

AN ABSTRACT OF THE THESIS OF

Angela L. Mallon for the degree of Master of Science in Forest Resources presented on May 30, 2006.

Title: Public Acceptance of Disturbance-Based Forest Management: A Study of the Attentive Public in the Central Cascades Adaptive Management Area

Abstract approved: _____

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Growing emphasis on ecosystem and landscape-level forest management across North America has spurred an examination of alternative management strategies which focus on emulating dynamic natural disturbance processes, particularly those associated with forest fire regimes. This topic is the cornerstone of research in the Blue River Landscape Study (BRLS) taking place in the Central Cascades Adaptive Management Area, located in the McKenzie River watershed of western Oregon. As scientists and managers involved with the BRLS work to unravel the ecological and economic implications of disturbance-based forest management, they must also consider the level of public acceptability for such an approach. Currently there is little information regarding what citizens know about disturbance-based management, their confidence in natural resource agencies to carry out this approach, and their overall level of support for it.

This thesis summarizes research on public acceptability of using historical disturbance as a guide for future forest management. Specifically, it examines the perceptions of disturbance-based management held by members of the attentive public in McKenzie River watershed communities and the cities of Eugene and Springfield. The study is based upon responses to a mail questionnaire distributed to this group in the summer and fall of 2005. This questionnaire covered three broad categories: participants' knowledge of forest management and ecosystem processes, their opinions about citizen-agency interactions, and their judgments about the use of disturbance-based management practices, including perceived risks and uncertainties associated with this approach.

This study yielded several important findings. First, members of the attentive public in the McKenzie watershed have high levels of knowledge with respect to basic ecosystem management terms, and lower levels of knowledge about landscape-level disturbance processes. Knowledge of disturbance-based management techniques is also low, and terminology associated with this approach is not intuitive for citizens. Second, public confidence in agencies and the information they provide appears to be problematic, though McKenzie watershed citizens tend to trust local agency personnel more than agencies as institutions (e.g. federal or regional level). Third, respondents display cautious support of disturbance-based management, with several qualifications. These include emphasis on the need for projects based on sound science, transparent and inclusive decision-making processes, frank disclosure of risks and uncertainties associated with projects, and clear management objectives.

Based on these findings, several recommendations can be made. First, acknowledge the important role that attentive citizens in McKenzie communities can play in making decisions about new management strategies, and engage them from the very beginning in decision-making processes. Second, objectives and rationale behind disturbance-based management approaches must be clarified for the public. Agencies can capitalize on the existing high level of basic knowledge of forests and ecosystem processes to cultivate understanding of disturbance-emulating techniques. Third, address issues of risk and uncertainty associated with a disturbance-based management approach. These issues are often primary factors in the public's willingness to accept forest management practices, particularly those that are new and largely untested. Fourth and finally, focus on improving citizen-agency interactions, not just on a per-project basis, but as a central, long-term goal.

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Public Acceptance of Disturbance-Based Forest Management: A Study of the
Attentive Public in the Central Cascades Adaptive Management Area

by
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A THESIS

submitted to

Oregon State University

in partial fulfillment of
the requirements for the
degree of

Master of Science

Presented May 30, 2006
Commencement June 2007

Master of Science thesis of Angela L. Mallon presented on May 30, 2006.

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In understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

Angela L. Mallon, Author

ACKNOWLEDGEMENTS

If there is one thing I have learned in the course of my research, it is that the outcome of any endeavor is rarely as valuable as the road one takes to reach it. I owe thanks to many who traveled with me on this road. First I thank my major professor Bruce Shindler, who never failed to praise a job done well and tempered any criticism with sure guidance towards a more productive course. I couldn't have asked for more in an advisor. I am also grateful to Fred Swanson, John Bliss, and Arne Skaugset for serving on my committee. Their insights led me to a richer understanding of my research results and a broader perspective on the role public attitudes can play in the area of natural resource management.

My comrades in the Harris Lab have been an invaluable source of friendship, laughter, spirited debate, and the inspiration for Google searches on obscure topics totally unrelated to my research. I especially thank Christine and Eric for piloting the welcome wagon, helping me navigate the College in my first months here, and becoming steadfast friends in the process.

I also owe much to my family. I thank my dad for following his dreams and giving his children a home in the woods where they could learn that humans are a part of natural systems, not separate from them. I am grateful to my mom, who never hesitated to drive 900 miles round-trip for short weekend visits (and my thesis defense) and who inspires me with her continued forest stewardship advocacy and action. I also thank my brother, Luke, who called regularly to make sure I hadn't been crushed under a stack of books and who keeps me mindful that academia and urban living won't change the fact that we're really just kids from the country.

Lastly I thank my husband, Adam, who was the reason I journeyed to Corvallis in the first place and who has been with me every step of the way since. He is the reason I look eagerly forward to the next bend in the road.

This research was supported by the Willamette National Forest and the Pacific Northwest Research Station. Additional support was provided by the Mary McDonald, Alfred W. Moltke, and Lu Alexander Fellowships from OSU College of Forestry and the Dinkelman Memorial Scholarship from the Entiat Women's Club.

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PUBLIC ACCEPTANCE OF DISTURBANCE-BASED FOREST MANAGEMENT: A STUDY OF THE ATTENTIVE PUBLIC IN THE CENTRAL CASCADES ADAPTIVE MANAGEMENT AREA

INTRODUCTION

In recent decades, federal forest management in the Pacific Northwest has shifted from a focus on sustained-yield timber harvest through dispersed and aggregated patch clearcutting to a system of management based on static land allocations laid out by the Northwest Forest Plan. However, growing emphasis on ecosystem and landscape management has spurred interest in alternative management strategies that focus on dynamic natural processes (Cissel 1999; Parsons et al. 1998). One such method is the use of historical disturbance as a guide for ecosystem management, which involves applying information about past natural disturbances to inform practices such as timber harvest, prescribed burning, and coarse filter approaches to conservation of species (Perera & Buse 2004).

As scientists and managers work to unravel the ecological and economic implications of “disturbance-based management,” they must also consider public acceptance for such an approach. Numerous studies have demonstrated the importance of understanding the role of citizen values and attitudes in ecosystem management (Clawson 1975; Firey 1960; Grumbine 1994; Shindler et al. 2002a). Decisions based solely on biological science can lead to policy failures; for this reason, ecological research must be supplemented with investigations into relevant social perspectives of forest management processes and practices (Endter-Wada et al. 1998). However, while the body of knowledge is large with respect to public perspectives towards ecosystem management as a concept, much less is known about citizen attitudes toward and support for methods for achieving specific objectives, particularly options for relatively new ideas like disturbance-based management (Shindler 2000).

This thesis summarizes research on public opinions about and support for the use of historical disturbance as a guide for future forest management in the Blue River

Landscape Study (BRLS). The BRLS is a primary project underway in the Central Cascades Adaptive Management Area (CCAMA), an area designated for joint experimentation by the Willamette National Forest and the Bureau of Land Management Eugene District. In particular this study focused on the attitudes towards disturbance-based management, and the agencies that will implement this approach, held by members of the attentive public in the McKenzie River watershed, including the cities of Springfield and Eugene. In this study, attentive public is defined as citizens who have demonstrated past interest in local forest issues, through participation in field trips, attendance at planning meetings, and submission of input during public comment periods or putting their name on a mailing list for information. Exploratory in nature, this research focused on gathering information about 1) citizen knowledge of forest management practices and ecosystem processes, 2) interactions with and trust in forest management agencies in the area, 3) perceptions of risk associated with disturbance-based management, 4) knowledge of key concepts and practices associated with disturbance-based management, 5) potential barriers to disturbance-based management, and 6) the overall level of support for this approach.

Research Setting

The Central Cascades Adaptive Management Area is located in the McKenzie River watershed, an area which extends from the crest of the Cascade Mountain Range to the Willamette River in west-central Oregon. Within this area are located several small communities (e.g. McKenzie Bridge, Leaburg, and Vida) as well as many popular outdoor recreation sites along the McKenzie River and on upland forests. The nearest metropolitan area is Eugene/Springfield with a combined population of 190,757 people, located at the confluence of the Willamette and McKenzie Rivers (U.S. Census Bureau 2004). The upriver population of the watershed is generally comprised of retirees, people employed in either recreation or extraction based natural resource economies, and residents who commute to jobs in the Eugene/Springfield area (Shindler et al. 1996).

Area residents use Willamette National Forest lands and BLM lands frequently, and a majority claims to pay a moderate or great deal of attention to forest management issues (Shindler et al. 1996). Furthermore, several studies of citizen perspectives in the area have shown residents greatly value participation in forest management decision-making and planning processes (Shindler et al. 1996; Williams 2001; Wright 2000). Over the years personnel in the CCAMA involved with the BRLS have attempted to engage the public through tours, field trips, and meetings, consistent with adaptive management goals which emphasize sharing research findings and soliciting public input.

Management Context

Research in ecosystem management has a long history in the McKenzie River watershed. In 1948 the H.J. Andrews Experimental Forest was established in the Lookout Creek drainage, one of the tributaries to the McKenzie River. Research in forest and stream ecosystem dynamics has been underway there since the 1950s, and pioneering research on the structure and function of old-growth forest ecosystems began there in the 1970s (Andrews Experimental Forest LTER 2002; FEMAT 1993). In 1991 the Cascade Center for Ecosystem Management was established to facilitate integration of historical research at the Andrews Forest with new research projects (Cascade Center 2003). One of these is the Blue River Landscape Study (BRLS), which is designed to develop and evaluate disturbance-based management objectives for the 57,000 acre Blue River Watershed (Rapp 2002). The stated purpose of the Blue River Landscape Study is to use "...historical disturbance regimes as a model for management activities intended to achieve the objectives of the Northwest Forest Plan: late-successional habitat, aquatic ecosystems, and sustainable timber production (Cascade Center 2003)."

The Blue River Landscape Study area and the H.J. Andrews Experimental Forest are both contained within the boundaries of the CCAMA, one of ten adaptive management areas established by the 1993 Northwest Forest Plan. The total area of the CCAMA is 158,000 acres, the majority of which is located in the McKenzie River

watershed, with a small section in the South Santiam River watershed (Shindler et al. 1996). Experiments and projects at the CCAMA have benefited from collaborative efforts and good relationships between scientists and managers at the AMA, the Andrews Forest, and the nearby McKenzie River Ranger District.

Managers at the CCAMA, like those at most adaptive management areas, confront many challenges in implementing adaptive management practices. These include coordination and cooperation across jurisdictional boundaries (Stankey & Shindler 1997), working within the context of a changing political climate (Shindler et al. 1999), and balancing the demands of managing adaptively on time and resources that must also be devoted to the day-to-day business (Stankey & Shindler 1997). Furthermore, managers in the CCAMA face questions about how to appropriately involve and communicate with the public in planning activities as well as how to determine the public's expectations for successful outcomes (Shindler & Neburka 1995). Indeed, in a study of public judgments about adaptive management and CCAMA managers conducted ten years ago, Shindler et al. (1996) found that just one-third of the participants believed the Forest Service and BLM were open to public input and use it in making decisions. This research, in addition to that conducted by Shindler, Williams, and Wright in 2002, forms the foundation for inquiries into the nature of interactions between agency personnel and McKenzie watershed citizens and the basis for comparisons of findings in this thesis.

With regards to the specific objectives of the BRLS, managers must address questions such as how natural variability is defined and past conditions are described, both spatially and temporally, as well as the challenges presented by unexpected disturbance events occurring in the present (Landres 1999). Some public support for such research has been demonstrated in a previous CCAMA study (Shindler et al. 1996), where two-thirds of the participants agreed with scientific experimentation in forest ecosystems. However, resource professionals will also need to navigate the transition between the theoretical phases of project planning and on-the-ground implementation. Moreover, because the BRLS strategy provides agency personnel

more flexibility to manage adaptively, it will be important to build trust and maintain open communication with members of the local public. Because of these factors, the BRLS presents unique opportunities for monitoring and evaluating agency attempts at disturbance-based management.

Within this context, this research has three primary purposes. The first is to examine the nature of citizens' attitudes and perceptions of disturbance-based management so that resource professionals in the CCAMA may weigh the feasibility of this management approach and discern how to better communicate with the public. The second purpose of this research is to provide information that will enable agency personnel to more fully communicate and engage with the public in developing ecosystem management strategies, while at the same time increasing citizen literacy about these techniques. Third and finally, this research will satisfy conditions laid out in an August 2003 Settlement Agreement between the American Forest Resources Council and the Bureau of Land Management (BLM). The terms of the settlement require that 1) the Forest Service and BLM evaluate alternative management practices in three Northwest Forest Plan AMAs, of which the CCAMA is one, and 2) the BLM undertake a revision of their land use plans in western Oregon, to be completed through adequate public process (US Department of Agriculture and US Department of the Interior 2003). This research serves to help address the public process requirements by obtaining input from community members throughout the McKenzie River watershed, focusing on federal lands under the jurisdiction of the Forest Service and BLM. As a result, it will help us organize our understanding of the factors that influence stakeholder opinions about the use of the disturbance-based management approach.

Objectives

In spite of substantial inquiry into citizen attitudes towards forest ecosystem management in general, research regarding perceptions and opinions of historical disturbance-based management in the U.S. is extremely limited. Thus, studies of

places where these practices are underway are particularly useful. Our study site includes communities in the McKenzie River watershed. The study objectives were:

- 1) To assess stakeholder understanding of natural disturbance processes and disturbance-based management techniques
- 2) To examine public acceptance for disturbance-based management and the forest agencies who will implement these practices
- 3) To assess public concerns pertaining to the risk and uncertainty inherent in this approach
- 4) To explore potential barriers to future implementation of disturbance-based management and provide information to resource professionals inside the CCAMA and beyond

LITERATURE REVIEW

This literature review explores the links between public acceptability of forest management practices, the theory and reality of adaptive management, and the context under which disturbance-based management approaches are taking place. Although a wealth of information about public attitudes towards forest management has been collected, this review focuses specifically on factors which are likely to influence citizens' judgments about the emulation of disturbance to achieve adaptive management goals.

The purposes of this review are three-fold: 1) to define key concepts in this research, including adaptive management, social acceptability, attentive public, and disturbance-based management; 2) to provide an overview of the research focusing on the emulation of historical disturbance techniques in ecosystem management; and 3) to describe relevant social science concepts and theories pertaining to citizen support for adaptive management.

Adaptive Management

Adaptive management in federal forests aims to synthesize landscape level management of forest ecosystems within a framework of flexibility and experimentation (Stankey 2005). In and of itself, ecosystem management is a constantly evolving notion that has been defined in varying ways by many different people. Through an examination of the historical development of the ecosystem management concept Grumbine (1994) created a working definition, which states that "Ecosystem management integrates scientific knowledge of ecological relationships within a complex sociopolitical and values framework toward the general goal of protecting native ecosystem integrity over the long term (p.31)."

Adaptive management goes a step further, providing an institutional structure in which land management agencies can apply a sequential approach of planning, acting, monitoring and evaluating to ecosystem management (Bormann 1994). This approach is based on the idea that ecosystems are not only resilient to but dependent upon systemic variability (Holling 1978; Walters 1986). Because of this, they may be

most appropriately managed by an adaptive system which integrates dynamic complexity identified through modeling, generation and testing of alternative hypotheses, and exploration of the interactions between ecosystem variables at multiple scales (Holling 1995; Walters 1986). When these technical aspects are implemented in a policy framework, a process of “social learning” occurs (Lee 1993). Langston (2005) describes adaptive management in this context as,

...a messy process of developing a management scheme that incorporates multiple human perspectives while responding to changing scientific understanding of dynamic ecosystems. At its best, adaptive management is a way of paying close attention to what happens when landscapes are managed, then altering practices when old ways no longer produce the desired results (p. 53).

Theoretically, adaptive management draws on the knowledge and skills of many different segments of society – such as scientists, managers, politicians, and ordinary citizens – to identify forest management problems and set about finding ways to address them. It also offers opportunities for facilitating cooperation between forest communities and federal agencies, increasing public knowledge of forest management issues, gauging their expectations and perceptions of forest policy, and garnering citizen support for management decisions (Shindler & Neburka 1997). The adaptive management approach relies on applying alternative management practices, monitoring their outcomes, and adjusting future practices to incorporate past lessons learned (Cortner & Moote 1999). As such, it is a type of management which to a great degree is founded upon uncertainty, and is highly dependent upon monitoring the effects of each management action that is applied (Gunderson 1999).

Adaptive management is a critical part of the Northwest Forest Plan, which identified 10 areas throughout Washington, Oregon, and California that were to be specifically managed according to this principle. These adaptive management areas were intended to test new approaches to forest management that incorporated ecological, economic, and social needs and objectives (Tuchmann 1996). The Blue River Landscape Study is an answer to the charge that the CCAMA “...develop

approaches for integrating forest and stream management objectives and implications of natural disturbance regimes (US Department of Agriculture & US Department of the Interior 1994).”

Scientists and managers in the CCAMA and BRLS face the particular challenge of straddling the line between scientific experimentation, implementation, and policy making. For example, Lach et al. (2003) found that many scientists at the Andrews Forest subscribed to traditional understandings of the role of science in management, which discourages advocacy for policy or management decisions. Lach et al. (2003) further found that some Andrews Forest personnel noted the tension between scientists’ inclination to be cautious in their conclusions about ecosystem characteristics and impacts of management versus the pressure that often exists for managers to make decisions even when faced with many ecological unknowns.

With respect to specific adaptive management approaches, such as emulating disturbance, information is lacking about agency scientist and manager perspectives. In terms of adaptive management in general, its perceived efficacy among agency professionals is even lower than among the public, while satisfaction with the level of innovation and flexibility in adaptive management implementation and projects is also low (Shindler 2003a). Stankey et al. (2003) have shown that personnel within agencies perceive constraints, both internal to the agencies themselves as well as external, to the innovation and creativity required to try alternative approaches to ecosystem management. Gunderson (1999) affirms this point by emphasizing that excessive application of the precautionary principle severely limits adaptive management, saying that “...the successes and failures of [adaptive management] are intertwined with system properties of flexibility and resilience. In a nutshell, if there is no resilience in the ecological system, nor flexibility among stakeholders in the coupled social system, then one simply cannot manage adaptively” (p. 2).

Emulating Historical Disturbance in Forest Management

Adaptive management has generally been characterized by a focus on landscape-level approaches. Interest in these approaches has led to research on the

effects of historic natural disturbance on landscape characteristics such as heterogeneity, biodiversity, species composition, succession, and consideration of how these concepts might be emulated in certain aspects of forest management (Landres 1999). Emulation of historical disturbances is just one approach to adaptive management. It has been referred to by many terms, including “the natural disturbance model” (Armstrong 1999), “range of natural variability” (Landres 1999), or “historical range of variability” (Aplet 1994). Perera and Buse (2004) describe the emulation of natural disturbance as a strategy in which,

...forest managers develop and apply specific management strategies and practices at appropriate spatial and temporal scales, with the goal of producing forest ecosystems as structurally and functionally similar as possible to the ecosystems that would result from natural disturbances, and that incorporate the spatial, temporal, and random variability intrinsic to natural systems (2004, p. 4)

Research suggests some emulation of natural disturbance is important in sustaining ecosystem health. Baker (1992) and Mladenoff et al. (1993) propose that integrating disturbance regimes may be critical to designing, managing and restoring nature reserves and, where this is not possible due to reserve design and goals, disturbance-caused variation should be emulated to the degree possible. Swanson et al. (1994) assert managing ecosystems according to knowledge of their natural variability is a sound method for sustaining diversity, resiliency and productivity. Other research recommends historical disturbance may be used as a guide or model for forest management and silvicultural systems (Bunnell 1995; Hunter Jr. 1993; McComb 1993).

Much of the focus in disturbance-based management approaches has been placed on emulating historical fire regimes. Stuart-Smith and Hebert (1996) describe efforts by Alberta-Pacific Forest Industries to create harvest patterns mimicking stand structure, forest patch size and shape and varying age classes produced by historical fire regimes. Quesnel and Pinnel (1998) suggest prescribed burning or other

management techniques used to emulate the effects of low-intensity fire should be applied to maintain ponderosa pine and western larch forests in British Columbia.

Other studies emphasize the limitations to emulating historical fire regimes in forest management. Anderson (1999) cites a number of concerns about this approach, including the existing lack of knowledge about historical fire regimes, the fact that the scale of disturbances we desire to emulate may be more than society is willing to accept (e.g. extensive clearcuts intended to mimic large burned patches), and economic or practical limitations (such as maintaining sufficient biomass on a disturbed site). Granstrom (2001) cautions that fire regimes have been altered considerably by human influences and climate change, and therefore may not be as closely linked to levels of biodiversity as some have proposed. These authors suggest caution in applying disturbance-based management and promote flexibility in its application. Furthermore, Swanson et al. (1994) emphasize one of the main challenges of using disturbance-based techniques is the lack of quantitative specifications for managing ecosystems according to a historical range of variability. This lack of specificity may enable a broad range of management approaches, but it also contributes to the challenge of determining the appropriate balance of social and ecological values in this type of ecosystem management.

Emulation of historical fire regimes has served as a guiding concept for research and management in the Blue River Landscape Strategy (BRLS). Cissel et al. (1999) suggest that the BRLS is well suited for the fire regime emulation approach, where it has potential to produce positive impacts on ecosystem health and diversity and can be particularly useful in informing reserve design for habitat protection and species conservation.

Although research suggests numerous ecological benefits to a disturbance-based management approach in the McKenzie watershed, whether or not this approach is socially acceptable is largely unknown. Research has shown that other management paradigms, specifically clearcutting, are unacceptable to a large portion of the public across the U.S. and in the Pacific Northwest (Bliss 2000; Ribe 2002). More recently, a

study from British Columbia on citizens' preferences for harvest patterns suggests the public generally supports larger harvest blocks with even green-tree retention (a pattern consistent with some disturbance-based management techniques), but does not specifically inquire about the nature of stakeholder opinions regarding disturbance-based management strategies (Meitner et al. 2005).

Social Acceptability of Adaptive Management

Social acceptability was first defined by Firey (1960) as one of the three pillars of successful natural resource management. Firey's research suggested that what he termed "cultural adoptability" shared equal importance with economic feasibility and ecological possibility as one of the critical factors of long-term, sustainable resource management decisions. According to Firey, if one of these criteria is missing from the scope of a particular management project, that project is unlikely to be viable over the long-term. Subsequent research has since confirmed that even the most scientifically and economically sound management plans are doomed to failure if they are viewed negatively by the public (e.g. Shindler et al. 2002a; Shindler & Collson 1998). This reality is reflected in U.S. environmental legislation such as at the National Environmental Policy Act (NEPA) and the National Forest Management Act (NFMA), which mandate public access to natural resource planning and decision making processes.

Kakoyannis and others (2001) suggest the institutional culture of natural resource management agencies often promotes the belief that public concerns are a mere inconvenience which can be surmounted by educating the public about the scientific "facts." In reality, achieving public acceptability is a far more complex pursuit. According to Stankey (1996), the concept of social acceptability is based on several principles. First, the utility and value of natural resources is defined by the public and is highly variable. Second, citizens in a democratic society possess the political power to enforce expectations for the use of public natural resources, which is accorded to them by legislation. Third, social acceptability judgments are influenced

by a number of factors in addition to scientific fact, including personal preferences and knowledge, ethics, values, and attitudes. Fourth, public assessments of acceptability are linked to expectations that certain actions will occur. For example, if a particular ecosystem condition is considered acceptable, people will expect that it be maintained; if it is unacceptable, the public will expect change or improvement to occur. The fifth principle of social acceptability is that it is tied to perceptions of risk and uncertainty inherent to resource management. Even where individuals generally support the idea of certain management actions they may be inclined to support a more cautious approach to implementation (Brunson 1996). In subsequent research, Stankey and Shindler (2006) assert another basic principle exists. This is one of opportunity, where under an adaptive management approach, agencies and citizens can come together to learn and inform one another.

The degree to which public acceptance of management practices is required stems directly from how relevant these practices and their outcomes are to citizens' lives (Stankey 1996). As stated by Brunson (1996),

Social acceptability in forest management results from a judgmental process by which individuals (1) compare the perceived reality with its known alternatives; and 2) decide whether the 'real' condition is superior, or sufficiently similar, to the most favorable alternative condition (p. 9).

Relevancy and acceptability are in turn based upon the context in which management takes place. Shindler (2000) identifies three contextual factors which influence public acceptability and may be viewed differently by citizens than resource managers and scientists. First is spatial context, which refers to how management affects places which have meaning to citizens – for example, popular recreation sites, the view from their back window, or the forests where they work. The second factor is temporal context. In addition to changes over time to places they are familiar with, this factor may encompass issues such as the historical relationships that citizens have with land management agencies, questions about the long-term consequences of management, and how long it will take before results can be observed. Third and finally is social

context, which may include the quality of decision-making processes, the perceived economic costs or benefits of management activities, and the political environment in which decisions are made.

Several examples illustrate how levels of acceptability vary according to these factors. Brunson and Shindler (2004) concluded that levels of social acceptability for forest management focused on flammable fuels reduction varied geographically and according to social and ecological conditions specific to certain locations, such as forest fuel type and management history. With respect to adaptive management specifically, Shindler and others (1996) also found that social acceptability varies according to citizens' ability to understand how management practices will look, how they will affect the economy and forest health, whether they feel the information they receive about actions is trustworthy, and whether they have played a meaningful role in management planning. Further, a study by Manning (1999) suggests the public tends to favor management approaches which emphasize a broad range of goals over commodity production and which maintain ecological integrity of natural systems. Other research shows levels of support for ecosystem management may differ according to different socio-demographic characteristics such as age, gender, and income (Jacobson & Marynowski 1997; Van Liere 1980; Williams 2001; Wright 2000). Jacobson and Marynowski (1997) found that users and area residents near Eglin Air force Base in Florida had slightly favorable opinions of ecosystem management, although those among this group who were more highly educated and affluent and from urban areas tended to demonstrate greater levels of support than those who were not.

Public satisfaction is low with regard to more specific aspects of adaptive management, such as the perception of whether adaptive management goals are being achieved, whether adaptive management areas are effective, or whether the public is sufficiently involved in the adaptive management process (Shindler 2003a). However, there is little information on whether the public supports specific forest management

techniques used in adaptive management approaches, particularly disturbance-based management.

Within this discussion of which practices are acceptable to the public and which are not, even the idea of “the public” is complex and highly pluralistic; in other words, there are multiple publics with a stake in land management decisions (Kakoyannis et al. 2001). For example, citizens’ views about natural resource issues can be strongly influenced by whether they are members of the attentive, as opposed to general, public (Williams 2001; Wright 2000). Some theories associate attentiveness with participation in the democratic process (Lynch 1987). Weible et al. (2005) define the attentive public as a group “...that stays reasonably informed about, and occasionally participates in, public policy debates” (p. 5). They define the “unattentive public” as being at the opposite end of the spectrum, essentially unconcerned with policy and therefore not likely to be major players in creating, implementing, or opposing policy.

In a natural resource context, the attentive public may be defined as those individuals who display a continuing interest or choose to become involved with a particular project, problem or issue, often referred to as “first responders” (Shindler 2003a). Members of the attentive public frequently become part of planning processes and have the greatest influences on whether projects and policies are implemented (Mazmanian 1980). For this reason they are often the first group of interest identified by resource managers seeking to gauge or improve acceptance for a particular project. In this study, the attentive public is being targeted with the expectation that knowledge of and interest in alternative ecosystem management strategies will be higher in this cohort, an assumption supported by the research of Wright (2000) and Williams (2001). They represent an important stakeholder group with whom forest agencies will be interacting for implementation over the long term.

Knowledge

In order for citizens to play a meaningful role in discussing and choosing appropriate forest management practices they must have some knowledge of the

problems that need to be addressed and potential solutions (Shindler et al. 2004b). Citizen understanding of management objectives is comprised of many different elements, including comprehension of ecosystem functions and processes, understanding of the legal and political context in which management takes place, and personally held values and beliefs (McCool & Guthrie 2001). Stankey and Shindler (2006) suggest there are two basic types of knowledge: technical (or scientific) and experiential. Technical knowledge is based on scientific fact, collected in an experimental or academic framework, generally transmitted among scientific and technical experts, and often taken out of the social context in which it was gathered (Kloppenburg 1991). Experiential knowledge on the other hand is highly context-based, and is derived from observations of and interactions with the world, as well as the historical perspectives which this experience bestows (Kloppenburg 1991; Wolforth 2004). That citizens' judgments are based on these two types of information is precisely why their judgments are not likely to change based on scientific fact alone (Stankey 1996). Findings by Shindler and Collson (1998), suggest that citizens are most likely to support decisions which are based upon both accurate, objective scientific information and place-based, experiential knowledge.

According to Brunson and Shindler (2004) citizens' cognitive beliefs about management are one of the factors which contribute to the provisional nature of social acceptability. Thus information, whether gained by educational or experiential means, can help citizens change their beliefs about ecosystem conditions or management practices. Where public knowledge of management approaches is low, it is critical to spell out the reasons for and effects of proposed management, cast management in the appropriate context, be explicit about the specific actions to be taken, and identify exactly where and when management will be undertaken (Stankey & Shindler 2006). Further, Shindler and others (2004b) state that, "Resource conditions and practices are more meaningful when people can equate them to local problems, such as familiar tree species in trouble or a recognizable place (e.g. a recreation site of forestland bordering a residential development) in need of restoration (p.18)." This means that citizens

generally understand management challenges and techniques better when they are presented in a locally or personally relevant context.

Certain demographic variables may influence citizens' knowledge of environmental conditions. These include age, levels of formal education, length of residency in a particular region, or residency in rural versus urban areas (Arcury 1990; Steel et al. 1998). Greater environmental knowledge is correlated with greater concern for environmental problems (Arcury 1990), and greater levels of formal education are generally correlated with greater environmental concern (Arcury 1986; Williams 2001). Women and younger citizens tend to demonstrate greater support for conservation measures (Arcury 1986; Van Liere 1980).

Numerous studies demonstrate the importance of education and outreach activities in building knowledge of and support for ecosystem management (Jacobson & Marynowski 1997). Cortner et al. (1996) state that "...under ecosystem management, the role of land manager may include educator, mediator....conflict manager, public relations specialist...or some combination of these roles (p.16)." Knowing the level of knowledge citizens possess can assist in developing effective communication strategies about management activities. Because knowledge is made up of both cognitive and judgmental dimensions, efforts to increase knowledge must address both of these elements.

Shindler and Neburka (1995) emphasize that the most successful public participation processes involve citizens who have strong knowledge of relevant management issues. Further, Jacobson and Marynowski (1997) suggest that citizens who are knowledgeable about ecosystem management plans and policies can be effective in educating other members of the public about the benefits of these approaches. With respect to strategies intended to emulate natural conditions, McCool and Guthrie (2001) point out that a greater level of knowledge about ecological processes is necessary among citizens who are poised to evaluate these strategies. Indeed, as stated by Kusel and others (1996) knowledge is "both the foundation and the product" of effective adaptive management (p. 616). As such, it represents one of

a number of important factors influencing citizen acceptability of management practices.

Trust

Another of the most critical elements of support for ecosystem management implementation is the level of trust in agency scientists and managers and experiences the public has with these people (Shindler and Toman 2003). Cortner and others (1996) emphasize the growing lack of trust between management agencies and the public, which persists despite rhetorical and research-based commitments to increasing public participation in decision processes. Wondelleck (1988), while acknowledging that agencies such as the Forest Service have made sincere efforts to regain citizens' trust, points out that such efforts have largely been ineffective, as evidenced by numerous disputes over management planning and policy.

Moore (1996) identifies two types of trust: interpersonal, and organizational. The first refers to the perception of mutual honesty, interest in the well-being of others, and reciprocity between individuals. The second is characterized by confidence in the equitability of decision-making processes.

There are many contextual factors which influence citizens' trust in agencies and agency personnel. Steel et al. (1998) found that rural residents dependent upon the timber industry displayed more trust in agencies such as the Forest Service and BLM, while urban residents who generally supported ecosystem management initiatives generally displayed less trust in these organizations. Other research has shown that citizens often display more trust in local managers and agencies than they do in these institutions at the regional or national level (Shindler et al. 1996). This has been attributed to the perception that local-level personnel are more inclined to respond to local concerns, in contrast to their federal or regional counterparts who may be perceived as beholden to political inertia or special interest groups (Shindler et al. 2002a). Research has also found that trust is linked to citizens' perceptions of risks, uncertainties, and potential benefits associated with management approaches (Winter

et al. 2004), or experiences with management practices gone awry, such as escaped prescribed burns (Brunson & Evans 2005).

Trust is also a factor in how information from agencies is received by the public. Confidence in agency information often depends less upon the content of the information itself and more on the credibility of the information provider (Binney et al. 1996). Peters et al. (1997) assert that public trust in information sources hinges upon a perception of agency care for and commitment to citizens' needs and priorities, as well as the perception that information providers are knowledgeable and credible. Shindler and others (1999) note that interpersonal trust – the mutual agreement between two individuals to trust one another in pursuit of mutually beneficial goals – is especially important.

In the context of new and innovative management approaches, enhancing public confidence in an agency's ability to manage effectively will be essential to implementation (Shindler et al. 1996). Shindler and others (2002a) assert that a key element to building trust between citizens and agencies is not just the outcome of management decisions, but a focus on making the decision process fair and open. According to Lawrence et al. (1997), efforts to increase this "procedural justice" have the potential to result in a positive feedback loop, whereby inclusive decision-making processes lead to increased levels of trust, which in turn contribute to more positive perceptions of agencies and their decisions.

Citizen participation in natural resource decision-making

Adaptive management, by its very nature, requires that plans be made by a broad group of people, including scientists, managers, and citizens (Cortner et al. 1996). Citizens are generally not satisfied to sit back and let "the experts" make the appropriate decisions (Brunson 1992) – they expect to understand and be involved in management decision-making processes (Shindler et al. 2004b). Recent studies from Oregon show that most citizens desire a greater role in federal forest management (Shindler 2003b; Shindler et al. 1996; Williams 2001). Thus, learning how to create

and sustain positive interactions with citizens has become one of the primary directives of federal forest agencies.

Yaffee and Wondolleck (1997) identify both short-term and long-term benefits associated with cultivation of relationships between agencies and citizens. The most obvious immediate benefit is that public support will be built for current agency direction and decisions. Over the long run, positive relations will help build the public's knowledge base and influence their natural resource values. Furthermore, citizen-agency connections provide a forum for participatory planning processes.

Shindler and Aldred-Cheek (1999) identify six characteristics of successful citizen-agency interactions. First is a transparent, inclusive public process, which provides access to all parties who have the potential to be affected by management decisions (Smith & McDonough 2001). Shindler and Neburka (1997) emphasize that efforts to involve the public must be sincere, and not empty gestures in an attempt to appease public perceptions of being ignored by agencies. Interactions should not only strive to disseminate information, but also increase understanding of decision-making principles (Paretti 2003).

The second attribute of successful citizen-agency interactions is that personnel in positions of leadership must be committed to interactive public outreach strategies. Members of the public have the most confidence in processes where agency decision-makers at the line officer level – e.g. district rangers or forest supervisors – are involved. As Yaffee and Wondolleck (1997) point out, public involvement attempts which are not taken seriously by agency leaders will not be taken seriously by the public. For this reason, “Agency leaders need to demonstrate commitment to building...relationships, not just for the sake of building relationships, but for the better decisions and enhanced effectiveness that such relationships can yield (Yaffee & Wondolleck 1997, p. 395).”

Third, agencies must have the ability to be innovative and flexible in public involvement processes and implementation of decisions. Furthermore, they must have the flexibility to adjust participation processes to fit the context specific to the

circumstances under which decision-making takes place. This may mean expanding participatory processes to distribute leadership, responsibilities, and power to a broader group of players (Cortner et al. 1996). Moreover, public involvement needs to begin early and occur continually, not just at the specific stages required by NEPA (Lawrence & Daniels 1996).

Fourth, agencies must display a long-term investment in public involvement and education, and must strive to integrate citizens in *all* stages of decision-making (Blahna & Yonts-Shepard 1989). In most cases, this long-term commitment will involve what Olsen et al. (2006) refer to as “pre-planning,” which entails developing standards for how community members will be involved and communicated with, and what role they will play in the planning process.

The fifth characteristic of successful citizen-agency interactions is demonstration that public input has been integrated tangibly into the final product of planning processes (Blahna & Yonts-Shepard 1989). Smith and McDonough (2001) state that “Participants [want] to know they [have] been heard and their ideas seriously considered (p. 245).” Open, inclusive decision-making processes enable agencies to understand and accommodate the concerns of a wide range of groups and individuals with a stake in ecosystem management (Yaffee & Wondolleck 1997).

Sixth and finally, successful public involvement integrates citizens’ experiential knowledge into management decisions. As argued by Kusel et al. (1996), landowners and community members living in close proximity to management units are valuable sources of two types of knowledge: information about unique attributes and processes of local ecosystems, and place-specific social values.

Positive citizen-agency interactions are also characterized by good communication. Olsen and others (2006) point to two distinct elements of communication – content and process. Content refers to what information is being given to the public, while process refers to how it is distributed. Traditionally, agencies have focused more on the former and have been criticized for failing to

adequately consider the need for a well-designed communication process (Kakoyannis et al. 2001).

Successful citizen involvement efforts consist of two-way information exchange, rather than just a “show-and-tell” format. Recent research by Toman et al. (2006) suggests that interactive types of communication, such as guided field trips, interpretive centers, and face-to-face conversations with agency employees are much more effective at reaching citizens than unidirectional formats like television, newsletters, and brochures. Similarly, McCaffrey (2004) asserts that the most effective communication efforts combine educational materials with personal conversations.

Several barriers to fruitful citizen-agency interactions have been identified. Broadly, these may be grouped into two distinct categories: procedural barriers put in place by institutional constraints, and barriers presented by personal values or attitudes. The Federal Advisory Committee Act (FACA) of 1972 represents probably the most significant of the institutional hurdles. The intention of FACA is to standardize and regulate the role of advisory committees to federal agencies, with the goal of minimizing redundancy among such groups and associated wasteful operations costs, and preventing particular interests from having undue influence (1972; Lynch 1996). In effect however, it is often perceived as an obstacle to collaborative efforts between agencies and the public, because it can require official chartering of individuals serving in an advisory capacity who are not full-time federal employees (Frentz et al. 1997). Land management agencies may balk at opportunities to involve citizen groups in decision-making processes for fear that such activities will be required to come into compliance with FACA directives.

Agency-specific culture can also represent a barrier to successful relations with citizens. In some cases, agencies at the organizational level may view public involvement simply as an opportunity to inform an uneducated public, rather than as a chance for cooperative decision-making (Lawrence & Daniels 1996). Cortner and others (1996) cite hierarchical leadership patterns, rewards systems which are poorly

suited to recognize successes not based on commodity production, and risk aversion as among the most critical hurdles to public involvement. Further, Yaffee and Wondolleck (1997) refer to constraints such as lack of time and monetary resources within agencies interested in building bridges with the public, while Blahna and Yonts-Shepard (1989) point out that many management units simply have no designated public affairs staff, and thus public participation activities are haphazardly assigned to units which have no special capacity to carry out these activities.

At an individual level, many agency staff members simply lack the skills, experience, and support to make successful interactions happen (Shindler et al. 1999). Yaffee and Wondolleck (1997) emphasize that agency personnel may lack trust in members of the public, or may simply be resistant to the change represented by planning paradigms which place more focus on public involvement. This point may in turn be related to a “we know best” attitude among resource professionals, which results from a perception that the public is unknowledgeable and thus unable to provide meaningful input (Magill 1991).

Under these complex and “messy,” management situations, both agency personnel and citizens must be willing to define successful interactions in broad terms (McCool & Guthrie 2001). These terms might include opportunities for mutual learning, implementation of suitable management plans, formation of positive relationships between agencies and the public, and building agency employees’ capacity to communicate with citizens. The formation of positive relationships is perhaps the most important, as they can provide the foundation for future successes in project planning and decision-making (Shindler et al. 1999).

METHODS

This assessment of stakeholder attitudes towards disturbance-based management employed a combination of qualitative and quantitative methods, which included focus group interviews during visits to selected field sites, individual interviews, and a mail questionnaire. Focus groups and interviews were primarily used in the initial phases of the research to inform the design of the mail questionnaire. They were used in a lesser degree to add insight to quantitative data analysis. The combination of both quantitative and qualitative methods enabled a broad inquiry into factors that influence public attitudes, which is not normally achieved by applying either method alone (Babbie 2001).

Focus Groups

Focus groups are frequently used in the first stages of research on new topics, with the purpose of identifying themes of interest and concern among stakeholder groups. Because disturbance-based management is a relatively new concept, focus groups were conducted in conjunction with two field trips to sites in the Blue River Landscape Study. These trips achieved several purposes, first to familiarize participants with the concept of disturbance-based management, second to lend context to discussions about the BRLS approach, and third to help identify important questions and concerns with this approach.

Field trips took place on two different days during the spring of 2005. The first field trip included 19 personnel (15 managers, 4 researchers) from the Willamette National Forest, Eugene District Bureau of Land Management, and H.J. Andrews Experimental Forest. Participants visited 3 different sites with harvesting treatments designed to emulate various fire regimes. Discussion during the agency tour was primarily focused on the challenges of implementing disturbance-based management in the BRLS; the reasons for using this approach; risk and uncertainty surrounding it; and support for disturbance-based management, both internal to the agencies and externally among the public. The information obtained from this trip was used to identify issues for discussion on the public field tour and also to further inform

questionnaire design for the mail survey. Information from the agency site visits is not otherwise a topic of this thesis.

The second field trip included 9 members of the attentive public from McKenzie River communities, with 8 agency personnel along to describe treatments of each site. Citizen participants were selected based on their status as leaders within their communities or as individuals interested in forest issues in the McKenzie River watershed. These individuals included business leaders, private landowners, and members of the McKenzie Watershed Council. Forest Service personnel who were familiar with communities in the McKenzie helped to identify and recruit participants for the tour. Participants on this trip visited two sites demonstrating disturbance-based management. The discussion in this group focused on the appropriateness of disturbance-based management, concerns and uncertainty surrounding this approach, reactions to treatments, political realities of a long-term strategy, and confidence in agencies to implement this approach. This discussion also revealed the citizens' level of understanding of the concept of disturbance-based management in general and the terms used to describe this approach.

Interviews

Prior to the field trips, semi-structured interviews were conducted with two researchers instrumental in initiating the BRLS and in constructing research objectives for the project. These interviews helped to identify themes and questions which could be covered in field trip discussions.

Following the public field trip, an interview was conducted with a member of the Eugene-based environmental community who was unable to attend the field trip. The purpose of this interview was to make sure all identifiable themes of interest and areas of concern were taken into account.

Mail Survey

An 8-page mail questionnaire was developed based on the themes identified during the focus group field trips, interviews, and a review of research literature.

Survey questions addressed respondents' knowledge of ecosystem management in general and disturbance processes in particular, opinions about forest management practices, support for disturbance-based management, and interactions with federal agencies who implement these approaches. Draft surveys were reviewed by research collaborators at Oregon State University and the Forest Service Pacific Northwest Research Station. The final questionnaire was distributed in the period between July and September, 2005.

The survey was distributed to a sample of 312 individuals from the attentive public. This sample was drawn from three primary sources: an existing Forest Service list of individuals who requested information about management activities or attended public meetings or field trips; the newsletter mailing list for the McKenzie Watershed Council; and a mailing list developed by Oregon State University researchers studying public perceptions of the CCAMA in 2000. Only residents of the McKenzie Watershed and Eugene-Springfield were included in the sample.

Questionnaires were mailed with a hand-signed cover letter and self-addressed, stamped return envelope according to a modified "total design method" (Dillman 1978). The first wave of mailings occurred in July 2005. Second and third wave mailings to individuals who did not return the questionnaire occurred at three-week intervals, with the final mailing being completed in September. Overall, 230 surveys were returned resulting in a response rate of 74%. Market research analysis indicates this level of response to be sufficiently high to make inferences to our larger study population of the attentive public in the McKenzie River watershed (Lehman 1989).

FINDINGS

Study findings are presented in written, graphical, and tabular format in the following sections: 1) participant profile, public awareness of forest issues, and knowledge of ecosystem processes, 2) opinions about forest management practices, citizen agency interactions, and use of information sources, and 3) support for disturbance-based management. In some cases categories have been collapsed for presentation purposes (i.e. *agree* and *strongly agree* combined into a single category, *agree*). Table footnotes indicate when responses between upriver and Eugene-Springfield participants were significantly different.

Participant Profile, Public Awareness, and Knowledge

Respondent characteristics

The demographic characteristics shown in Table 1 provide a context for understanding responses of survey participants. This information will be used to identify trends associated with different population segments. Findings are arranged so that differences between responses from upriver communities (rural) and the more urban Eugene-Springfield (E/S) can be identified.

Overall, we see the sample is dominated by males, though a slightly greater proportion of rural females than urban females responded. This result is consistent with results from past forest management surveys. The mean age (60 years) is slightly greater than the mean age of respondents from past similar studies (Shindler et al. 2002c; Williams 2001), perhaps reflecting an important characteristic of the attentive public – possession of free time to pay attention to natural resource issues.

Two findings are particularly noteworthy. One is the average length of residency in the McKenzie River watershed (32 years) which is related in part to the average age of survey respondents. Recent research suggests long-term residency corresponds to a high level of knowledge of and attention to forest issues (Shindler & Toman 2002). Also of interest is the high level of education indicated by survey

respondents – 70% of the total have earned a bachelor’s degree or higher. Eugene-Springfield respondents have significantly higher levels of education.

Table 1: Respondent characteristics

	Overall	E/S	Upriver
Total sample size	230 ^a	133	93
Mean years of residence in Lane County	32	33	32
Gender			
Male	74%	76%	70%
Female	27%	24%	30%
Mean age	60	59	61
*Education			
Some high school	1%	0%	2%
High school	5%	4%	7%
Some college	23%	17%	33%
Bachelor’s degree	25%	29%	20%
Some graduate school	15%	16%	14%
Graduate degree	30%	35%	25%

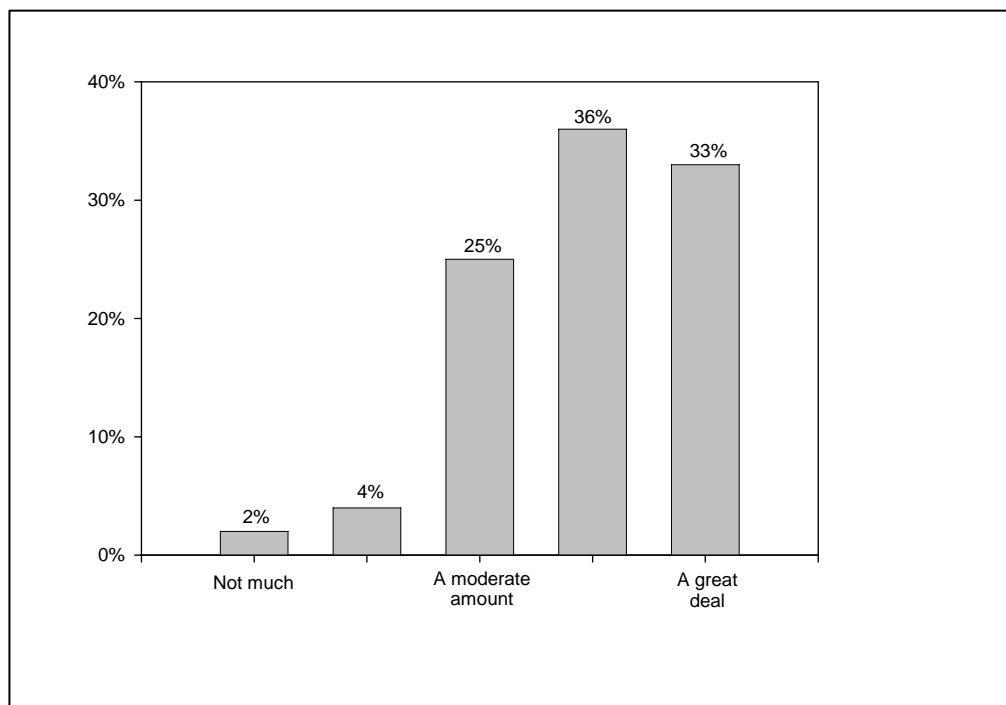
^a Four respondents chose not to provide zip codes, and thus were not assigned to E/S or Upriver categories

*Eugene-Springfield respondents possessed significantly higher levels of education

Public awareness

To test the notion that our sample represented the “attentive public,” participants were first asked to indicate how much attention they pay to national forest issues or problems. Previous studies have linked self-rated awareness of forest-related issues to knowledge about forest management practices (Shindler & Toman 2002; Williams 2001). In this case 94% of participants indicated they pay a moderate to a great deal of attention to national forest issues (Figure 1).

Figure 1: How much attention do you pay to national forest issues or problems?



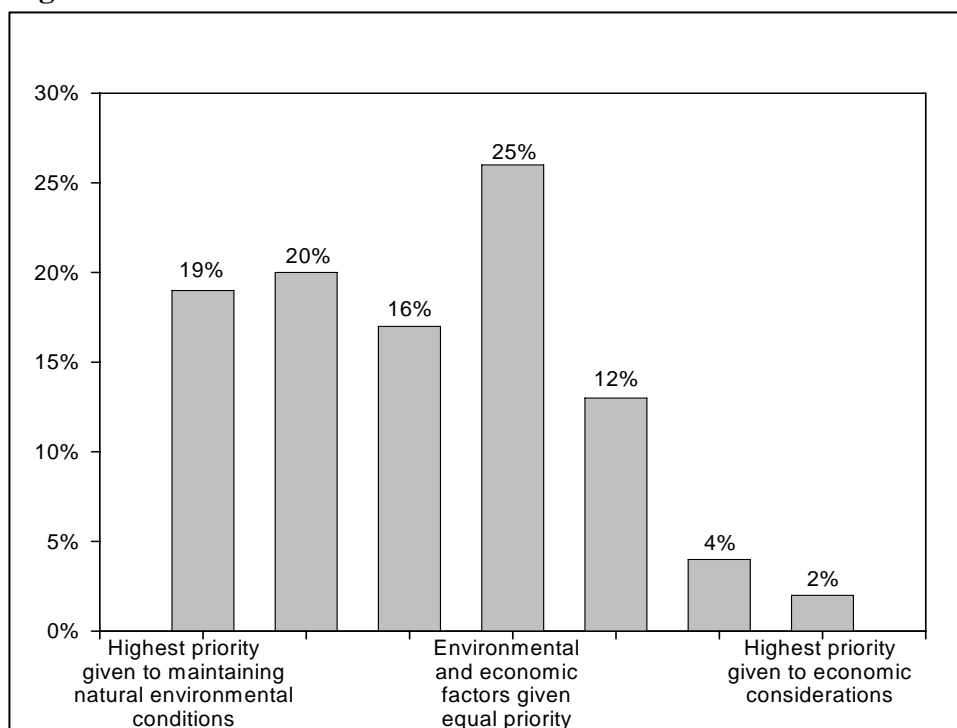
Policy orientation

Respondents were next asked to rank their forest management policy orientation on a seven point continuum indicating preferences for environmental versus economic priorities (Figure 2). Responses on the left side of the continuum indicate a preference for environmental conservation even if there are economic consequences. Responses on the right side represent an inclination to favor economic considerations, even if negative environmental consequences result. The mid-point of the continuum represents a balance between economic and environmental priorities.

Overall, more than half (55%) of the respondents are grouped left of the midpoint, indicating some level of preference for environmental objectives over economic ones. Another 25% favors a balancing of environmental and economic priorities, but the majority of respondents indicate some level of preference for

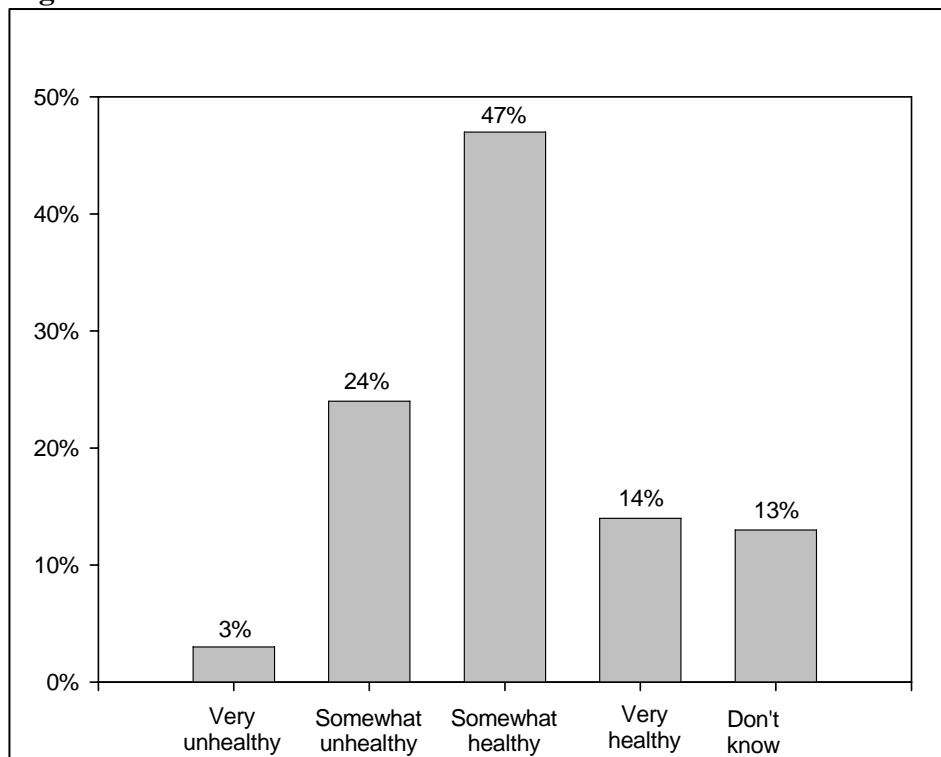
environmental objectives over economic ones. These results contrast with research by Shinder et al. (2002c) on the general population in the Pacific Northwest, which found responses were more normally distributed along the continuum (i.e. a large majority favoring a balancing of priorities and fewer responses on either end).

Figure 2: Environmental-economic continuum



Perceptions of forest health

Next, we looked at how respondents perceived the condition of federal forest lands in the McKenzie River area. Participants were asked to rank forest condition on a scale from one (*very unhealthy*) to four (*very healthy*), or to mark *don't know*. Overall, about half of respondents believe federal forests in the McKenzie are healthy (Figure 3). Slightly over one-quarter judged forests to be unhealthy, suggesting some concerns exist about the condition of forests in the area.

Figure 3: Condition of federal forest lands in the McKenzie watershed

Knowledge measures – Ecosystem management terms and projects

The purpose of this section of the survey was to assess participants' understanding of the terminology used in forest management and their awareness of associated projects. Respondents were asked whether they knew the meaning of a term, had heard the term but didn't know the meaning, or if they had never heard it (Table 2). The first eight terms are general concepts related to ecosystem management. The table shows that overall knowledge levels are high for most of these terms. Over 90% of respondents indicated full knowledge of the terms *watershed*, *riparian area*, and *ecosystem management*, while over 70% were familiar with the concepts of *patch-clearcutting*, *forest succession*, and *active management*. Respondents were less familiar with the terms *rotation age* and *uneven-aged management*.

The second group of terms deals with concepts specific to disturbance-based management. At this point in the survey respondents had received no introduction to the concept; this section of the survey was designed to gauge their baseline knowledge of concepts related to the approach. Findings indicate that knowledge levels are much lower than for terms in the first section. In most cases, less than half of all respondents understand these concepts, and one-quarter to one-third have never heard of them. Only *fire return interval* was recognized by the majority, which may reflect the influence of recent education efforts and media attention on the topic of forest fire ecology.

The third group section asks about familiarity with ecosystem management projects or places located in the McKenzie River watershed. Sixty-four percent of respondents were familiar with HJ Andrews Experimental Forest, which is not unexpected given its long history in the watershed and continuing efforts at public outreach. Over half of all respondents were familiar with the Northwest Forest Plan, and this is the only term with which urban residents display a significantly greater level of familiarity than rural residents. However, only 25% of participants know about the Central Cascades Adaptive Management Area, and only 17% are familiar with the Blue River Landscape Study. In each case these levels are lower than those found by Williams in a similar survey from 2001.

Table 2: Knowledge of forest ecology terms and projects (all values in percents)

	Know term	Heard term, don't know meaning	Never heard term
Ecosystem management terms			
watershed	96	2	1
riparian area	95	3	2
ecosystem management	91	8	2
patch clear-cut	81	14	5
forest succession	71	18	11
active management	71	20	9
rotation age	66	17	17
uneven-aged management	60	16	25
Disturbance-based management terms			
fire return interval	59	27	14
adaptive management area	47	33	21
disturbance-based management	41	31	29
range of historic variability	40	30	31
disturbance regime	32	30	38
Management Projects/Places			
HJA Experimental Forest	64	22	14
*Northwest Forest Plan	53	38	9
Central Cascades AMA	25	39	36
Blue River Landscape Study	17	40	43

**Significantly more Eugene-Springfield respondents indicated familiarity with this term ($p < 0.05$).*

Knowledge measures – Ecosystem processes

To obtain further information on participants' knowledge of forest systems, the next section of the survey provided a series of statements about ecosystem processes and asked respondents to rate them as generally true, generally false, or to indicate if they were not sure (Table 3). Responses to these statements demonstrated high levels of knowledge about the general importance of disturbance processes in forest ecosystems (98%) and species survival (80%), the value of decadent material in

healthy forests (100%) and streams (90%), and ideal conditions for Douglas-fir regeneration (71%). These results contrast with the relatively low levels of knowledge about fire frequency at sites in the McKenzie watershed (27%) and to a statement where we first introduce the idea of disturbance-based management (53%). Responses to these questions were characterized by relatively high levels of uncertainty – 38% and 37% respectively.

Table 3: Knowledge of ecosystem processes

	Correct	Incorrect	Not sure
Disturbance events (fires, flood, wind) have played a significant role in shaping natural forests in the McKenzie River Watershed for thousands of years. (True)	98	1	1
Plant and animal species depend on disturbance events for survival. (True)	80	6	14
Some dead and dying trees are natural components of forest systems. (True)	100	0	0
Large trees and logs in streams are a barrier to fish and should be removed when possible. (False)	90	4	6
Douglas-fir trees regenerate better in open, sunny areas, than shady ones. (True)	71	14	15
*Historically, sites in the upper McKenzie River Watershed experienced fire frequently (every 10 to 20 years). (False)	27	35	38
Natural disturbance-based forest management involves using harvesting techniques and prescribed fire to emulate past events like floods, wildfires, windstorms, and landslides. (True)	53	10	37

**Eugene-Springfield respondents significantly more likely to answer correctly (39%) than upriver respondents (28%); $X^2 = 6.63$, $p = 0.036$.*

Opinions about Management practices, Citizen-Agency Interactions, and Use of Information Sources

The second section of the questionnaire focused on citizen's opinions about different aspects of federal forest land management, including attitudes about certain forest management practices, opinions about the different information sources used to

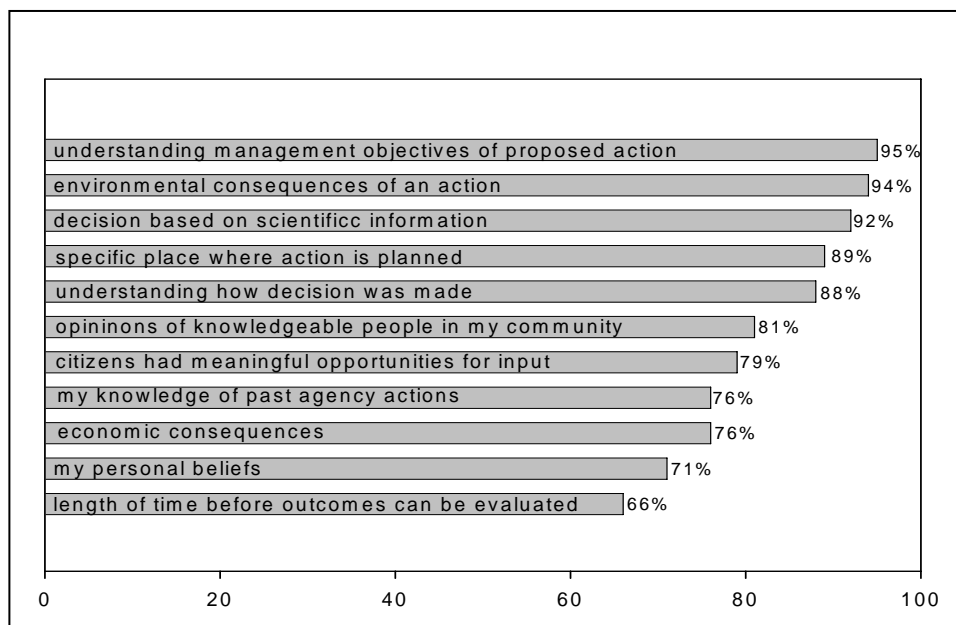
communicate with the public about natural resource issues, and experiences interacting with agency personnel.

Factors influencing judgments about management decisions

Developing a better understanding of how people form judgments about management policies is an essential research question to these and other studies. Thus, we asked participants about factors that influence their ideas about current Forest Service or BLM management actions and decisions. In providing a list of important factors, we drew from the body of research on social acceptability (Shindler et al. 2002a; Shindler & Neburka 1997; Stankey & Shindler 2006). Respondents were asked to rate each factor as *very important*, *important*, *slightly important*, or *not important*.

As shown in Figure 4, a majority of respondents believes all of these factors are important in influencing their support for forest management decisions. For assessment purposes, the listed factors can be grouped into three different levels of importance. The highest tier (important to 88% or more) included understanding management objectives, environmental consequences of management actions, the role of scientific information in decision making, the place for which an action is planned, and understanding how a decision was made. A second tier, rated as important by over three-quarters of respondents, included opinions of other knowledgeable people, the opportunity for meaningful citizen input, knowledge of past agency actions, and economic consequences. Personal beliefs and the length of time before outcomes can be evaluated complete a third tier. These results are generally consistent with the findings of Williams (2001). Overall, responses of Eugene-Springfield and upriver respondents were not significantly different.

Figure 4: Importance of factors influencing support for forest management actions and decisions



No significant difference between Eugene-Springfield and upriver communities

Participants were also given the opportunity to list additional factors which influence their ideas in an open-ended format. Of those who chose to respond to this item, many stressed the importance of knowing how politics affected the science used in making forest management decisions. Most viewed political influence negatively, as exemplified by the comments of one respondent, who stated that it was important to know “If an action or decision was heavily influenced by political considerations over objective scientific information...” Another respondent emphasized the need to know that, “...personal agendas and biases...are suppressed in favor of use of sound scientific and economic tools for making forest management decisions.”

Responses to this open-ended question also highlighted personal preference about projects which focus on long-term, sustainable ecosystem management. According to one participant, “I feel it is very important to take the long view, to manage for sustainability over centuries, to preserve species and diversity. I feel that ‘old growth’ is a vital repository of diversity and it is essential that no more old

growth stands be cut, ever!” Another stated that “Decisions [should be] based on sound ecosystem management, not simply on conifer production.”

Trust in natural resource institutions

Next, we asked survey participants to rate their level of trust in local natural resource institutions (Table 4). Respondents displayed the greatest trust in Oregon State University scientists, with three-quarters indicating full or moderate trust in this group. Over two-thirds of the attentive public indicated full or moderate trust in Andrews Forest personnel and McKenzie Ranger District staff; however, respondents also had the least familiarity with these institutions. Over half of survey respondents felt the Forest Service was trustworthy. Respondents displayed the least trust in the Bureau of Land Management, and this was the only case in which any significant difference between Eugene-Springfield and upriver respondents existed. Trust levels in the Forest Service and BLM are both lower than those found by Williams (2001) in a similar survey of the attentive public.

Table 4: Trust in natural resource institutions

	Full or moderate trust	Limited or no trust	Not Sure
Oregon State University scientists	77%	15%	8%
McKenzie Ranger District staff	71%	17%	12%
H.J. Andrews Experimental Forest personnel	67%	9%	24%
U.S. Forest Service	59%	37%	5%
*U.S. Bureau of Land Management	46%	48%	6%

**Eugene-Springfield residents displayed significantly more trust in agency*

Information sources

To obtain further insight into how the attentive public gets and views information about natural resource issues, we next asked participants to rate the level of usefulness of various sources concerning the management of federal forest lands.

First, we asked respondents to rate general information sources (e.g. newspapers, interest groups, university personnel) on a four-point usefulness scale (*none, slight, moderate* and *high*), also providing a place for them to indicate if they had no experience with a particular source. Next, using the same criteria, we asked them to rate information formats often used by federal agencies. For presentation purposes these two groups of sources have been condensed into the same table and arranged in descending order (Table 5). These figures represent opinions from those who had experience with a particular source. The percent of respondents who indicated experience with a source is shown in the far right-hand column.

By sorting the results in this way, an interesting pattern emerges. First, the two most highly rated information sources are university researchers and educators, which corresponds to the high levels of trust in OSU scientists and researchers in indicated by the previous survey question, and watershed councils, which is likely the result of the study sample having been partly chosen from the local McKenzie Watershed Council mailing list, but also may reflect the outreach efforts of the local watershed council. Overall, we see that several interactive forms of information exchange are grouped near the top of the list, a finding which corresponds with other recent studies on communication strategies (McCaffrey 2004; Toman et al. 2006). Conversations with agency personnel are highly ranked at 80%. Over two-thirds of respondents indicated that guided field trips to forest sites and small interactive workshops were also highly or moderately useful. In spite of being a relatively technical source compared to other formats, Environmental Impact Statements were also highly rated. Although EIS's are typically rated low as a useful source (Toman et al. 2006) scores here probably reflect the attentive public's greater attention to these documents and an interest in more specific details.

Table 5: Levels of usefulness of information sources

	Level of Usefulness ^a		Percent of respondents w/ access to source
	High/ Moderate	Slight/ None	
University researchers/educators	85	15	93
Watershed councils	81	19	96
Conversations with agency personnel	80	20	87
FS/BLM guided field trips to forest sites	77	23	84
Small, interactive workshops	69	31	79
Environmental Impact Statements	66	34	86
Newspapers	63	37	99
FS/BLM Newsletters	62	38	90
Agency public meetings	60	40	87
Environmental groups	60	40	96
Visitor centers	55	45	93
FS/BLM Brochures	49	51	94
*Agency websites	44	56	77
Timber groups	44	56	95
Television	43	57	97
*Internet	41	59	84
Radio	39	61	93

^a Percentages reflect responses from those who had an opinion about a specific information source

*Significantly more Eugene-Springfield respondents found this information source useful

Sixty percent or more of respondents rated newspapers, newsletters, agency public meetings, and environmental groups as moderately or highly useful. Timber groups were considered useful by just 44% of respondents.

Visitors centers and brochures, which usually receive high ratings from a strong majority of the general public (Toman et al. 2006) were only rated as such by 55% and 49% of the attentive public in this survey. This suggests that members of the attentive public are apt to seek more specific sources of information on forest projects and plans, rather than the general information given by brochures and interpretive

centers. Similar reasoning may be applied to the low ratings received by television and radio.

Only two information sources received significantly different ratings from Eugene-Springfield and upriver resident: agency websites, and the internet in general, which may be reflective of the educational differences in these two groups.

Overall, these data show that this sample is an attentive group. Based on the percent of respondents who access various sources, this sample utilizes more information sources than participants in a dozen similar surveys throughout the western U.S.

Forest management preferences

Public opinion about forest management depends a suite of factors that shape and sustain citizens' judgments about policies and the agencies that will implement them (Shindler et al. 2002a). Thus, we also explored participants' preferences for various approaches to forest management. Participants rated their preferences on a four-point scale ranging from *strongly disagree* to *strongly agree*, with the option of indicating *no basis for opinion*. Responses are displayed in Table 6. Interestingly, a majority of respondents (59%) agreed that following nature's way is preferable to human intervention in management of forest ecosystems. However, even more respondents indicated that some active management was necessary to maintain healthy forests. Respondents were also largely supportive of forest thinning – only 12% disagreed that thinning was a legitimate tool for forest management. Nevertheless, 43% of respondents also worry that thinning programs would lead to unnecessary harvesting.

Almost all respondents indicated that scientific experimentation is acceptable on federal forest lands, and 83% agreed that scientists should be more involved in making forest management decisions. About two-thirds said that timber production was an appropriate use of federal forests in the McKenzie River watershed. Finally,

71% indicated that local priorities should take precedence over national priorities for forest management.

Table 6: Forest management preferences

	Strongly agree/Agree	Disagree/Strongly disagree	No basis for opinion
Following nature's way is preferable to human intervention in ecosystems.	59	34	7
Long-term active management (e.g. timber harvest, tree planting, thinning, habitat restoration, prescribed fire) is necessary to sustain healthy forests.	76	21	4
Thinning forests is a legitimate method for sustaining long-term forest health.	83	12	6
I'm worried that thinning programs will lead to unnecessary harvesting.	43	51	6
Scientific experimentation is appropriate on selected forest lands.	94	2	4
Scientists should take a more active role in forest management decisions.	83	11	6
Timber production is an appropriate use of federal forests in the McKenzie watershed.	67	28	5
Local priorities should have greater influence on management decisions than national priorities.	71	24	5

Interactions with federal agencies

Positive and negative interactions with federal land management agencies often greatly influence public support for forest management plans and projects. For this reason, our survey included questions about the nature of interactions between respondents and federal forest managers. Respondents rated these on a 4-point scale from *strongly disagree* (1) to *strongly agree* (4). They were also given the option to

indicate no basis for opinion. Results are displayed in Table 7 and for presentation purposes are grouped in two thematic areas of citizen-agency interactions, communication, and openness and relationship building.

Overall, opinions about interactions in both categories are mostly unfavorable. Regarding communication, only 32% of respondents agree that agency personnel provide consistent messages on project plans, and 39% believe they do a good job of explaining management activities. Forty-three percent believe agency information is up to date or reliable. Nearly half view forest management information skeptically because of lack of trust in the agencies. In general, participants felt slightly more optimistic about agency explanation of options and consequences related to forest projects (51%), significantly more than the 26% that agreed with the same statement in 2001.

In the area of openness and relationship building, just 34 % agree that forest managers effectively build trust and cooperation with the public, while 43% believe agencies are open to public input and use it to shape management decisions. Over half agree that the average citizen has no way to influence agency plans. The single statement garnering the most agreement (64%) was about trusting local agency personnel, but believing national-level politics may inhibit their ability to do their job.

Interestingly, Eugene-Springfield respondents reflected significantly more positive attitudes than their upriver counterparts for five of the statements. It is also important to note that a sizeable number of respondents chose *no basis for opinion* in all but one category. One interpretation of this may be that there is a substantial segment of the attentive public that is waiting to see how projects play out before making judgments. These cases represent an opportunity for the agencies to initiate positive interactions.

Table 7: Interactions with Forest Service and BLM

	Strongly Agree/Agree	Disagree/ Strongly Disagree	No basis for opinion
Communication			
*Agency personnel provide a consistent message on project plans.	32	44	23
*Federal forest managers do a good job of explaining their management activities.	39	46	15
*The information provided by forest agencies is up to date and reliable.	43	34	23
I look at forest management information skeptically because I do not trust the agencies.	47	42	11
Agency information about forest projects usually provides a good explanation of options and consequences.	51	36	13
Openness and Relationship Building			
*Forest managers effectively build trust and cooperation with local citizens.	34	49	17
*Federal forest managers are open to public input and use it to shape forest management decisions.	43	39	18
I feel the average citizen has no way to influence the agency planning processes.	57	38	5
I trust local Willamette National Forest Service personnel, but I don't trust government at the national level to let them do their job.	64	21	15

**Significantly more Eugene-Springfield respondents agreed with this statement*

To further understand responses to questions about citizen-agency interactions, we also asked survey participants for suggestions on how forest agencies can improve those interactions. Overwhelmingly, people who responded to this question expressed

a desire for more information about federal forest management projects. Suggestions included more public meetings, the creation of newsletters and brochures, and publication of management proposals in local newspapers. A large number of respondents also articulated the need for more opportunities for public input. One participant stated the need for "...public meetings (small and large) where forest managers listen to the public rather than telling the public what the forest managers plan to do with the public's forests." Several respondents expressed a favorable opinion of field trips to forest sites, including one who said "I think the guided field trips made available to the public are very effective...[they] should be done more [often]!"

Opinions about Disturbance-based Management

The last section of the survey sought to gauge participants' support for disturbance based management techniques. This section was prefaced by the following text explaining the objectives of the BRLS and some of the techniques used to emulate natural disturbance.

We need your opinion about management priorities for the McKenzie River Watershed. To provide some background, the Northwest Forest Plan identified adaptive management areas as places where federal land managers can develop and evaluate new approaches to forest management. The Central Cascades Adaptive Management Area lies in portions of the McKenzie Watershed and contains both the H.J. Andrews Experimental Forest and the Blue River Landscape Study area (BRLS).

The BRLS proposes managing large forest areas (such as an entire watershed) by planning at a landscape level. Under this approach, managers base their plans on natural disturbance events like wildfire, landslides, wind, and floods that have occurred over time. The idea is to use harvesting techniques to create openings of various sizes similar to those created by historical events. One objective is to determine if this approach taken over the long-term will result in fewer risks to plants, animals, water quality and ecological processes than other management practices. On the next two pages, please tell us how you feel about using this type of historic, disturbance-based management approach on federal forests.

Perceived risks and uncertainties associated with disturbance-based management

We first asked participants about potential risks or concerns they might associate with the use of disturbance-based management in the McKenzie watershed.

These findings are reported in descending order in Table 8. Several findings are of interest. The first involves politics and public perceptions. The largest number of respondents (88%) expressed concern that national politics would continue to change forest management priorities, while 74% felt the public may not understand a disturbance-based approach. Also, trusting the agencies to make good decisions was perceived as a risk by more than two-thirds of respondents.

Additional risks centered on the issue of timber harvest in federal forests. A substantial majority indicated concern that disturbance-based management might create potential for harvesting in old-growth stands, that it might be used as an excuse to justify more harvesting, or that it would result in too much harvesting overall. A majority also worried that not enough science would be incorporated into decisions, and that this management approach would lead to additional road building in forests. Half of all respondents were concerned that the public would not be adequately involved in decision-making processes. Other topics were considered to present much less risk.

Table 8: Perceived risks or concerns associated with disturbance-based management

	High/moderate risk or concern	Little/no risk or concern	Not sure
national politics will keep changing the priorities	88	7	4
the public may not understand this approach	74	18	7
potential for harvesting in old growth stands	70	25	5
trusting the agencies to make good decisions	69	28	3
agencies will use this new language to justify excessive harvesting	61	35	4
too much harvesting overall	60	32	8
not enough science in decisions	56	38	6
will lead to additional road building in forests	56	40	5
not enough public involvement in decisions	50	44	6
visual impacts on forests	45	51	4
the long-term nature of this strategy	43	44	13
too many areas being set aside and “locked up” from management	35	59	6
too little harvesting overall	33	60	7
too much public involvement in decisions	32	64	5
this approach won’t pay for itself	30	54	16

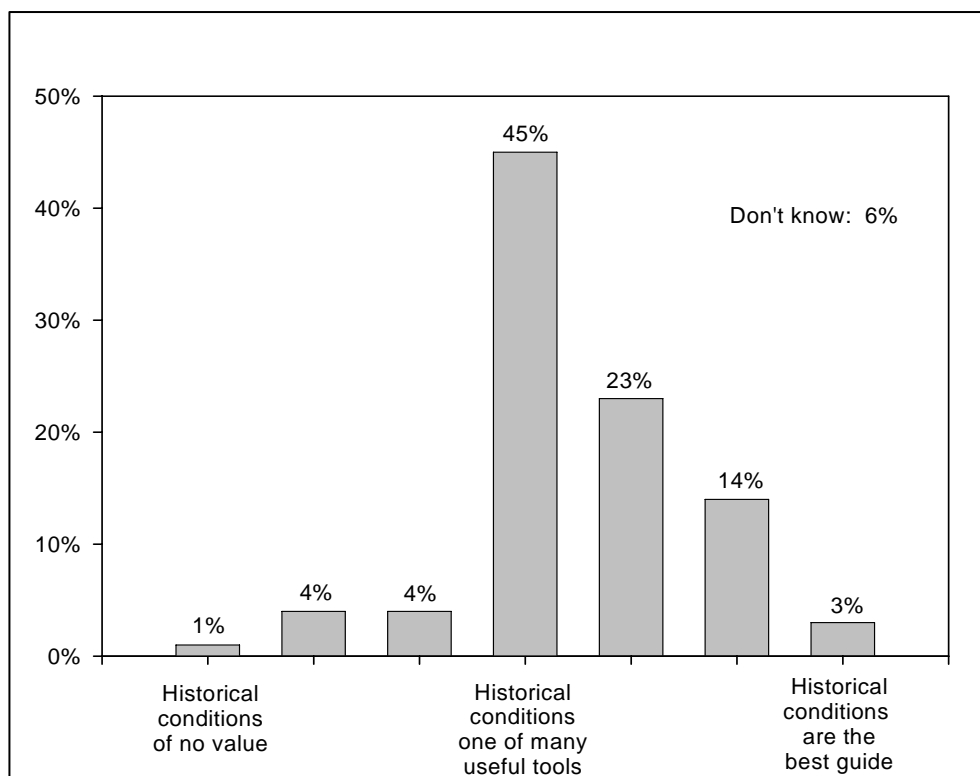
Importance of disturbance-based management

Using a seven point scale, respondents were also asked how important it is to pay attention to historic, natural disturbances to help guide future decisions.

Responses on the left end of the continuum tend to agree more with the statement *historical conditions are impossible to reproduce and are of no value in guiding future forest management*, while responses on the right end tend toward a belief that *historical conditions are the only ecologically responsible guide for managing federal forest land*.

The midpoint of the continuum represents the statement *historical conditions are one of many guides that can be used in forest management*.

Figure 5: Opinions about the value of disturbance-based management



Eugene-Springfield respondents are significantly more likely to favor the use of historical disturbance ($p < 0.05$)

Overall, the majority of respondents favor using historical conditions as one of many which useful tools in forest management. It is noteworthy that 40% of the respondents are grouped on the right side of the continuum, compared to just 9% who saw little value in this approach. With respect to the urban and rural subgroups, Eugene-Springfield respondents are more likely to favor the use of historical disturbance in forest management than their upriver counterparts.

Using timber harvest to emulate disturbance

The final question asked respondents to indicate their level of agreement with a series of statements about using harvesting methods to emulate historical disturbance over large blocks of federal forest land. These findings are shown in Table 9. First, the greatest number of respondents (85%) agreed that forest reserves are still necessary for plant and animal conservation. Seventy-six percent indicated they would tend to support disturbance-based management plans that were adequately reviewed by scientists; a similar level agreed with this question in 2001. It may be important to note that three-quarters of participants also indicated their support would hinge upon the type of harvesting techniques that were planned.

Table 9: Opinions about using harvesting methods to emulate disturbance

	Strongly agree/ Agree	Disagree/ Strongly disagree	Not Sure
Forest reserves (areas with no timber harvest) are still necessary for plant and animal conservation.	85%	11%	4%
I would support this approach if management plans are critically reviewed by scientists.	76%	15%	9%
My support will be based on knowing the type of harvesting techniques planned.	75%	16%	8%
I support the landscape-level historical disturbance approach described above.	58%	15%	27%
I have confidence that agency managers know enough about forest and stream ecosystems to carry out disturbance-based management.	53%	33%	14%
I am concerned that plans based on historic disturbance will be used as an excuse to cut too much timber.	49%	45%	6%
I am concerned about economic losses from timber sales that leave live and dead trees	31%	62%	7%

In response to a direct question on this topic, 58% indicated support for the disturbance-based management approach. Notably, more than a quarter of respondents expressed uncertainty about this same question. Meanwhile, slightly more than half expressed confidence that managers have sufficient knowledge of ecosystems to carry out this management approach, with 14% showing uncertainty about this statement.

Interestingly, 49% expressed concern that disturbance-based management would be used as an excuse to harvest timber at excessive levels, somewhat lower than those who rated this as a risk (Table 8). Finally, the potential for economic losses generated fewer concerns.

Correlations between Support and Respondent Characteristics

To further assess influences on public judgments about disturbance-based management, we conducted a bivariate correlation analysis to measure the relationship between citizen support for this approach and the following factors: 1) respondent knowledge of ecosystem project, terms and processes, 2) trust in agencies, 3) past interactions with agencies, 4) perceptions of federal forest health in the McKenzie, 5) place of residency (Eugene-Springfield or upriver), and 6) education level. Additive scores were generated to represent support for disturbance based management as well as each of the knowledge, agency trust and past interactions variables. For knowledge of projects, terms, and processes, respondents who knew the meaning or answered correctly scored 1, while those who did not know the meaning or had not heard it scored 0. Responses to the other categorical variables (trust and past interactions) were organized on a scale from 1 to 4, where 1 corresponded to negative responses, and 4 to positive responses. Score ranges and bivariate correlation coefficients are shown in Table 10.

Only two characteristics, residency and education, had no significant correlation with levels of support for disturbance-based management. Ecosystem knowledge, agency trust, ratings of past interactions with agency personnel, were all positively correlated with support for disturbance-based management, meaning that as

the value of each of these variables increases, so did support for disturbance-based management. Perceptions of forest health were negatively correlated with support, meaning that the less healthy respondents believed federal forests in the McKenzie to be, the greater support they showed for disturbance-based management.

Table 10: Bivariate correlations between support and respondent characteristics

	Support Range: 7-28
Knowledge (projects) Range: 0-4	0.382*
Knowledge (terms) Range: 0-13	0.346*
Knowledge (processes) Range: 0-7	0.356*
Agency Trust Range: 5-20	0.389*
Past Interactions Range: 9-36	0.460*
Perceptions of Forest Health	-0.220*
Residency	-0.080
Education	0.061

*Correlation is significant at $p < 0.01$

DISCUSSION

The purpose of this study was to examine understanding of and support for disturbance-emulating forest management techniques among an important group of stakeholders – the attentive public. These are the individuals who pay attention to local forest issues and are often the ones who first respond to new plans and practices. The intent of this analysis is to contribute to a greater understanding of the factors that influence citizen support for alternative management strategies on federal forest lands in the McKenzie River watershed. To better explore stakeholder characteristics, this study also compared the responses of two subgroups: residents of Eugene-Springfield and upriver communities. Research objectives were to assess (a) stakeholder understanding of natural disturbance processes and disturbance-based management techniques and the agencies that will implement these policies, (b) stakeholder acceptance for disturbance-based management, (c) stakeholder concerns pertaining to the risk and uncertainty inherent in this approach, and (d) explore potential barriers to future implementation of disturbance-based management inside the BRLS. The following sections provide a summary of key findings which are organized and presented as a series of points most relevant in the context of federal forest management and policy.

Participant awareness and orientation

Inquiry into the level of attention local citizens give to forest issues, the priority they place on environmental versus economically motivated management goals, and their perceptions of forest health provide a context for understanding their ideas about disturbance-based management. These findings indicate McKenzie area residents tend to be well educated, particularly in comparison to the general population in the Pacific Northwest (Wilton 2002). Nearly all participants said they pay a moderate to great deal of attention to forest management issues. This suggests this study was successful in selecting members of the public considered to be “attentive” to national forest issues. As such, they are the members of the public with whom

resource managers are most likely to interact for formulation and implementation of forest plans.

McKenzie watershed citizens tend to give priority to environmental objectives over economic ones in forest management projects, suggesting area residents are not motivated to support projects by economic justifications alone. Given these circumstances, agency personnel will need to find different ways to frame discussions about the utility of disturbance-based management.

Perceptions about overall forest health in the McKenzie Basin were mixed. Measures of “forest health” can be subjective, but in the end, the rationale for using an historic range of variability model will be based on maintaining healthy forest conditions. This context seems to be most appropriate for communicating the message of disturbance-based management. Indeed, this analysis indicates that as citizens’ perceptions of forest health decline, support for disturbance-based management tended to increase.

Knowledge

The measures of citizen knowledge of ecosystem management in our study are from self-reported scores of respondents. Although not an absolute measure, previous research indicates this method to be a fair assessment of citizen understanding of basic issues. The high levels of knowledge recorded in our current study concur with Williams’ (2001) findings from the region’s attentive public. Meanwhile, this inquiry into citizen understanding of the terms and concepts more specific to disturbance-based management provides insight to the context in which the attentive public is likely to assess this approach.

Although past research has demonstrated urban residents generally possess greater knowledge about natural resource issues (Arcury 1990; Van Liere 1980), this research found few significant differences between Eugene-Springfield and upriver citizens. These results correspond to more recent studies which suggest that differences between rural and urban environmental values and knowledge are

becoming more muted, owing to shifts in rural natural resource dependency and exurban-migration (Brunson et al. 1997; Fortmann & Kusel 1990; Jones et al. 1999; Jones et al. 2003). Large numbers of retired residents, commuters to jobs in Eugene-Springfield, and declining dependence on timber income are all trends which characterize upper McKenzie communities. Furthermore, while Eugene-Springfield residents did possess significantly higher levels of formal education, education levels over the entire group were still quite high, a factor commonly associated with greater environmental knowledge.

Overall, respondents displayed high levels of knowledge about basic forest management terms and concepts. These findings are consistent with expectations for individuals who have an average length of residency in the McKenzie watershed of 32 years, who claim to pay a moderate to great deal of attention to forest issues, and who possess high levels of formal education. This level of knowledge also may reflect the effectiveness of efforts by Andrews Forest personnel, the forest agencies, and the local watershed council to increase public understanding of stream and river system health. Williams (2001) suggests familiarity with specific terms (e.g. riparian area, woody debris) may also be partially explained in part by their increasingly common usage among the media and relatively self-explanatory nature. However, high knowledge levels may also be attributed to the attentive public as individuals who consider these to be salient issues and who may exert some effort to become informed. This heightened awareness is advantageous to scientists and managers working to build literacy about and support for relatively new management strategies such as disturbance-based management, as it may serve as a foundation for understanding more complex terms and concepts associated with innovative approaches.

The lower levels of self-assessed knowledge with respect to disturbance-based management and its historical perspectives are notable. These suggest that many of the concepts specific to disturbance-based management are not intuitive for members of the public, even those who pay attention to management activities in the McKenzie watershed. For example, the term historic range of variability (HRV), often used by

managers to refer to disturbance-emulating management approaches, does not do much to describe the management technique but rather the concept upon which it is based. Citizens may have difficulty visualizing what this approach might look like, adding to their uncertainty about it. Furthermore, this lack of clarity may cause citizens to doubt why disturbance-based management is appropriate or necessary. For this reason, scientists and managers will need to find more direct means to tell the story of disturbance-based management. Indeed, this analysis demonstrates that as knowledge of terms and processes increases, so does support.

Similarly, citizens' familiarity with specific projects and places in the McKenzie watershed is variable, suggesting that a majority of the attentive public has little awareness of current experimentation with disturbance-based management in the BRLS. It is also likely that few understand the purpose and objectives of the CCAMA, particularly its focus on experimentation. This assumption is supported by low familiarity with the Northwest Forest Plan, which likely translates into lack of understanding about specific land allocations associated with the plan (i.e. reserves, matrix, and AMA's). Citizens may have trouble grasping the policy context in which experimentation with disturbance-based management takes place. Perhaps more importantly, this lack of exposure to local projects represents a missed opportunity for managers to engage the public in learning about alternative management strategies. Visits to these sites with scientists and managers can help to establish more trusting relationships and improve communications between agencies and the public. These are important steps for building confidence in and support for new management techniques (Shindler et al. 2002b).

Forest management preferences

Many members of the public, particularly the attentive public, possess strongly held ideologies and value judgments regarding the use and management of natural resources (Bellah et al. 1985). One of the most fundamental of these is what role, if any, humans should play in the management of ecosystems. Findings from this study

which indicate that McKenzie watershed citizens have a preference for following “nature’s way” versus human intervention in ecosystem processes are likely related to their values for environmental concern over economic considerations. Interestingly, citizens also demonstrated a strong belief that active management and forest thinning were necessary activities for sustaining forest health. Moreover, most citizens believe timber production is appropriate on federal forest lands in the McKenzie watershed, but many worry that activities such as forest thinning can lead to unnecessary harvest. These findings suggest a cautious support for management actions that involve some level of harvest, even to emulate disturbance. It remains to be determined what level this might be, and the process by which agencies solicit input from the public in this regard will likely be a critical factor in building long-term acceptance for any approach that involves timber harvest.

Overall, support for scientific experimentation and scientist involvement in federal forest management has grown since Williams’ study in the same area (2001). Moreover, confidence in the information provided by scientists is high. This is particularly encouraging for personnel on the CCAMA and BRLS, whose activities are largely focused on scientific experimentation. Indeed, researchers have suggested that demonstrated scientific involvement in management can be successful in creating and restoring citizens’ trust in agencies (Stankey & Shindler 2006).

Citizen-agency interactions

Given the perceived level of risk and uncertainty inherent to the disturbance-based management approach, positive public interactions and citizen trust in personnel will be central to overcoming barriers to future management plans. These findings yielded several important conclusions about citizen-agency interactions in the McKenzie watershed.

First, it is clear that trustworthy relations between the public and agency personnel need to be cultivated. Of particular importance is that both the Forest Service and the BLM will need to make a commitment to appropriately engaging

citizens in planning activities. This will mean treating trust-building as a central, long-term goal, not simply as an activity that is pursued on a per-project basis to smooth the way for controversial management objectives. Citizen trust in agencies is built over the course of many positive interactions; it also can be eroded quickly by one negative experience. One of the most effective methods of improving citizen-agency relations is for personnel to act in ways which defy previous judgments that were based on past negative interactions or failure to adequately involve the public (Peters et al. 1997). A well coordinated, ongoing public outreach program is an essential component for building trust in communities.

Second, confidence in agencies and the information they provide is problematic. Nearly half of survey participants agreed with the statement *I look at forest management information skeptically because I do not trust the agencies*. Respondents also expressed skepticism about the openness of forest managers, use of public input, and their ability to provide reliable information to the public. This presents an obvious hurdle to scientists and managers working to build support for the use of disturbance-based management and other ecosystem management strategies. Research has shown that the public's lack of trust in agencies can lead to increased concerns about the risk associated with management activities (Brunson 1992; Kakoyannis et al. 2001; Stankey 2005), and can undermine efforts to increase knowledge about them. The overall low trust ratings found in this study suggest the need for a more inclusive planning process. Certainly this is reflected in many of the additional hand written comments from survey respondents, many of which suggest that agencies should not solicit public input, only to ignore it completely, or should do a better job of considering public concerns in project planning.

Third, it is important to acknowledge that the McKenzie public's responses about citizen-agency interactions are not universally negative. Many citizens make distinctions between the trustworthiness of individual agency employees and agencies as institutions. These dichotomous views of agency credibility at the institutional versus local level are not uncommon (Shindler 2000). In cases where individuals in a

community have personal interactions with local agency employees, this can lead to greater confidence in the local management unit's ability to the job well and in the best interest of the community. A citizen's confidence in an institution however, may be shaken by a perception that local priorities will continually be trumped by regional or national ones or frustrations with seemingly impenetrable bureaucracy. Bearing this in mind, these findings suggest support for alternative management strategies will most effectively be built at the local level, taking advantage of existing relationships between agency employees and citizens while working to build new ones. When discussing the context of project objectives it will be important to emphasize locally-based benefits, priorities and goals, rather than stressing the necessity of projects coming into compliance with regional (i.e. Northwest Forest Plan) or national agency directives. This will also mean listening to local citizens and addressing their concerns.

It may be relevant that Eugene-Springfield residents held significantly more positive views about their interactions with federal forest agencies. This sub-group also indicated higher levels of trust in the BLM than their rural counterparts. Although past research has found rural residents are likely to have more trust in agencies than their urban counterparts (Steel et al. 1998), these findings concur with more recent studies that suggest this confidence is in decline (Brunson & Evans 2005; Shindler 2003b). Several reasons may be posited for this shift. For example, Brunson and Evans (2005) suggest rural residents may be the first to witness and be affected by declines in forest health, such as the incidence of large wildfires and unsuccessful attempts to prevent or control them. As such, these residents may be more likely to perceive inaction on the part of federal agencies as incompetence to address such problems (Kelly 2005; Shindler 2003b). Other research suggests frequent transfers of agency personnel or downsizing practices have eroded relationships between rural residents and agency personnel who were once, but now are no longer, long-term members of the of the communities where they work (Wondolleck 1988) .

Finally, while researchers from the Andrews Forest were rated as particularly trustworthy, nearly one-quarter of respondents were not sure how to rate this group. A substantial segment of respondents also had no basis for opinion about interactions with agency personnel. These figures taken together suggest a lack of contact between citizens, even those who pay attention to forest issues, and important agency personnel in the area. This represents an opportunity for scientists and managers to increase outreach and educational activities at the Andrews Forest, particularly those related to the BRLS. The advantages for improved communication and trust building are apparent.

Information Sources

Because most agencies have limited time and resources to devote to communicating with the public about forest management, it is important for them to know which outreach strategies are most effective among citizens. In this study, the high ratings of conversations with agency personnel, guided field trips to forest sites, and small workshops speak to the efficacy of interactive forms of communication. These types of information exchange have met with positive results in numerous local settings, especially for influencing public judgments and behaviors (Shindler et al. 2004a; Toman et al. 2006; Toman 2004). Because McKenzie watershed residents believe they are useful, personnel working in the BRLS are in a position to take advantage of these strategies to increase citizen understanding and build support for disturbance-based management. These activities create opportunities for face-to-face communication and allow citizens to ask questions and clarify concepts with the help of agency personnel. This is particularly important in the case of new or different management strategies with which citizens may have very little familiarity.

Meanwhile, the use of newspapers and newsletters to disseminate information relevant to ecosystem management approaches appears to be an area where agencies can improve their efforts. However, unlike more interactive exchanges, these mass media forms of communication are more useful for building awareness of programs

than for changing citizen behavior (Toman et al. 2006). Numerous written comments on the surveys expressed the desire for more information to be provided in these formats. Our attempts to identify a study sample using agency mailing lists indicate a need for improvement in this area as well. We were unable to uncover any comprehensive contact list such as might be used for regular distribution of newsletters or other outreach materials. At present, the Willamette National Forest outreach by mail appears to exist primarily for distribution of Schedules of Proposed Action to a short list of interested parties, many of whom reside outside of the McKenzie River watershed. This represents an area for improvement and an opportunity to create public awareness of agency activities.

The higher ratings of information provided by watershed councils and other citizen groups suggest it may be prudent for agencies to partner with these organizations as a conduit for dissemination of disturbance-based management information. Not only are these groups viewed as useful, credible sources, but they also represent access to a network of citizens with which the agencies might not otherwise have regular contact. Agencies may be able to “piggyback” on communications distributed to members of these groups to provide important details about BRLS activities, such as field trips to study sites, proposed management plans, and public input opportunities. In addition, building relationships with these organizations can serve to broaden the constituent base of local management agencies. This may be especially advantageous when public involvement activities allow for the selection of knowledgeable individuals committed to group processes, which Shindler and Aldred-Cheek (1999) identify as one of the most important criteria of successful citizen-agency interactions.

Acceptance and support for disturbance-based management

A primary finding from this study is the cautious support demonstrated for disturbance-based management among the McKenzie River attentive public. However, taken within the context of citizens’ perceptions about risk and uncertainty,

forest management preferences, and opinions about their interactions with agency personnel, there are a number of important qualifications to this support.

First, citizens were most concerned that national politics will influence agency policies towards disturbance-based management. This sentiment was echoed in a number of the written comments on survey forms. This reflects a growing awareness of, and probably frustration with, the political context in which forest management takes place, where frequent changes in national administrative direction have the potential to substantially alter management objectives and outcomes. Citizens' concerns correspond with the common sentiment expressed by agency scientists and managers in preliminary interviews that it is difficult to manage forests for the long term when political priorities "change every four years." These findings concur with past research showing that while citizens may trust their local Ranger District to design plans and projects, they may not trust the federal government to let personnel make good on these decisions (Shindler et al. 2002a).

Second, the nature of timber harvesting practices associated with disturbance-based management is a primary concern for citizens in the watershed, particularly the potential for excessive thinning, increased road building, and fear of harvesting in old-growth stands. Because disturbance-based management in the BRLS has occurred in mature and late-successional forest stands these concerns will be difficult to overcome. Agency participants in our preliminary fact finding field tour recognized this as one of the most controversial aspects of the project for some groups in the watershed. Indeed, one member of a local environmental group commented during an interview, "Historical disturbance is a very appropriate guide for forest management [and] a valuable tool in forest restoration. My heartburn stems from the way it is being implemented, in old-growth stands and not in second growth where I feel it is most necessary." While the agencies may debate the accuracy of characterizing stands in certain project areas as "old-growth," findings indicate a segment of the public perceives these places as threatened and is therefore unlikely to support disturbance-

based management projects on a larger scale without first having these concerns addressed.

Third, the idea that a disturbance-based approach would not pay for itself was among those of the least concern to citizens. This feeling was echoed during conversations on the public field-trip to BRLS project sites, where some participants indicated they would hypothetically be willing to subsidize such projects even if the revenue gained from timber extraction as part of these projects was not enough to cover costs. From an agency standpoint this may not be much help; these days institutional funding for forest health projects is often linked directly to fuel reduction activities or commodity production (Cortner et al. 1996). Nevertheless, these findings are important because they suggest that financial concerns are unlikely to represent a barrier to further implementation of disturbance-based management, at least from the local public's viewpoint.

Fourth, results indicate that with respect to citizens' outright support for disturbance-based management, the votes are still out. Although more than half say they support the approach, a large segment also indicates they are not sure. These findings have several implications. One, citizens may not have a full understanding of the approach on which to base their judgments. Two, citizens may be waiting to see the outcomes of BRLS experiments before deciding. Three, participants may be hesitant to express support if they feel agencies cannot be trusted. It is clear there is a substantial segment of the McKenzie public who is unwilling to grant agencies *carte blanche* to implement this strategy without demonstrating their own credibility and the science which justifies disturbance-based management.

Fifth and finally, most respondents believe forest reserves are still a necessary part of forest planning. Agency personnel must take this seriously – particularly those who believe that landscape-level disturbance-based management may serve as an alternative to the late-successional reserves outlined by the Northwest Forest Plan. At this point, the informed citizenry has strong feelings that these are necessary for plant

and animal conservation, and may not support plans which would alter them in a substantial way.

CONCLUSIONS

Citizens' support for HRV and disturbance-based management in the McKenzie watershed will be the product of a suite of factors. Though agency personnel may be tempted to believe that an increase in community understanding of this approach will be adequate to produce citizen support, providing additional information to stakeholders is just one piece of a multifaceted puzzle. Public opinion also will be influenced by the relevancy of planning and implementation of disturbance-based management within the context of local conditions as well as by the quality of citizen interactions with the agencies (Shindler et al. 2002a).

Results from this study are relevant to local Forest Service and BLM managers as they represent the opinions of residents in the McKenzie River communities who pay attention to federal forest management. However, because the attributes of this group – higher education levels, more knowledge of forest issues, length of residency in the area – may be different from other communities, these results cannot be generalized to other agency settings. Nevertheless, as the populations of forest communities throughout the northwest continue to evolve, influenced by changes such as ex-urban migration patterns, it is likely these findings will ultimately be useful beyond the current study.

The data show that citizens in the McKenzie area may eventually support some form of disturbance-based management. This support is likely to be tied to two factors: 1) the ability of the agencies to provide a sound rationale for its use and 2) the degree to which citizens are genuinely engaged in the discussion. It is apparent the first factor will be better addressed by involving scientists in explanations of these practices, including assessments of potential risks as well as the desired outcomes. Currently the disturbance-based management concept is unfamiliar to most citizens and few places exist where the public can see for themselves the short and long-term consequences of this approach.

The second factor can be enhanced by the presence of scientists, but the responsibility for improving communications with the public is clearly on agency

managers at all organizational levels. This task will not be an easy one. Studies over the past decade show that little has been accomplished to improve citizen-agency interactions in the McKenzie River watershed (Shindler 2003a; Shindler et al. 1996; Williams 2001; Wright 2000). While gains have been made elsewhere in the region by focusing attention on public outreach and partnership arrangements (Shindler 2003a; Shindler & Gordon 2005; Shindler et al. 2004a; Shindler et al. 1996; Williams 2001; Wright 2000), citizens in McKenzie watershed communities perceive little positive change in agency efforts to foster a more open public planning process.

Although individual personnel working in the CCAMA are technically competent and well meaning, over the years there appears to have been a shortage of agency-wide commitment to building a meaningful relationship with the McKenzie watershed community. Now, with downsizing and decreased funding affecting all operations, difficult decisions will need to be made about just how much to invest in outreach and communication activities. In any case, for the HRV concept and disturbance-based management to succeed, an atmosphere of learning together through face-to-face interaction with communities seems essential (Shindler et al. 2002b). This will necessarily include managers, researchers, and members of the attentive public who represent numerous points of view and will carry the message (positive and negative) to their wider group of constituents.

Within this context, our research identifies several areas where agency personnel may focus their efforts to influence public understanding and acceptance of disturbance-based management.

Acknowledge the reality of the McKenzie communities and the important role of citizens who are attentive to forest issues.

It is evident, and comes as little surprise, that citizens in the McKenzie watershed tend to prefer conservation values over commodity production. New management strategies, especially those involving harvesting, will be scrutinized here more so than most other places. Instead of seeing these judgments as barriers, they

could be viewed as an opportunity to craft programs that ensure informed public access to decision processes and to further build an ecological literacy among stakeholders (Orr 1992). Most important in this process will be a need to engage the attentive public in meaningful ways. They are already a highly relevant part of the community dynamic, paying attention to agency actions and interpreting what they see for their (general) public constituents. These individuals are the first to respond to any new action, and often do so through sophisticated means. Because they are articulate, this is a group most likely to respond to scientific rationale for alternative management strategies. Seeking out their ideas and experiences will improve the quality of the information factored into decisions (Fischer 2000). These activities also serve as an effective means for building community support and understanding of the disturbance-based approach. Additionally, engaging the attentive public can provide important feedback on public attitudes regarding the eventual implementation of management practices (Molina et al. 1997). As Jasonoff (1990) argues,

Acknowledging the legitimate role of citizens and their concerns does not diminish the importance of scientific understanding. However, attempts to ignore or discount public judgments of local conditions could undermine consideration of science in political settings, where decisions occur.

Clarify objectives of HRV and disturbance-based management.

The HRV concept is not an intuitive one for the public. In order to adopt this management approach on the McKenzie, it may be tempting for agencies to say, “Trust us, we know what we are doing.” Currently the Forest Service and the BLM do not have sufficient credibility with citizens for this approach to be successful. There is a need for a more tangible message; for example, citizens will respond better to management actions they can directly attribute to objectives for forest health, wildfire fuels management, habitat protection, species conservation, and so on. But neither HRV nor disturbance-based management is likely to be the catch phrase that will capture their support.

The current approach may be acceptable on small units within the BRLS, but to expand this experimentation phase to other settings will require a better public dialogue. There simply are too many questions and concerns about the future of remaining old growth, the potential for excessive harvesting, levels of scientific review, political influence from outside the region, and a general lack of understanding of outcomes.

Such discussion provides room for clarifying the terms and objectives of disturbance-based management. For example, many citizens support “active management” on federal forest lands in the McKenzie watershed. However, it is unlikely that everyone shares an understanding of this idea or how it might play out on the ground. Now is an opportunity to discuss the specifics of a desired approach as well as the existing need for more assertive (active) management in local forests.

This will mean articulating the disturbance-based management message in clear and consistent terms. One challenge will be to objectify the disturbance-based concept for citizens by making it specific to their interests. It may be useful to cast the problem with forest health as the central focus and then link this concern to the role alternative management practices can play. Public attitudes and behavior are often tied to the specificity with which policies are presented (Stankey & Shindler 2006). While in the abstract, people support good ideas (like biodiversity or species protection) but they really sit up and take notice when these ideas begin to translate to treatments on the ground in familiar places. Five questions that can help clarify for citizens the necessary specifics of planned actions are adapted from Zinn et al. (1998):

- 1) what local site is involved?
- 2) what issues drive the action?
- 3) what actions are proposed?
- 4) when will it happen?
- 5) how long before we know the outcomes?

Clear and consistent objectives allow citizens to become comfortable with specific practices and will better prepare them to reach agreement on an appropriate strategy (Shindler & Gordon 2005). Alternatively, failure to clearly convey the

motives and details of disturbance-based management for the public is likely to engender distrust, misperceptions of agency intentions, and unwillingness to support management objectives.

Take advantage of existing knowledge and concerns to increase understanding of disturbance-based management.

The high level of basic knowledge about forests among McKenzie watershed residents is well documented (Shindler et al. 1996; Williams 2001). The current study confirms the level remains high, certainly with the area's attentive public. This is also a particularly well-educated group. Findings indicate McKenzie citizens are poised to receive and understand more specific information about disturbance-based management and the desired ecosystem characteristics of this approach.

The data show that the local attentive public access many sources of information. Overall they value more interactive approaches, particularly those including key agency personnel, researchers, and local watershed councils. Such interactions on field visits, at demonstration sites, and in small interactive workshops have been shown to be the best methods for changing attitudes and altering citizen behavior toward natural resource issues (Toman et al. 2006). These formats are also the most effective for building relationships among parties. This will be important as the attentive groups branch out and carry their informed message throughout their community networks.

An initial tendency among management agencies might be to shy away from outreach activities as they could serve to "stir the pot" of controversy about local practices. Although calling attention to specific projects and practices could mobilize action on the part of certain groups, it should not be seen as creating opposition where it did not exist. Such latent positions are inevitably present and are certain to become overt once project implementation begins (Stankey & Shindler 2006). By being more open and explicit about details during the planning phase, the opportunity is available

for discussion, informed debate, and learning. Through these processes the potential for building acceptance and support exists.

Address issues of uncertainty and risk.

Uncertainty and risk are primary factors in the public's willingness to accept forest management practices, particularly those that are unfamiliar or untested (Shindler & Beckley 2006). In risk-averse environments, public resistance to programs makes it tempting to overstate the confidence in the outcomes of policies and specific practices (Stankey & Shindler 2006). Discussions of the disturbance-based approach will need to be frank about the challenges inherent to this type of management, the consequences associated with it, and the specific nature of the management techniques used to emulate disturbance (Shindler 2000). Because the ambiguities associated with more innovative types of management can translate into increased citizen perception of risk (Kakoyannis et al. 2001), scientists and managers working in the BRLS must help members of the public distinguish between the true risks associated with this approach and the uncertainties inherent to it. This will mean that agencies must be forthcoming about difficult decisions and the choices involved. When citizens begin to understand issues of uncertainty it provides a context in which managers and scientists can discuss how mistakes or unintended consequences of experimental management will be dealt with or mitigated.

These goals are best pursued through face-to-face discussion in terms the public can understand. It is important to be direct about the likelihood that something "bad" (e.g., an escaped burn, extensive smoke, altered viewshed) might actually occur and how managers intend to deal with it. If this is done on a demonstration site, it becomes easier to move the discussion to other places where future treatments are desired. People are more likely to accept management activities when they have had a chance to see them in action and become comfortable with the outcomes (Gregory 2002). More open, interactive exchanges among managers, scientists, and citizens will be useful for evaluating potential scenarios prior to policy changes. When given a

range of options, citizens can help decide, and will accept, those that work best for local forests (Ehrenhaldt 1994).

Focus on improving citizen-agency interactions.

In the case of the BRLS, scientists and managers are not only required by law to involve citizens in ecosystem management, but are obligated to do so by the goals of adaptive management. They face the challenge of building connections with the public while fulfilling research and management goals, and must do so in times of downsizing and decreased agency funding. Under these circumstances, implementation will be difficult, but it is still in the best interest of agencies to pursue relationships with citizens that demonstrate a sincere and long-lasting commitment.

People respect and respond to individuals they view as trustworthy. As everyone knows, building trust is a long-term proposition; alternatively, it can be lost in a single action. Thus, achieving a balance point is a continual process of adjustment and working together (Westley 1995). In the case of local forests, the public is looking for genuine leadership from agency personnel (Shindler & Beckley 2006). Citizens want to know that managers share their concerns for resources important to the local community. Agency actions and professional competence are the criteria by which most people will judge the sincerity of these efforts (Stankey & Shindler 2006). In the case of the McKenzie watershed communities, it is important to remember that trust is effectively built at the personal level. Local personnel can get projects accomplished regardless of how people feel about the larger bureaucracy. A key aspect of this approach is to choose the right leaders for the outreach job and then support them (Shindler & Gordon 2005). The ability to make genuine connections with citizens is a special talent; not everyone is adept at this aspect of the job. Strategies will include creating opportunities to meet the local community in their setting. In these situations, agency personnel should be prepared to understand and learn from the public's concerns about issues of local importance.

Perhaps the most important element of building successful citizen-agency interactions will be creating realistic expectations among all parties (Shindler et al. 2002a). This will include redefining the roles that citizens and agency personnel are expected to play in making decisions about federal forest management. McKenzie citizens expect to know more about management than what standard NEPA documents can provide. They are concerned about ecosystem health, but are open to the idea of some level of timber harvest on federal forest lands. They are a complex group with complex perspectives, and many currently believe there are few effective places to share their perspectives about the BRLS and its objectives. Nor do they feel well informed as to what these objectives might be. Meanwhile, the operations surrounding the BRLS have been relatively insulated from citizen perceptions of disturbance-based management under the umbrella of science and experimentation. These circumstances represent an opportunity to employ the flexibility and experimentation mandated by adaptive management to expand the role which citizens can play in improving ecosystem health.

It is clear that acceptance of disturbance-based management in the McKenzie watershed is contingent upon whether the public believes it has received credible information about projects and has had access to planning processes. Successfully involving citizens means creating a legitimate role for them before management objectives are set in stone and implementation begins (Lawrence & Daniels 1996). It is also clear that citizens would like to see evidence of scientific involvement and project review. In the end, public acceptance of management practices is not so much determined by the project outcomes as by the processes through which decisions were made (Kakoyannis et al. 2001; Wondolleck 1988). While there is no denying this type of citizen participation consumes both time and other resources, there are many reasons to believe these investments will pay off over the long-term.

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APPENDIX: SUMMARY OF SURVEY RESPONSES

CITIZEN SURVEY OF FEDERAL FOREST CONDITIONS IN THE MCKENZIE RIVER WATERSHED



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This study is part of a comprehensive project to evaluate alternative landscape management strategies being considered by the U.S. Forest Service and the Bureau of Land Management. This phase of the project is designed to evaluate public reactions to federal forest conditions and alternative management approaches as well as the implementation of ideas within the Blue River Landscape Strategy. The following report summarizes responses to a questionnaire completed by members of the attentive public residing in the McKenzie River watershed, including the cities of Springfield and Eugene. The questionnaire was distributed by mail to a total of 312 citizens and 230 were completed, resulting in a 74% response rate. This report is a summary of frequency distributions (percent of response) for specific questions. Reported percentages have been rounded off to the nearest whole number and in certain cases response categories have been combined for presentation purposes (e.g. *strongly agree* and *agree* into a single category).

I. Prior experience with forest management

1. How much attention do you pay to national forest issues or problems? (*Circle one number*)

	Not much		Moderate Amount		Great Deal
Total:	2	5	25	37	32
Urban:	4	3	24	35	35
Rural:	0	7	25	40	29

2. Many federal forest management issues involve difficult trade-offs between environmental conditions (wildlife, old growth forests) and economic considerations (employment, tax revenues). Where would you locate yourself on the following scale concerning these issues?

Rural: 18-----23-----12-----25-----15-----5-----3

Urban: 21-----18-----20-----26-----12-----3-----2

Total: 20-----20-----17-----26-----13-----4-----2

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

/
Environmental and economic factors should be given equal priority.

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

3. How familiar are you with the following plans, places or projects?

	I understand what this place or project is about	I've heard of this place or project	I've never heard of this place or project
H.J. Andrews Experimental Forest			
Total:	64	22	14
Urban:	61	23	16
Rural:	68	20	12
Blue River Landscape Study			
Total:	17	40	43
Urban:	19	38	44
Rural:	16	44	40

	I understand what this place or project is about	I've heard of this place or project	I've never heard of this place or project
Central Cascades Adaptive Management Area			
Total:	25	39	36
Urban:	26	33	41
Rural:	24	47	29
Northwest Forest Plan			
Total:	53	38	9
Urban:	59	31	10
Rural:	45	48	8

4. In general, how would you rate the condition of federal forest lands in the McKenzie watershed? (Check "Don't know" if you feel uncertain about this issue.)

	Very unhealthy	Somewhat unhealthy	Somewhat healthy	Very healthy	Don't know
Total:	3	23	47	14	14
Urban:	3	23	50	11	13
Rural:	2	24	43	17	14

5. To communicate effectively, agency personnel need to know if specific forestry terms have meaning for citizens. For the following terms, please indicate your level of familiarity.

	I know the meaning of the term	I've heard the term, but I don't know the meaning	I've never heard the term
ecosystem management			
Total:	91	7	2
Urban:	94	5	2
Rural:	87	11	2
active management			
Total:	71	20	9
Urban:	73	19	8
Rural:	69	22	9

		I know the meaning of the term	I've heard the term, but I don't know the meaning	I've never heard the term
disturbance-based management	Total:	41	31	27
	Urban:	42	29	29
	Rural:	40	32	28
adaptive management area	Total:	47	33	21
	Urban:	48	29	23
	Rural:	44	38	17
watershed	Total:	96	2	2
	Urban:	98	1	1
	Rural:	93	5	2
range of historic variability	Total:	40	30	31
	Urban:	41	28	31
	Rural:	38	30	31
disturbance regime	Total:	32	30	38
	Urban:	35	26	40
	Rural:	28	36	37
fire return interval	Total:	59	27	14
	Urban:	60	27	13
	Rural:	58	26	16
uneven-aged management	Total:	60	16	24
	Urban:	62	17	21
	Rural:	57	14	29

	I know the meaning of the term	I've heard the term, but I don't know the meaning	I've never heard the term
rotation age			
	Total: 66	17	17
	Urban: 70	17	13
	Rural: 61	16	23
riparian area			
	Total: 95	3	2
	Urban: 95	2	2
	Rural: 96	3	1
patch clear-cut			
	Total: 81	14	5
	Urban: 84	11	6
	Rural: 76	19	5
forest succession			
	Total: 71	18	11
	Urban: 75	15	10
	Rural: 66	22	13

6. People have different ideas about how forest systems work. In this section we are trying to understand what citizens know about forests or may be uncertain about. Please tell us if these statements are generally true, generally false, or if you are not sure (circle one number for each response).

	Generally true	Not sure
Disturbance events (fires, flood, wind) have played a significant role in shaping natural forests in the McKenzie River Watershed for thousands of years. (True)		
Total:	98	1
Urban:	99	0
Rural:	97	2
Plant and animal species depend on disturbance events for survival. (True)		
Total:	80	14
Urban:	84	11
Rural:	73	17
Some dead and dying trees are natural components of forest systems. (True)		
Total:	100	0
Urban:	100	0
Rural:	100	0
Large trees and logs in streams are a barrier to fish and should be removed when possible. (False)		
Total:	90	6
Urban:	91	5
Rural:	89	8
Douglas-fir trees regenerate better in open, sunny areas, than shady ones. (True)		
Total:	71	15
Urban:	69	16
Rural:	73	14
Historically, sites in the upper McKenzie River Watershed experienced fire frequently (every 10 to 20 years). (False)		
Total:	27	38
Urban:	30	31
Rural:	24	48
Natural disturbance-based forest management involves using harvesting techniques and prescribed fire to emulate past events like floods, wildfires, windstorms, and landslides. (True)		
Total:	53	37
Urban:	56	35
Rural:	50	41

II. Opinions about forest management

7. Peoples' opinions about forest management are based on many things. Please consider the following statements carefully. How important is each factor to you when you are making judgments about current Forest Service or BLM management actions and decisions?

	Very important/ Important	Slightly/ Not Important
My knowledge of <i>past</i> agency actions		
Total:	76	24
Urban:	68	32
Rural:	85	15
Environmental consequences of an action		
Total:	94	6
Urban:	95	5
Rural:	93	7
Economic consequences of an action		
Total:	76	24
Urban:	77	23
Rural:	74	26
The opinions of knowledgeable people in my community		
Total:	81	19
Urban:	81	20
Rural:	82	18
Understanding the objectives of a proposed management action		
Total:	95	5
Urban:	95	5
Rural:	94	6
The specific place for which an action is planned		
Total:	89	11
Urban:	86	14
Rural:	92	8
My personal beliefs about how forests should be managed		
Total:	71	29
Urban:	70	30
Rural:	74	26

	Very important/ Important	Slightly/Not Important
That the decision was based on scientific information		
Total:	92	8
Urban:	95	5
Rural:	88	12
That citizens had meaningful opportunities to contribute to a decision		
Total:	79	21
Urban:	83	17
Rural:	74	26
The length of time required before outcomes of an action can be evaluated		
Total:	66	34
Urban:	61	40
Rural:	72	28
Understanding how a decision was made		
Total:	88	12
Urban:	87	13
Rural:	89	11

8. Public trust in natural resource institutions is essential to the success of forest management programs. Please indicate your level of trust in these organizations to make or contribute to good decisions for maintaining and restoring healthy forest conditions. Mark “Not sure” if you have no basis for judgment.

	Full	Moderate	Limited	None	Not sure
U.S. Forest Service					
Total:	14	45	33	3	5
Urban:	18	42	30	4	7
Rural:	10	48	36	2	3
U.S. Bureau of Land Management					
Total:	12	35	40	8	6
Urban:	15	37	37	6	6
Rural:	7	32	45	10	7
Oregon State University scientists					
Total:	25	53	13	1	8
Urban:	26	50	15	1	7
Rural:	22	57	9	2	10
H.J. Andrews Experimental Forest personnel					
Total:	24	43	7	1	25
Urban:	24	38	7	0	31
Rural:	25	49	7	3	16
McKenzie Ranger District staff					
Total:	16	55	15	2	12
Urban:	17	51	12	2	18
Rural:	15	60	19	3	3

9. How useful are the following sources of information for you concerning management of federal forest lands? By “useful” we mean sources that you pay attention to and that provide good, credible information. If you are unfamiliar with one, please check “No experience”.

		Level of Usefulness				
		High	Moderate	Slight	None	No experience
Newspapers						
	Total:	20	43	30	7	1
	Urban:	21	43	31	5	1
	Rural:	19	42	27	11	1
Radio						
	Total:	8	28	43	14	7
	Urban:	6	32	46	10	6
	Rural:	11	23	39	19	7
Television						
	Total:	10	32	36	19	3
	Urban:	9	30	43	14	5
	Rural:	11	37	26	26	1
Internet						
	Total:	8	27	29	21	16
	Urban:	9	32	29	14	17
	Rural:	8	20	30	30	13
Environmental groups						
	Total:	24	34	27	11	4
	Urban:	24	35	25	12	5
	Rural:	24	31	30	11	4
Timber groups						
	Total:	7	36	33	20	5
	Urban:	6	34	36	20	5
	Rural:	9	38	30	20	4

		High	Moderate	Slight	None	No experience
University researchers/educators						
	Total:	38	42	11	3	7
	Urban:	36	47	10	2	6
	Rural:	41	35	12	4	8
Watershed councils						
	Total:	37	41	14	4	4
	Urban:	40	41	11	3	5
	Rural:	33	41	20	4	2
Forest Service and BLM Sources						
Brochures						
	Total:	6	40	40	8	6
	Urban:	7	37	40	8	8
	Rural:	6	44	39	9	2
Newsletters						
	Total:	14	41	27	8	10
	Urban:	12	41	28	8	11
	Rural:	8	17	43	25	8
Agency websites						
	Total:	7	27	24	19	23
	Urban:	9	30	22	15	24
	Rural:	3	23	26	25	22
Environmental Impact Statements						
	Total:	24	32	23	6	15
	Urban:	24	35	21	5	15
	Rural:	24	29	27	7	13
Conversations with agency personnel						
	Total:	29	40	15	3	14
	Urban:	33	34	14	2	16
	Rural:	23	48	16	3	10

	High	Moderate	Slight	None	No experience
Guided field trips to forest sites					
Total:	39	25	15	4	17
Urban:	40	23	14	3	20
Rural:	36	30	17	6	11
Small, interactive workshops					
Total:	23	31	18	6	22
Urban:	24	26	19	4	26
Rural:	21	38	17	9	15
Agency public meetings					
Total:	12	39	29	6	14
Urban:	10	36	31	8	15
Rural:	15	43	25	4	12
Visitor centers					
Total:	16	36	36	5	7
Urban:	15	37	36	4	8
Rural:	17	34	36	8	5

10. Public opinion can be useful in determining if management programs will be successful. To help managers make decisions about federal forest lands, please indicate **your feelings** about the following statements (mark “No basis for opinion” if you are uncertain about a statement):

	Strongly agree/ Agree	Strongly disagree/ Disagree	No basis for opinion
Following nature’s way is preferable to human intervention in ecosystems.			
Total:	59	33	7
Urban:	61	32	8
Rural:	58	36	7

	Strongly agree/ Agree	Strongly disagree/ Disagree	No basis for opinion
Long-term active management (e.g. timber harvest, tree planting, thinning, habitat restoration, prescribed fire) is necessary to sustain healthy forests.			
Total:	76	20	4
Urban:	77	20	3
Rural:	76	20	4
Thinning forests is a legitimate method for sustaining long-term forest health.			
Total:	83	12	5
Urban:	85	11	4
Rural:	80	12	8
I'm worried that thinning programs will lead to unnecessary harvesting.			
Total:	44	51	5
Urban:	43	52	6
Rural:	45	50	5
Scientific experimentation is appropriate on selected forest lands.			
Total:	93	3	4
Urban:	93	2	5
Rural:	95	3	2
Scientists should take a more active role in forest management decisions.			
Total:	82	12	6
Urban:	84	10	6
Rural:	80	13	7

	Strongly agree/ Agree	Strongly disagree/ Disagree	No basis for opinion
Timber production is an appropriate use of federal forests in the McKenzie watershed.			
Total:	67	27	6
Urban:	68	25	6
Rural:	64	31	5
Local priorities should have greater influence on management decisions than national priorities.			
Total:	71	24	5
Urban:	37	28	5
Rural:	76	18	7

11. Federal forest agencies (Forest Service, BLM) interact in various ways with local communities. Please give us your opinion about your experiences and interactions with the agencies in your area.

	Strongly agree/ Agree	Strongly disagree/ Disagree	No basis for opinion
Federal forest managers are open to public input and use it to shape forest management decisions.			
Total:	43	39	18
Urban:	50	32	18
Rural:	33	48	19
Forest managers effectively build trust and cooperation with local citizens.			
Total:	34	49	17
Urban:	42	41	17
Rural:	23	59	18

	Strongly agree/ Agree	Strongly disagree/ Disagree	No basis for opinion
Agency information about forest projects usually provides a good explanation of options and consequences.			
Total:	51	36	13
Urban:	55	34	11
Rural:	46	39	16
Federal forest managers do a good job of explaining their management activities.			
Total:	39	46	15
Urban:	45	40	15
Rural:	33	53	13
Agency personnel provide a consistent message on project plans.			
Total:	32	44	23
Urban:	39	37	24
Rural:	25	55	21
I look at forest management information skeptically because I do not trust the agencies.			
Total:	47	42	11
Urban:	41	48	11
Rural:	56	35	9
The information provided by forest agencies is up to date and reliable.			
Total:	43	34	24
Urban:	54	25	22
Rural:	28	47	26

	Strongly agree/ Agree	Strongly disagree/ Disagree	No basis for opinion
I feel the average citizen has no way to influence the agency planning processes.			
Total:	57	38	5
Urban:	51	43	6
Rural:	65	31	4
I trust local Willamette National Forest Service personnel, but I don't trust government at the national level to let them do their job.			
Total:	64	21	15
Urban:	61	23	16
Rural:	68	18	14

III. Opinions about disturbance-based management

12. People may have different ideas about the risks involved in sustaining healthy forests through a landscape level, historic disturbance-based approach. How do you feel about the following items as **potential risks or significant concerns** for using this approach in the McKenzie watershed?

	High risk or concern	Moderate risk or concern	Little risk or concern	No risk or concern	Not sure
the public may not understand this approach					
Total:	19	56	17	1	8
Urban:	19	58	17	2	5
Rural:	18	53	16	1	11
trusting the agencies to make good decisions					
Total:	30	39	24	3	3
Urban:	27	42	27	3	2
Rural:	33	36	22	3	6

	High risk or concern	Moderate risk or concern	Little risk or concern	No risk or concern	Not sure
too little harvesting overall					
Total:	14	19	32	27	7
Urban:	11	21	38	25	5
Rural:	18	17	26	31	9
too much harvesting overall					
Total:	32	27	23	9	8
Urban:	30	28	30	7	6
Rural:	37	26	16	11	11
potential for harvesting in old growth stands					
Total:	49	21	18	7	5
Urban:	44	25	20	7	4
Rural:	56	17	17	6	6
agencies will use this new language to justify excessive harvesting					
Total:	34	27	25	10	4
Urban:	34	27	25	12	3
Rural:	37	26	24	8	6
will lead to additional road building in forests					
Total:	31	24	29	10	5
Urban:	33	25	29	8	5
Rural:	30	24	29	11	6
not enough science in decisions					
Total:	22	34	29	9	6
Urban:	21	31	32	9	8
Rural:	23	39	26	8	5

	High risk or concern	Moderate risk or concern	Little risk or concern	No risk or concern	Not sure
too much public involvement in decisions					
Total:	7	25	4	18	5
Urban:	6	24	52	13	5
Rural:	8	27	35	25	5
not enough public involvement in decisions					
Total:	18	32	35	9	6
Urban:	21	28	38	11	3
Rural:	16	36	31	7	9
too many areas being set aside and “locked up” from management					
Total:	15	20	29	30	7
Urban:	12	20	30	34	6
Rural:	17	21	28	26	8
visual impacts on forests					
Total:	17	29	39	12	4
Urban:	13	26	48	10	3
Rural:	22	31	27	14	6
this approach won’t pay for itself					
Total:	8	22	32	22	16
Urban:	9	18	34	26	12
Rural:	8	26	28	18	20
the long-term nature of this strategy					
Total:	17	2	28	16	13
Urban:	14	26	33	17	11
Rural:	21	28	21	15	16
national politics will keep changing the priorities					
Total:	61	27	7	1	4
Urban:	58	31	7	2	3
Rural:	66	22	7	0	6

13. In general, how important do you feel paying attention to historic, natural disturbances is in helping to guide what future forest conditions should be like? (Check “Don’t know” below if you feel uncertain about this issue.)

Total:	0-----4-----4-----45-----23-----14-----3		
Urban:	0-----4-----3-----39-----27-----16-----4		
Rural:	1-----3-----7-----53-----19-----11-----2		
	\	/	/
Historical conditions are impossible to reproduce and are of no value in guiding future forest management		Historical conditions are one of many guides that can be used in forest management	Historical conditions are the only ecologically responsible guide for managing federal forest land

	Don't Know
Total:	6
Urban:	8
Rural:	4

14. For **federal lands** in the McKenzie Watershed, please give us your opinions about using harvesting methods to emulate historical disturbance events over large blocks.

	Agree	Disagree	Not Sure
I have confidence that agency managers know enough about forest and stream ecosystems to carry out disturbance-based management.			
Total:	53	33	15
Urban:	58	30	13
Rural:	46	39	16
I would support this approach if management plans are critically reviewed by scientists.			
Total:	76	15	9
Urban:	78	12	10
Rural:	73	20	7

	Agree	Disagree	Not Sure
Forest reserves (areas with no timber harvest) are still necessary for plant and animal conservation.			
Total:	85	11	4
Urban:	88	6	6
Rural:	81	18	1
My support will be based on knowing the type of harvesting techniques planned.			
Total:	75	17	8
Urban:	76	18	6
Rural:	75	14	11
I am concerned about economic losses from timber sales that leave live and dead trees			
Total:	31	62	7
Urban:	32	63	5
Rural:	30	61	10
I am concerned that plans based on historic disturbance will be used as an excuse to cut too much timber.			
Total:	49	45	6
Urban:	47	46	8
Rural:	52	44	3
I support the landscape-level historical disturbance approach described above.			
Total:	58	15	27
Urban:	61	13	26
Rural:	54	18	28

IV. Demographic information

15. How long have you lived in Lane County?

	Years (mean)
Total:	32
Urban:	33
Rural:	32

16. Are you?

	Male	Female
Total:	74	27
Urban:	76	24
Rural:	70	30

17. What is your age?

	Years (mean)
Total:	60
Urban:	59
Rural:	61

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

	Total	Urban	Rural
Some high school	1	0	2
High school graduate	5	4	7
Some college	23	17	33
Bachelor's degree	25	29	20
Some graduate school	15	16	14
Completed graduate degree	30	35	25