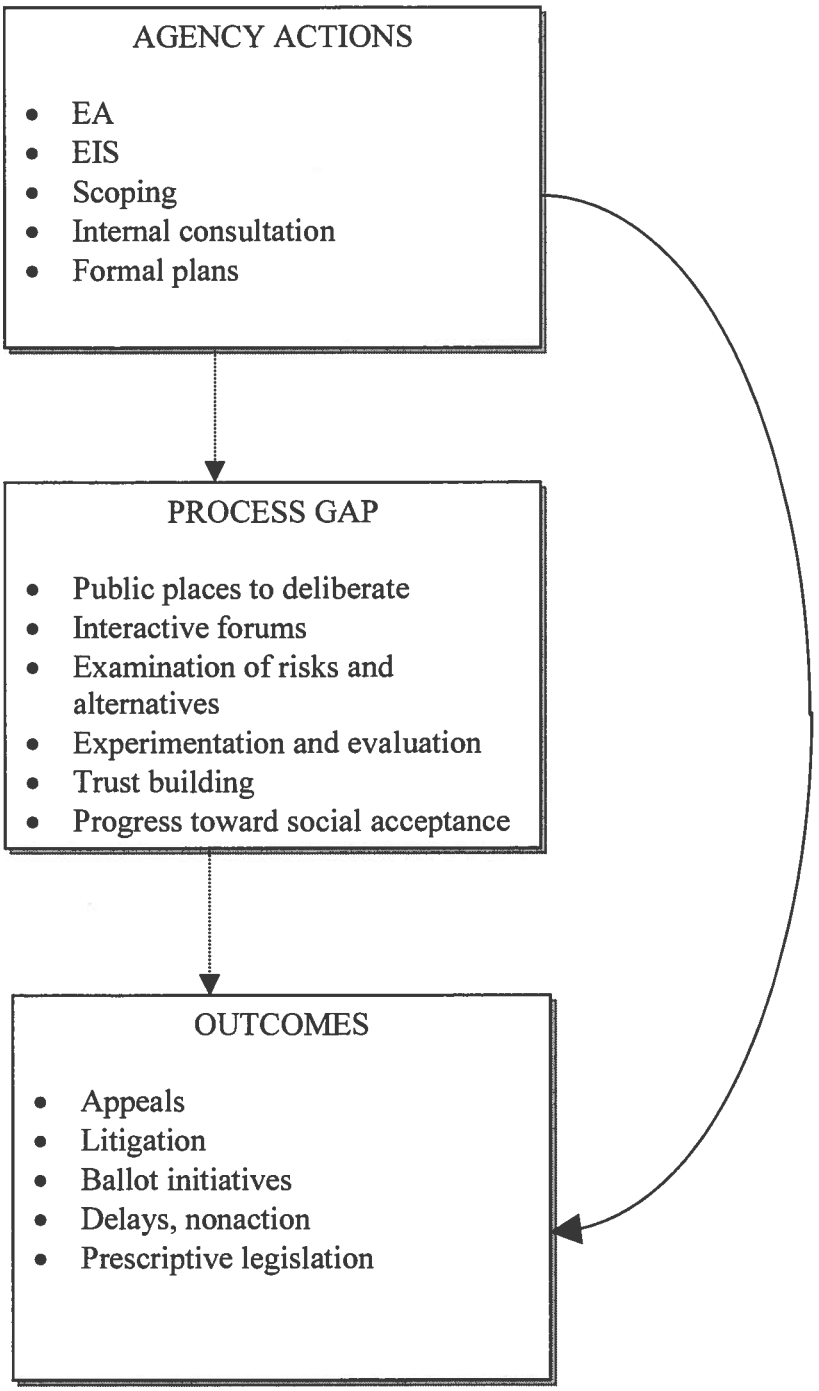
communication format, including its accessibility (its ability to reach people), how well it is understood, its trustworthiness, and its overall usefulness. Depending on the context of the situation, managers can pick and choose the most appropriate outreach methods.

Concentrate on Agency-Public Interactions along with Information Provision

One of the most critical findings of this study involves the Forest Service's relationship with citizens. This is a central concern in that research throughout the past decade strongly indicates that feelings of distrust and disenfranchisement in communities can trump agency efforts to initiate forest management programs. In a recent problem analysis on the social acceptability of forest practices, Shindler and others (2002*a*) observed that public acceptance is often hampered by an agency focus on decisions rather than the decision-making process. Their premise was that agencies like the Forest Service are quick to jump from the formal steps of the decision stage to program implementation without recognizing the value in more deliberative planning strategies that include publics, particularly citizens in communities where programs will play out on the ground. The in-between step—frequently missed, overlooked, or ignored—represents legitimate public process where learning most often occurs and trust is built among constituents. This scenario is diagramed in Figure 8, the Forest Policy Process Gap. It depicts the gap existing in many agency decisions where managers are particularly good at meeting procedural requirements (formal steps in box 1) and ending up with the outcomes in box 3—formal policy directives and frequent attempts by citizens to override unpopular decisions. Although decisions may eventually stand, many are delayed, altered, or otherwise derailed. In the end, little of this activity is conducive to learning about the alternatives themselves or building relations within communities.

The relevance for designing a communication strategy for ecosystem health should be clear. The plan must include measures to plug the process gap. We know that agency staff has become particularly adept at meeting the NEPA requirements depicted in box 1 (writing environmental analyses and hosting traditional scoping events); but the public repeatedly has indicated that these are poor methods for communicating information (Cortner et al. 1998). Participants in the current study have said these traditional forms of

Figure 8: Forest Policy Process Gap



communication lack the substance they expect from agency leaders. Greater attention will need to be placed on the process of how people come to understand forest conditions and develop support for forest initiatives. These include providing forums for people to deliberate, places to examine risks and the consequences of various management practices, and methods for working out acceptable approaches to solving forest health problems. A comprehensive communication strategy will not only focus on information, but also on how and why it is communicated.

It is one thing to emphasize collaborative methods for communication and another to be realistic about the abilities and skills to carry out the job. On local ranger districts, for example, resources are limited and personnel must use their time and talents judiciously. However, from studies of successful collaborations throughout the region researchers have identified many of the attributes common to productive outreach strategies. Although these have been outlined in previous reports (Shindler et al. 1999) and have recently been updated (Shindler and Toman 2002), they are worth detailing here because of their relevance to designing strategies for ecosystem health. These characteristics of successful agency-community interactions include:

- interactions start early and are continuous
- reasons for meeting are clearly defined with purposes and end products identified at the outset
- programs are inclusive and encourage the participation of local opinion leaders, affected property owners, and interested community members
- agency personnel use a variety of mechanisms for interacting with citizens; the focus is on personalizing information for a contextual conditions
- terms and language are defined for common use
- personnel and citizens enter interactions with genuine intentions and are open, honest, and respectful
- process provide for innovation and flexibility and allow for failure
- decision makers regularly participate in the process
- appropriate staff (i.e., technical specialists) are included to answer questions and provide substantive details
- choices include cost comparisons of treatment alternatives
- actions result in tangible outcomes in surrounding communities
- personnel follow through on commitments and decisions
- citizens are able to see how decisions are made and what information was used in the process

Additional support for agency outreach efforts is available in a recent PNW Research Station General Technical Report, "Monitoring and Evaluating Citizen-Agency Interactions: A Framework Developed for Adaptive Management" (Shindler et al. 1999). This report outlines steps for establishing outreach programs as well as tools for evaluating their effectiveness.

Many technical tools of information dissemination are available to resource professionals. However, the successful implementation of a communication strategy often comes down to how well personnel attend to public process. Providing opportunities for people to adequately evaluate the range of information, including the risks and uncertainties of various alternatives, brings them much closer to lending support to the eventual decisions. Under these circumstances—where people are given a chance to learn about and deliberate the choices, even ones that are limited or imperfect—they will often choose the lesser of the two evils and accept it (Ehrenhaldt 1994). It is the process of working through the choices together that also leads citizens to be more trusting of the decision maker.

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APPENDICES

APPENDIX A: Summary of Survey Responses

CITIZEN SURVEY OF FEDERAL FOREST CONDITIONS AND ECOSYSTEM HEALTH

FREQUENCY DISTRIBUTION
SUMMARY DRAFT

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This preliminary report summarizes responses to a mail survey of the general public in Oregon and Washington about their knowledge and opinions of federal forest conditions. Research was conducted from August to November 2001 in which 949 individuals received questionnaires and 482 were completed for a 51% response rate. This report provides a summary of overall frequency distributions only and does not report frequencies for sub-samples. Some categories for questions have been collapsed for presentation purposes (e.g., *strongly agree* and *agree* were combined into a single category). A more detailed analysis will be forthcoming in the final project report.

Support for this project was provided through a challenge cost share agreement between Oregon State University and the USDA Forest Service, Pacific Northwest Region.

1. **How close is your residence to a National Forest or lands managed by the Bureau of Land Management?**

16%	less than 5 miles	18%	31-50 miles	13%	not sure
20%	5-15 miles	10%	51-75 miles		
21%	16-30 miles	2%	more than 75 miles		

2. **How often do you visit National Forest or BLM lands?**

2%	never	20%	about once a month	2%	daily
17%	less than once a year	5%	about once a week	3%	not sure
48%	a few times a year	3%	several times a week		

3. **In general, how would you rate the overall condition of Pacific Northwest forests?**

	4%	25%	57%	15%	
Very unhealthy	1	2	3	4	Very healthy
		/	\		
		Somewhat unhealthy	Somewhat healthy		

4. **Public trust in natural resource institutions is essential to the success of forest management programs. Please indicate your level of trust in these agencies to contribute to good decisions for maintaining and restoring forest conditions.**

		Level of Trust		
		Moderate/Full	None/Limited	No opinion
a.	U.S. Forest Service	53%	36%	12%
b.	U.S. Fish & Wildlife Service	50%	36%	14%
c.	Oregon State University	44%	11%	44%
d.	University of Washington	43%	12%	45%
e.	Bureau of Land Management	43%	43%	15%
f.	Oregon Dept. of Forestry	41%	18%	41%
g.	National Marine Fisheries Service	40%	37%	24%
h.	Washington Dept. of Natural Resources	37%	27%	37%

5. **Many federal forest management issues involve difficult trade-offs between natural environmental conditions (wildlife, old-growth forests) and economic considerations (employment, tax revenues). Please indicate your priorities on the following scale about these issues.**

12%	12%	13%	39%	14%	5%	4%
1	2	3	4	5	6	7

Highest priority should be given to maintaining natural environmental conditions even if there are negative economic consequences.

Both environmental and economic factors should be given equal priority.

Highest priority should be given to economic considerations even if there are negative environmental consequences.

6. **There has been a lot of discussion lately about forest management; however, some terms used by resource professionals may not be familiar to many people. Please help us understand how familiar you are with each of the following terms.**

	I know the meaning of the term	I've heard the term, but don't know the meaning	I've never heard of the term
a. threatened & endangered species	97%	1%	2%
b. native vegetation	95%	4%	1%
c. watershed	92%	6%	2%
d. snag	85%	10%	5%
e. exotic species	83%	14%	3%
f. large woody debris	80%	10%	10%
g. ecosystem management	78%	18%	5%
h. ecological restoration	75%	20%	5%
i. biodiversity	59%	23%	17%
j. habitat fragmentation	45%	33%	23%
k. riparian area	44%	24%	32%
l. forest succession	43%	37%	20%

7. The most common reason that plant and animal species become extinct is...

2%	66%*	12%	5%	16%
predation	habitat loss	competition	natural disasters	not sure

8. Today the primary source of erosion on forest land is...

6%	45%	11%	14%	23%
natural geologic activity	clear cuts	roads	forest fires	not sure

9. Streams and streamside areas are most altered in...

52%	9%	7%	5%	28%
urban areas	farm land	forest land	range land	not sure

10. Insect and disease outbreaks are more likely to damage trees under which forest condition?

10%	57%	2%	3%	29%
old growth	over crowded	selectively thinned	clear cut	not sure

11. Please respond to these statements to the best of your ability by indicating whether you believe they are generally true, generally false, or you are not sure.

	Generally True	Generally False	Not Sure
a. Some dead and dying trees are a natural component of forest systems.	95%	2%	3%
b. Vegetation along stream banks improves water quality.	85%	3%	12%
c. Many forests in the region are susceptible to severe wildfire primarily because of long-term fire suppression activity.	50%	19%	31%
d. Both Douglas-fir and ponderosa pine trees regenerate better in open, sunny areas than in shaded ones.	41%	15%	45%
e. Currently, humans cause most forest fires in Oregon and Washington.	30%	49%	21%
f. Large trees and logs in streams are a barrier to fish and should be removed when possible.	10%	78%	12%

**Underlined percentages reflect the most correct answer.*

12. To help natural resource managers make decisions, please tell us your level of agreement or disagreement for each of the following statements. Mark "No basis for opinion" if you have no experience from which to make a judgment.

	Agree/ Strongly agree	Neutral	Disagree/ Strongly disagree	No basis for opinion
Sustaining healthy forests requires long-term, active management.	87%	5%	4%	4%
Scientific experimentation is appropriate on selected forest lands.	68%	16%	7%	9%
Scientists should take a more active role in forest management decisions.	56%	23%	12%	9%
Federal forest management agencies need major changes, not just minor adjustments.	51%	20%	9%	21%
Most federal forest agency communications (meetings, written reports, etc.) are *not* user-friendly.	36%	23%	9%	33%
Much of federal forest land is over-crowded with too many trees.	32%	19%	35%	16%
Federal forest managers are open to public input and use it to shape forest management decisions and plans.	25%	21%	37%	18%
Federal forest managers do a good job of explaining their management activities.	13%	27%	36%	25%

13. **Below are descriptions of three different forest settings that may be present in Pacific Northwest forests. Please tell us which management practices you think are acceptable for each setting.**

a. **A depleted or cut-over forest**: one where most trees have been removed by wildfire or clear cutting. Which of the following are acceptable for restoring forest conditions? (*check all that apply*)

92% plant new trees
35% use prescribed fire to control forest fuels
33% selectively thin trees
32% create snags for wildlife
32% extinguish all forest fires
21% remove woody debris and stumps
20% use herbicides to control unwanted vegetation
8% mow forested area brush and grass
7% clear-cut logging
9% none of the above, let nature take its course

b. **An overstocked forest**: one with dense stands of trees where tree growth and other vegetation is inhibited. May be subject to disease and insect infestation as well as wildfire. Which of the following are acceptable for restoring forest conditions? *(check all that apply)*

88% selectively thin trees
39% use prescribed fire to control forest fuels
24% extinguish all forest fires
21% remove woody debris and stumps
17% use herbicides to control unwanted vegetation
16% create snags for wildlife
12% plant new trees
12% clear-cut logging
7% mow forested area brush and grass
8% none of the above, let nature take its course

c. **A healthy, high quality forest**: one with sufficient numbers of green trees and plants, native wildlife habitat, stable soil, little disease or insect damage, and opportunities for recreation. Which of the following are acceptable for sustaining forest conditions? *(check all that apply)*

50% selectively thin trees
29% extinguish all forest fires
27% use prescribed fire to control forest fuels
24% plant new trees
16% create snags for wildlife
14% remove woody debris and stumps
13% use herbicides to control unwanted vegetation
8% mow forested area brush and grass
7% clear-cut logging
37% none of the above, let nature take its course

14. Today there is a lot of discussion about maintaining healthy forests in the Pacific Northwest. Agreement on what makes for a healthy forest is less clear. We would like your opinion about what components are parts of a healthy forest.

	Component of a Healthy Forest?		
	Yes	No	Not sure
a. presence of green trees	97%	1%	2%
b. abundance of wildlife	93%	3%	4%
c. low levels of disease and infestation	91%	4%	5%
d. trees of various sizes	90%	3%	7%
e. abundance and variety of plants	88%	3%	9%
f. unaltered streams	87%	5%	9%
g. a variety of tree species	85%	5%	11%
h. snags and decaying logs	79%	12%	9%
i. opportunities for recreation	70%	16%	15%
j. presence of big, old-growth trees	68%	18%	14%
k. naturally-occurring fire	57%	21%	22%
l. stable rural communities	55%	18%	27%
m. regular economic returns by logging	46%	31%	23%
n. high number of trees	29%	44%	27%
o. lack of human intervention	26%	49%	25%
p. abundance of exotic plant species	24%	45%	31%
q. closing public access roads	22%	53%	25%

15. People get information about forests from a variety of places. How useful have the following sources of information been to you? By useful we mean sources that are credible and provide good information. Please tell us how useful, understandable, and trustworthy each source is, or mark "No opinion" if you have no experience with a particular source.

	*Level of Usefulness**		Easy to	Trust-	No
	Moderate/High	None/Slight	understand?*	worthy?*	opinion
a. newspapers/magazines	69%	31%	84% yes	52% yes	12%
b. university researchers	67%	34%	58% yes	84% yes	24%
c. TV/radio programs	62%	38%	86% yes	49% yes	11%
d. extension agents	56%	44%	77% yes	82% yes	24%
e. family and/or friends	52%	48%	89% yes	77% yes	21%
f. forest industry groups	47%	53%	64% yes	44% yes	21%
g. internet	42%	58%	70% yes	49% yes	41%
h. environmental groups	35%	66%	52% yes	25% yes	15%
i. federal forest agencies....					
• interpretive signs at visitor centers	74%	26%	97% yes	91% yes	16%
• guided field trips to forests	63%	36%	94% yes	88% yes	38%
• informational brochures	63%	37%	90% yes	78% yes	29%
• conversations with agency personnel	60%	40%	80% yes	75% yes	37%
• newsletters	53%	47%	83% yes	75% yes	37%
• public meetings	44%	56%	59% yes	59% yes	40%
• planning workshops	40%	60%	66% yes	71% yes	49%

* *Percentages reflect responses from individuals who had an opinion about the specific source.*

16. People have different ideas about potential threats to healthy forest conditions. In your opinion, do you agree or disagree that the following items are threats to healthy forest conditions?

	Threat to forests?	Agree/ Strongly agree	Disagree/ Strongly disagree	No opinion
a.	insect/disease outbreaks	90%	7%	3%
b.	industrial pollution	82%	13%	6%
c.	over harvesting	82%	14%	4%
d.	urban sprawl	81%	12%	7%
e.	too many recreationists in some areas	74%	22%	4%
f.	over-crowded stands of trees	73%	15%	12%
g.	conversion of forest land to other uses	73%	19%	9%
h.	impacts from motorized recreation	73%	22%	5%
i.	wildfires	70%	26%	3%
j.	invasion of exotic species	63%	15%	22%
k.	road building in forests	55%	40%	6%
l.	too little harvesting	51%	40%	8%
m.	fire suppression	49%	33%	17%
n.	too many areas being set aside and "locked up" from management	48%	32%	21%
o.	too much forest fragmentation	44%	15%	41%
p.	too much public involvement in decisions	30%	61%	10%

17. How much confidence do you have in federal agencies such as the Forest Service and the BLM to use practices like tree thinning and prescribed fire to maintain public forests in Oregon and Washington?

5%	26%	44%	19%	7%
none	limited	moderate	full	no opinion

18. Which of the following best describes where you live?

24%	rural area	11%	city of 50,001 to 100,000
7%	town/city of 2,500 or less	10%	city of 100,001 to 250,000
20%	town/city of 2,501 to 25,000	4%	city of 250,001 to 500,000
16%	town/city of 25,001 to 50,000	9%	city of more than 500,000

19. Gender: 21% Female 79% Male

20. Age: 54.9 Years (mean)

21. Are you retired? 34% Yes 66% No

22. What is the highest level of education you have completed?

4%	some high school	17%	Bachelor's degree
34%	high school graduate/GED	9%	Some graduate school
20%	two year college degree	17%	Graduate/professional degree

23. Do you or your immediate family depend on the following industries for your economic livelihood? (If retired, did you previously depend on any of the following?) ***(check all that apply)***

19%	Timber	7%	Tourism/recreation	5%	Fishing
12%	Farming	6%	Hydro-electric	2%	Mining
7%	Ranching	6%	Special forest products	28%	Other

24. What is your approximate annual household income before taxes?

1%	less than $10,000	21%	$50,001 to $70,000
9%	$10,001 to $20,000	21%	$70,001 to $100,000
11%	$20,001 to $30,000	7%	$100,001 to $130,000
26%	$30,001 to $50,000	4%	more than $130,000

25. Are you a member of any formal organizations that are interested in public land issues? ***(check all that apply)***

10%	Environmental organization	3%	Farm/range land group
8%	Recreation group	3%	Forest industry group
8%	Fish/wildlife group	2%	Watershed council

APPENDIX B: Research Citations for Table 12

Brunson, M., and B. Shindler. 2002. Fire conditions on public forests and rangelands: A survey of citizens in Central Georgia and the Piedmont Plateau Region. Research Report. Logan, UT: Utah State University.

Brunson, M., and B. Shindler. 2002. Fire conditions on public forests and rangelands: A survey of citizens in Central Oregon—Jefferson and Deschutes Counties. Research Report. Logan, UT: Utah Stte University.

Brunson, M., and B. Shindler. 2002. Fire conditions on public forests and rangelands: A survey of citizens in Colorado's Estes Valley and Front Range communities—Larimer and Boulder Counties. Research Report. Logan, UT: Utah State University.

Brunson, M., and B. Shindler. 2002. Fire conditions on public forests and rangelands: A survey of citizens in Southeast Georgia and Northeast Florida. Research Report. Logan, UT: Utah State University.

Brunson, M., and B. Shindler. 2002. Fire conditions on public forests and rangelands: A survey of citizens in the Central Arizona Highlands—Yavapai County. Research Report. Logan, UT: Utah State University.

Brunson, M., and B. Shindler. 2002. Fire conditions on public forests and rangelands: A survey of citizens in Utah's Great Basin—West Salt Lake/Tooele Region. Research Report. Logan, UT: Utah State University.

Shindler, B., and M. Brunson. 2001. Fire conditions on public forests and rangelands: A national survey of citizens. Research Report. Corvallis, OR: Dept. of Forest Resources, Oregon State University.

Shindler, B., and E. Toman. 2002. A longitudinal analysis of fuel reduction in the Blue Mountains: Public perspectives on the use of prescribed fire and mechanized thinning. Corvallis, OR: Dept. of Forest Resources, Oregon State University.

Shindler, B., K. Koehler, and E. Toman. 2002. Fire conditions in national forests: A survey of citizens in Minnesota, Wisconsin, and Michigan. Research Report. Corvallis, OR: Dept. of Forest Resources, Oregon State University.

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