Public Acceptance of Forest Conditions and Fuel Reduction Practices:

A Survey of Citizens in Communities Adjacent to National Forests in Minnesota, Wisconsin, and Michigan

Dr. Bruce Shindler
Jessica Leahy
Eric Toman

Oregon State University

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A National Fire Plan project in cooperation with the North Central Research Station, USDA Forest Service and the Joint Fire Science Program

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Executive Summary

Introduction and Study Objectives

This report provides a detailed summary of public opinion research conducted in the summer and fall of 2002 in the Great Lakes region by forest social scientists at Oregon State University. It is a National Fire Plan project in cooperation with the USDA Forest Service, North Central Research Station and the USDI/USDA Joint Fire Science Program. This study was prompted by concerns about wildfire and the need for public acceptance of agency policies as the U.S. Forest Service attempts to implement fire and fuel management plans in the region's forest communities. This information will be useful as personnel on local Forests and Ranger Districts develop plans for fuel reduction and restoration programs and communicate with citizens about treatment alternatives.

The focus of this study is on communities adjacent to National Forest lands in Minnesota, Wisconsin, and Michigan where fire management concerns are increasing and relatively little is known about public opinion of agency policies. Today, fire managers are concentrating treatments at the wildland-urban interface where problems are the most severe and risk is eminent. Because residents in forest communities are often the first to respond to management programs, especially fuel reduction treatments, the focus on citizens at the local level is particularly relevant for agency personnel. Initially, the research team interviewed thirty Forest Service fire and fuel management personnel in the region to gain their perspective on problems and concerns. These conversations led to field visits and eventually to the design of a direct-mail survey to assess public perspectives. Overall, 1,125 households in the three states were contacted and 593 individuals completed the questionnaire for a 53% response. Specific study objectives were to:

- investigate factors that influence public acceptance of forest conditions and fuel reduction and restoration strategies.
- examine citizens' understanding of forest conditions and fuels management (in general) and the range of specific treatments practiced or being considered in the region.
- measure public preferences for a range of fuel reduction and restoration practices.
- examine existing relationships among the public and natural resource agencies and measure public confidence in managers' ability to effectively implement fuel reduction and restoration programs.
- identify how citizens' view various sources of information related to natural resources, including the credibility of information and which delivery systems are most useful.

Key findings

Findings help expose the complexity of fire management and fuel reduction problems and reinforced the importance of a sound communication process. Overall, respondents demonstrated a relatively high level of awareness about forest conditions in the region, but only a moderate level of understanding of causal components and treatment alternatives. Notable findings include:

Understanding of forest conditions

- There is considerable public awareness of forestlands; most residents (87%) indicated they pay attention to local forest conditions and are concerned about their management.
- There is a general perception that forests in the lake states are healthy (rated as such by three-fourths of the respondents).
- A slight majority (51%) thought it was likely that a wildfire could break out near their home in the next five years.
- Although citizens were generally familiar with many of the terms and current issues surrounding fire management, specific knowledge was considerably lower. For example, a good deal of uncertainty and a number of misperceptions persist about key terms such as *prescribed fire* and *fuel reduction* as well as important fire related concepts (i.e., that humans cause most of the wildfires in the area and that fire plays an important role in controlling insect and disease outbreaks). Overall, Minnesota residents were the most knowledgeable respondents, Michiganders the least.
- Among general information sources about forestry issues newspapers, magazines, and television were rated most highly for *ease of understanding*; university researchers and family and friends were the most *trustworthy*; and newspapers, TV, forestry industry groups, and university researchers were rated the most *helpful*. Across all categories, the lowest rated sources were environmental groups and the internet.
- Fewer respondents overall were familiar with information from forest agencies, but those who were rated them more highly. Interactive forms of information exchange (guided field trips, interpretive centers, and conversations with agency personnel) received high marks as being *understandable, trustworthy*, and *helpful*.

Fire management and treatment alternatives

- The two issues of greatest importance to respondents were managing healthy forests and communicating with the public.
- Agreement about forest fire conditions in local areas was mixed. For example, respondents were equally split or uncertain about whether jack pine has become a fire hazard and if local forestland is overcrowded with too many trees. Responses were similarly split over support for closing some forest roads to reduce the fire danger.
- Beliefs about the effectiveness of fuel management practices were also mixed. Just over half recognized that both prescribed fire and mechanical vegetation removal affected the intensity or frequency of wildfires. However, few individuals were concerned about these practices impacting either recreation opportunities or scenic quality. And only about one-third were concerned about the effects of smoke from prescribed fire.

- Almost three-fourths of respondents agreed the greatest risk of using prescribed fire was the fire going out of control.

- Overall, thinning received the most support for fuel reduction purposes; 59% agreed "thinning is a legitimate tool that resource managers should be able to use whenever they see fit." Another 28% agreed that "it is something that should be done only infrequently, in carefully selected areas." Respondents were the most cautious about the use of prescribed fire; 38% and 44%, respectively, agreed with similar statements about this treatment. However, very few people (6%) believed these practices were unnecessary or created too many impacts.

- Overall, Minnesota residents were the most tolerant of potential impacts and the most supportive of fuel reduction measures. Michigan residents were the least informed and the least supportive of the treatments.

Citizen-agency interactions

- The majority of respondents believed that citizen participation in forest planning is of substantial value even if it adds to the cost of government.

- Respondents (72%) were most trusting of the Forest Service in relation to other forest organizations (timber companies, tribes) and local agencies (city, county, and state government). In each case, Minnesotans were the most trusting of these entities and Michigan residents registered the least amount of trust.

- With regard to confidence in the Forest Service to specifically use fuel reduction treatments, scores were somewhat lower. Thinning was the most highly rated practice with 67% of respondents confident in the agency, followed by mechanical vegetation removal (61%) and then prescribed fire at 56%.

- Opinions about how the Forest Service interacts with local communities was mixed. About the same number agreed, disagreed, or had no basis for opinion about most statements including 1) "the Forest Service is open to public input and uses it to shape management decisions," 2) "Agency managers build trust and cooperation with citizens so that people feel the agency is acting in their best interest," and 3) "The Forest Service does a good job of providing information about its management acitivities."

- About one-third of the respondents believe local agency personnel are hindered from doing their job because of restrictions at the national level.

- Several socio-demographic characteristics were correlated with support for treatment methods and how citizens view the agency. As with many other studies, the strongest associations involved natural resource knowledge. Increased knowledge about forest conditions and management alternatives led to greater support for all three fuel reductions practices as well as greater confidence in the Forest Service to implement these programs.

Summary of Conclusions

The concluding comments involve a set of overarching strategies that are intended to help guide agency personnel and citizens toward improving conditions in forest communities.

Build literacy among communities

Findings suggest that citizens in the study region possess a high level of awareness of forest conditions but, at best, a moderate level of understanding about how these conditions evolved and the management alternatives available. In order for citizens to have a real ability to participate in and support management actions, they must have a capacity for participation. As the major steward of public forestlands, the primary responsibility for developing this capacity falls to the Forest Service. The first task will be to develop a common understanding about forest health and fire management, including the message that conditions in many areas require management action.

The most effective communication program will involve a multi-layered strategy. The first layer should be broad-based for developing awareness among the general population and typically includes "bulk" formats for information dissemination such as the popular media outlets, brochures and videos at visitor centers, and so forth. The second layer involves more targeted outreach in forest communities to address specific concerns in these locales. Communication formats will vary from setting to setting (e.g., field trips to affected sites, demonstration projects, school education programs), but all have a common ingredient: personnel in lead roles need to be credible, trusted local individuals who can engage community members in discussions of problems that are relevant to their immediate concerns (Shindler et al. 2002). The third layer of communication is at the ground level. This should involve hands-on cooperative projects where the agency and citizens work together to solve local problems. Activities should include experimentation with practices that allow for evaluation of treatments and outcomes prior to broad-scale application.

Address Uncertainty and Risk

Fire management and fuel reduction involve much uncertainty about how systems work as well as concerns about risks associated with practices to maintain or restore forest conditions. As the public becomes more aware of forest conditions and also expects to have a role in planning processes, agencies will need to help citizens sort through the complexity in these decisions. Public concerns often center on how serious, certain, and soon the risks will be as well as how sure resource professionals are that a potential solution will be effective. Addressing local conditions and including communities in the process is essential. Forest conditions and practices are more meaningful when people can equate them to local problems that affect their livelihood and their quality of life. One approach is to provide places where personnel and residents can cooperatively plan and execute forest treatments. At these sites agency members can provide leadership, develop common objectives for learning how to manage healthy forests, and build on the long, slow process of establishing greater trust among forest communities.

This will mean that the Forest Service will need to adopt policies that better *enable* personnel to develop effective strategies for community collaborations, that *encourage* these

efforts within management units, and that *clarify the roles* of all participants so that motivated individuals can find a common objective for achieving on-the-ground results (Wondolleck and Yaffee 1994).

Focus on Situational Context and Site-specific Conditions

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

Concentrate on Agency-Public Interactions along with Information Provision

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

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

Introduction

The debate and uncertainty surrounding ecosystem-based management approaches have raised concerns about public acceptance to a new prominence. Evidence from across the country indicates there is an inherent instability in resource policies that do not adequately integrate citizens' concerns (e.g. Cortner et al. 1998, Shindler et al. 2002). This is particularly important in communities adjacent to National Forests, where forest conditions may be in decline and a substantial threat of wildfire exists. In these settings resource professionals are attempting to develop scientifically sound, publicly supported solutions for reducing hazardous fuel and maintaining healthy forest landscapes.

With the current emphasis on landscape-level and ecosystem-based strategies, accounting for both public and private lands are essential components of the fire management planning process. This is particularly the case in the East and the Midwest where National Forests do not dominate ownership patterns. Forest conditions at the wildland-urban interface (WUI) have become especially important in recent years. In these locations, the Forest Service must work cooperatively with other (public and private) landowners to suppress fires and conduct fuel management activities. Our ability to reach more lasting decisions will depend on a number of factors, including how well resource professionals address the uncertainty of risks (both from wildfires and practices used to control them), local concerns in forest communities, and the role and participation of affected parties. To be successful, fire managers and scientists require accurate information about the public's understanding of forest conditions and insight on citizens' preferences for specific treatments.

The focus of this study is on the U.S. Forest Service's North Central Region where relatively little is known about the opinions and preferences of residents in forest communities, particularly with regard to fire management and fuel reduction activities. Researchers at Oregon State University designed this exploratory study to begin to understand the public's perspective about forest conditions in the lake states as well as their views on management practices and the agencies responsible for implementing them. The research team has undertaken similar projects at both the national level and six other regions throughout the country.

Today, fire managers are concentrating many treatments at the WUI where problems are the most severe and risk is eminent. Because residents in forest communities are often the first responders to management programs implemented at the Ranger District and Forest level, this study targeted communities adjacent to National Forest lands. Overall, 1,125 households in Minnesota, Wisconsin, and Michigan were contacted as part of a direct-mail survey. A total of 593 individuals completed the questionnaire for a 53% response. The purpose of this research report is to:

- identify factors that influence public understanding and acceptance of forest conditions and fuel reduction in these communities
- measure public preferences for a range of fuel reduction and restoration practices
- examine citizens' confidence in the Forest Service to effectively implement these programs.

Management Context

In contrast to other areas of the country, particularly the western U.S., the issue of wildfire has not received much attention in the North Central Region. Decades have passed since large-scale fires came through the area in any substantial number or regularity. Although fires on the magnitude of the Great Chicago Fire and the Peshtigo Fire are well known, they are generally perceived as historical events rather than indicators of a real and current threat. Increased emphasis on fire suppression by the region's fire fighting agencies has generally resulted in a decline in the size of fires and the number of acres burned each year. For example, during the 1930s an average fire burned about 84 acres in Wisconsin; by the 1990s, the average dropped to two acres per fire (Wisconsin DNR 2001).

However, concerns over forest health and stand density have led managers to believe wildfires may soon become a major problem in the region, especially in the lake states of Minnesota, Wisconsin, and Michigan. Forest conditions, in general, are becoming more at risk over time as jack pine and red pine stands become over-mature and balsam budworm attacks leave many standing dead trees. Several recent events serve as examples of the difficulty communities face as forest succession occurs and conditions become more challenging. Two significant fires occurred on or near the Huron-Manistee National Forest in Michigan. In 1980, a Forest Service prescribed burn escaped and became the Mack Lake Fire that eventually ignited 24,000 acres and 44 structures. Ten years later the Stephen Bridge Road wildfire destroyed 76 homes and 6,000 acres of public and private forestland. And in 1999, severe storms caused a 300,000 acre blowdown event on the Superior National Forest in Minnesota.

Although wildfires may be less of an urgent issue in the lake states than in the western U.S. where big fires have been capturing the headlines—and some managers may feel they have the benefit of time to develop strategies for managing forest health—forest management in this region has its own challenges. In the exploratory phase of this study, the research team interviewed National Forest fire managers in all three states and made site visits to learn more about specific concerns. On many Districts, small checkerboard ownership patterns are a primary concern. Both fire suppression and fuel reduction efforts in such places are more difficult than on expansive, more contiguous western federal forests. The wildland-urban interface is much more pronounced here. And in most areas, managers worry about the lack of awareness of fire risk among their communities. A diverse public, including a substantial number of summer homeowners and recreationists, makes the communication job more difficult.

Additional concerns include public safety and property protection, increased development, impacts on wildlife populations, lack of awareness (or disregard) of property boundaries, the high number of incidental roads, more human-caused fires, and generally more people at the interface. Some outcomes are obvious. It is easier for human-caused fires (e.g., debris and burn barrels) to start on private land and carry over to public land. Indeed, 50% of all fires in the lake states stem from debris burning. Arson is also a primary concern in the region; this source accounts for 53% of the major fires over 100 acres (Cleland 2001).

Other problems expressed by fire managers are more subtle, but equally challenging. These include a general lack of awareness among residents about wildfire risk and public skepticism over unpredictable treatments that seem new or different. Winter and Fried's (2000, p.33) focus group research from forest communities in rural Michigan sheds some light on the problem:

> *Because participants consider forest fires inherently uncontrollable, and the resulting damage essentially random, they are only weakly supportive of investments in firefighting infrastructure, unlikely to take all possible steps to safeguard their own properties, and resolute in their emphasis on solutions that reduce the number of fire ignitions. Their universally negative perceptions of prescribed fire may ultimately preclude its use as a risk management tool in Michigan's wildland-urban interface forests.*

These findings suggest that memories of the area's Mack Lake Fire are still strong. Subsequent empirical data from the same study region noted that residents' primary concern about prescribed burning is the potential for "out of control fires" (Vogt et al. 2002).

Managers also reported that several National Forests in the lake states have a modest amount of fuel reduction work underway while others have been slow (for various reasons) to implement programs. Many fire management personnel are new to their current positions either through transfer from other assignments or because individual Districts are just now "staffing up" to meet existing concerns. Prescribed fire is used to some extent on most Forests, although the prime objective of this treatment is often focused on restoring oak savanna and prairie habitat for wildlife and native plants. Mechanical vegetation removal is more commonplace, as is thinning and salvage logging—especially on Forests in northern Minnesota after the major blowdown events of past seasons. Factors contributing to low levels of fuel reduction work include the historic view that these practices were not necessary, lack of resources to hire personnel to manage a fuels program and conduct on-the-ground treatments, concerns about public acceptance of practices, and few community outreach programs in place to "sell" the benefits of such practices.

Public outreach efforts in the region differ significantly from one Forest to another. In general, there is a relatively short history of community interaction on fuel management programs. All Districts provide opportunities for public participation as required by the National Environmental Planning Act (NEPA). Most units also use newspapers and radio announcements to provide information or otherwise notify community members of upcoming activities. A few Districts are active with specialized fire committees or groups (such as Fire Wise in Minnesota and the State Fire Council in Michigan). Except in areas where specific fire events have occurred, there seems to be a low level of public concern over the prospect of wildfire and consideration given to fuels management. Forest managers report that people tend to be interested when local projects could affect them personally. In these cases, property owner safety and smoke are the primary concerns. Smaller numbers of people are skeptical of thinning as a treatment method. Managers report several confrontations with groups who believe the need to thin forests is being used as an excuse to harvest timber for economic—not ecological—reasons.

Background

To meet the objectives for ecosystem management and healthy forests, resource professionals must understand how natural systems function and are sustained. However, they also need to understand how citizens interpret and respond to different forest conditions, decision processes, and management actions. Although there is a growing body of research on public reaction to the use of prescribed fire, comparatively little information exists on citizen perspectives on alternative strategies for fuel reduction or ecological restoration (e.g., mechanized thinning, mowing, planting fire resistant species, green stripping). Recent studies suggest that factors important to public judgments include concern over economic risk, long-term impacts on environmental health, and trust in our natural resource agencies to effectively implement management practices (Shindler 1997, Brunson et al. 1997, Winter et al. 2002). The search for contextually appropriate and socially acceptable treatments is essential to federal forest managers.

As mentioned, more is known about public awareness of and attitudes toward prescribed fire than other treatments. Prior to the mid 1970's, the federal lands policy of immediately suppressing all fires received nearly unanimous public support. This, of course, was due primarily to aggressive fire-fighting efforts, complete with national public education campaigns and a general interpretation of Smokey Bear's message to mean that all forest fires have detrimental effects on resources. With a more recent emphasis on the use of fire as a management tool, public attitudes have been evolving toward a broader acceptance of fire in forest and rangeland ecosystems (Carpenter et al. 1986). Studies indicate a positive influence of information and education on people's opinions (Shelby and Speaker 1990, Carpenter et al. 1986). They also suggest that prescribed fire is not acceptable in all settings, particularly at the urban interface. Concerns become elevated in these settings and include risk factors (public property and traffic safety), aesthetic concerns (scenic quality and recreation use), health issues (smoke and air quality), and ecological effects (on wildlife, vegetation, and water quality).

Although social assessments of thinning and other treatments for fuel reduction are uncommon, a relatively recent strategy has emerged in the name of restoring natural forest conditions. Drawing on ideas from as early as Leopold (1934), scientists are recommending ecological restoration strategies as methods to reconstruct naturally functioning ecosystems (e.g. Gobster and Hull 2000, Covington and Wagner 1996). Although some researchers (e.g. Covington and others 1997) have suggested that a major constraint to this approach may be a lack of healthy forest systems to serve as points of comparison, a number of applied examples are beginning to emerge where assessment of these practices can be conducted. In these cases, the ecological applications are readily identifiable, but researchers have also started to investigate the social context of these restoration projects (e.g. Hull and Gobster 2000, Shindler and Williams 2001, Shindler and Brunson 2002). For example, longitudinal studies from eastern Oregon show that citizens are very supportive of mechanized thinning programs but are frustrated by the Forest Service's inability to implement them (Shindler and Toman, in press).

Recent research also indicates that the public's willingness to accept a new or different management approach may depend on the perception of whether it is being fairly implemented

and how well it is working (Brunson 1993). Indeed, separate studies in the Great Lakes region reported that attention to local factors, such as the compatibility of economic and environmental goals (Landre and Knuth 1993) and achieving fairness in decision processes (Smith and McDonough 2001), are primary considerations in support for outcomes. These ideas seem to support the use of targeted communication strategies (Bright and Manfredo 1997); that is, messages and information in local communities where citizens can observe their design and implementation. A popular belief among social scientists (e.g. Taylor and Daniel 1986, Lauber and Knuth 1997, Daniels 1997, Shindler and Brunson 1999) suggests that experimentation with new or alternative practices is more likely to be supported if the public understands the rationale, research questions, and subsequent outcomes associated with the proposed treatments. A thorough investigation and analysis of these situations will help resource managers choose treatment and communication strategies.

Purpose and Objectives

This study was designed in cooperation with the North Central Research Station to evaluate public opinion about forest conditions in the region as well as citizen responses to fuel reduction treatments planned or underway on National Forests. Specific research objectives were designed to:

- investigate factors that influence public acceptance of forest conditions and fuel reduction and restoration strategies.
- examine citizens' understanding of forest conditions and fuels management (in general) and the range of specific treatments practiced or being considered in the region.
- measure public preferences for a range of fuels reduction and restoration practices.
- examine existing relationships among the public and natural resource agencies and measure public confidence in managers ability to effectively implement fuel reduction and restoration programs.
- identify how citizens' view various sources of information related to natural resources, including the credibility of information and which delivery systems are most useful.

While several social assessment studies have been conducted in the area in recent years, and provide reference data for previous sections of this report, these have been limited to specific communities. This study is intended to include all communities surrounding National Forests in the three-state area and can be used to approximate opinions of the local publics that federal managers must account for in planning activities.

Study Approach and Methods

The chosen population of interest consisted of residents in forest communities adjacent to National Forest lands in Minnesota, Wisconsin, and Michigan. We came to this decision after interviewing 30 Forest Service fire and fuel management personnel on the Superior, Chippewa, Chequamegon-Nicolet, Hiawatha, Huron-Manistee, and Ottawa National Forests. Our initial intent in contacting these individuals was to gain their perspective on the problems and concerns they faced in program implementation. These conversations led to field visits with personnel to

further develop our understanding of the research sites and the specific context in which local fire managers work.

These steps helped identify essential issues and subsequently improved the quality of the research design. Many discussion items are reflected in the final mail questionnaire. Through the interviews, we discovered that the majority of management concerns centered on local communities—the condition of highly visible forests close to residential areas, protecting individual homes, planning treatments at the urban interface, communicating with residents, and gaining the support and trust of local citizens. The survey targets local communities because 1) they are important to managers at the District and Forest level and 2) these residents are the "first responders" – the ones most directly affected by proposed plans and, thus, the first to judge the outcomes.

A mail survey was designed and sent to a random sample of citizens in Minnesota, Wisconsin, and Michigan who were residents in counties adjacent to National Forests. This allowed for partitioning of responses on selected variables of interest (e.g., state residency, value orientations, and other demographic information). Survey design was based on protocols developed by the research team for a recent national study and a series of six surveys in fire-prone areas (Arizona, Colorado, Florida, Georgia, Oregon, and Utah). Attention was given to replicating specific questions where appropriate, but the primary emphasis was on ecosystem types, management strategies, and identified concerns within the North Central Region.

Using the "total design method" (Dillman 1978), the protocol included a mail-back questionnaire with an explanatory cover letter and follow up mailings to elicit a sufficient response. Of the 1,125 people contacted, 593 persons returned usable surveys resulting in a 53% response rate. The number of study respondents was divided almost evenly between Minnesota (202), Wisconsin (201), and Michigan (190) residents. Market research analysts consider this number of respondents sufficient and this rate of return substantially high to adequately represent our population of interest (Lehman 1989).

Survey Findings: Awareness and Understanding of Forest Conditions

This section provides survey findings about respondent characteristics and public understanding of fire management and information sources. Findings are presented in the following text and tables. Where significant differences between states exist, results are presented for each state. Otherwise, aggregate data for all three states are shown.

Demographic Characteristics

Table 1: Respondent Characteristics

Mean age (years)	**58**
Gender **Female** **Male**	 **24%** **76%**
Mean residency in state* (years) MN 48 WI 45 MI 51	**48**
Mean residency in community (years)	**30**
Type of community **Rural area** **Small town** **Suburban** **Urban**	 **55%** **41%** **2%** **2%**
Education **High school only** **Some college** **College graduate** **At least some graduate school**	 **41%** **30%** **12%** **17%**
Someone in household suffers from a Respiratory ailment	**27%**

Differences between states are significant at *p<.05

Characteristics of the study respondents are presented in Tables 1 and 2. Demographic characteristics can help explain responses to survey questions or be used to further analyze attitudes and opinions about forest conditions. Some of these data will be used in correlation analysis later in the report.

Table 2: Proximity to potential wildfire

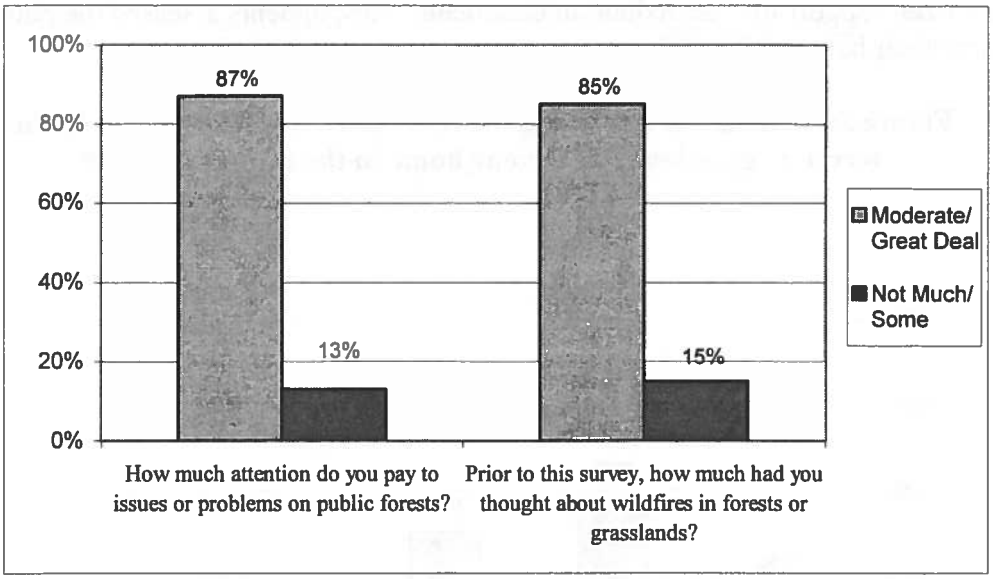
Distance to a forest or natural area where a wildfire might burn:	
land adjacent to my residence*	**49%**
MN	51%
WI	49%
MI	37%
less than one mile*	**11%**
MN	14%
WI	15%
MI	11%
1-5 miles*	**24%**
MN	20%
WI	22%
MI	33%
More than five miles away*	**15%**
MN	15%
WI	14%
MI	19%

Differences between states are significant at *p<.05

Public Awareness

Citizen awareness and understanding of forest conditions and practices is central to their acceptance of management decisions. In this study, respondents were asked how much attention they pay to issues on public forests and how much they had thought about wildfires in forests or grasslands (Figure 1). Most respondents (87%) reported that they pay at least a moderate amount of attention to issues on public forests and about the same number also thought about wildfire in these areas.

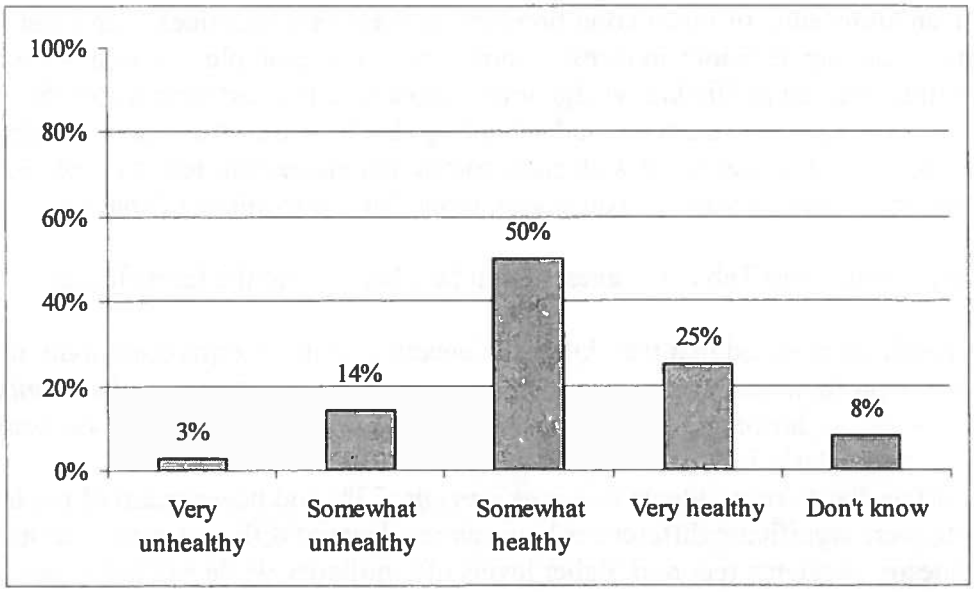
Figure 1: Attention to forest issues



Perceptions of Forest Conditions

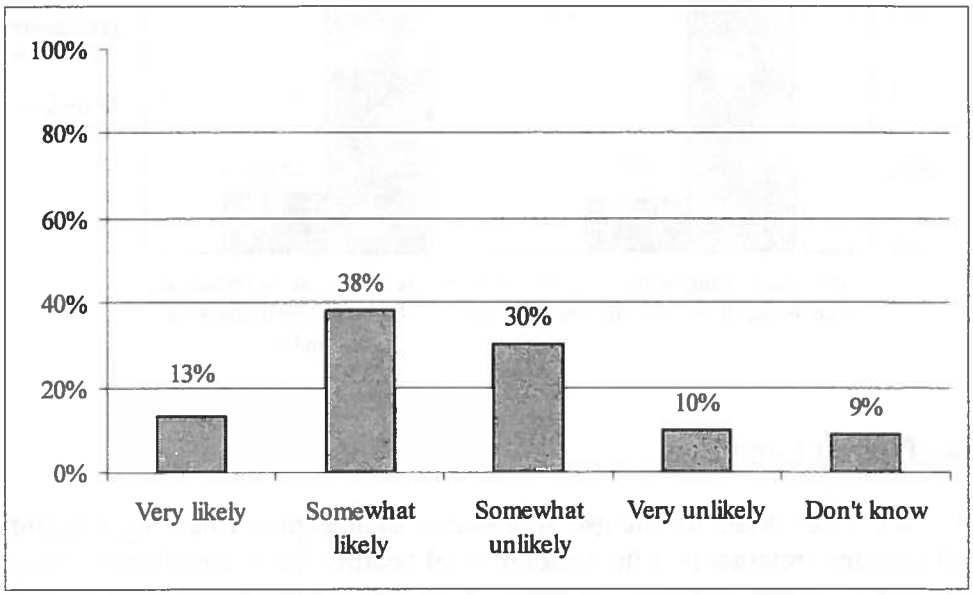
One of the stated goals for the use of practices such as prescribed fire, vegetation removal, and thinning treatments is the restoration of healthy forest conditions. Respondents were asked to rate the current overall condition of the public forests in their area on a 4-point scale (Figure 2). Most everyone was able to judge the quality of forestland; three-quarters thought the forests were either somewhat healthy (50%) or very healthy (25%). Only 17% rated the forest as unhealthy.

Figure 2: Ratings of public forests in your area



One benefit of more healthy forest conditions is the reduced chance of wildfire. Public perceptions of fire conditions and the relative importance of these concerns are likely to influence citizen support for fuel reduction treatments. Respondents assessed the potential for wildfire near their homes (Figure 3).

Figure 3: What is the likelihood that a wildfire could break out in the forest or grasslands near your home in the next five years?



A slight majority of respondents (51%) thought it was likely that a wildfire could break out near their home in the next five years; another 9% were unable to make a judgment.

Participant Knowledge

Citizen knowledge of forest conditions and management practices is an essential component of reaching decisions in forest communities. For example, numerous studies have identified a link between public knowledge levels about wildfire and support for the use of prescribed fire. To help gauge citizen understanding about the use of fire and thinning we asked respondents how familiar they were with eight common management terms (Table 3) and then engaged them in a series of true/false questions about forest conditions (Table 4).

Summary results from Table 3 suggest a high familiarity with the terms listed:

- Respondents reported that they knew the meaning of most terms commonly used by resource professionals, such as *controlled burn* (96%) and *threatened and endangered species* (94%); however, recognition of *prescribed fire* (62% overall) was somewhat lower, particularly in Wisconsin and Michigan.
- Least familiar to respondents was *pine barrens*; 33% had never heard of the term.
- There were significant differences between residents of different states. In most cases, Minnesota residents reported higher levels of familiarity while Michigan residents reported much lower levels.

Table 3: Knowledge of natural resource terminology

Term	Know meaning of the term	Heard, but don't know meaning	Never heard of the term
Controlled burn	**96%**	**3%**	**1%**
Ecosystem management**	**63%** MN 69% WI 66% MI 54%	**25%**	**12%**
Native vegetation**	**84%** MN 87% WI 87% MI 77%	**11%**	**5%**
Threatened & endangered species*	**94%** MN 96% WI 95% MI 90%	**5%**	**1%**
Prescribed fire**	**62%** MN 75% WI 58% MI 52%	**25%**	**13%**
Blowdown**	**70%** MN 91% WI 73% MI 44%	**15%**	**15%**
Pine barrens**	**39%** MN 30% WI 53% MI 32%	**28%**	**33%**
Fuel Reduction**	**65%** MN 71% WI 66% MI 55%	**21%**	**14%**

Differences between states are significant at *p<.05 and **p<.01.

Summary results from the true/false quiz in Table 4 suggest a somewhat lower level of knowledge about specific wildfire conditions and causes:

- Over two-thirds of respondents knew that humans cause most wildfires in the area, that years of fire suppression have increased the risk of severe wildfire, and that many plants require fires to sprout.

- However, substantially high numbers were uncertain or answered incorrectly about the time of year when most fires occur, whether fires are important in controlling insect and disease outbreaks, and that fires are important for maintaining deer and bird habitat .
- When asked about the growth of white pine, an important local species, answers were evenly split between sunny and shaded areas being more beneficial. This corresponds with our own (subsequent) research. We found conflicting evidence: white pines are shade tolerant (Minnesota DNR 1998), intermediately shade tolerant (U.S. Forest Service 1990), and shade intolerant (Canadian Forest Service 1995).

Table 4: Citizen knowledge about wildfires

Statement		Answer Choices		
		Most Correct		
Humans cause most of the wildfires in my state.		**Generally true** **68%**	Generally false 16%	Not sure 16%
Most forest fires in my area occur in the Fall.		**Generally false** **59%**	Generally true 13%	Not sure 28%
Years of fire suppression have increased the risk of severe wildfire in the region's forests.		**Generally true** **76%**	Generally false 10%	Not sure 14%
Fires play an important role in controlling insect and disease outbreaks in forests.		**Generally true** **48%**	Generally false 17%	Not sure 35%
Fires are important for maintaining habitat for deer and game birds.*		**Generally true** **52%**	Generally false 26%	Not sure 22%
	MN	**59%**	20%	20%
	WI	**52%**	29%	19%
	MI	**45%**	30%	25%
White pines grow better in open, sunny areas than shaded ones.		**Not sure** **43%**	Generally true 45%	Generally false 12%
Many plants require occasional fires so that new seeds or seedlings can sprout.		**Generally true** **73%**	Generally false 12%	Not sure 15%

Differences between states are significant at *p<.05. Generally correct answers in bold.

Information Sources

Information and the credibility of sources play an important role in forming support for management practices. In citizens' everyday lives, people come in contact with numerous forms of information from a variety of places. Using a protocol the research team developed for surveys nationwide, we asked respondents about seven different sources of information. We wanted to know *how easy the source is to understand, how trustworthy it is,* and *how helpful it is* (Table 5). We then asked how *helpful* the source is overall.

The first data column in Table 5 represents the percentage of respondents who were unfamiliar with the particular information source and had no basis for opinion to answer questions. Thus, the remaining columns reflect responses from those familiar with each source. Findings indicate that:

- From the "no opinion" column we see that Michigan residents consistently had the highest level of response in this category. Also, the *internet* is the least accessed source of information among the major sources listed.
- The popular media (*newspapers, magazines, TV*) and *family/friends* were most highly rated for ease of understanding; *environmental groups* received the lowest rating.
- Respondents were cautious in rating the trustworthiness of sources; *university researchers* and *family/friends* were the only groups trusted by more than 70%. The *internet* and *environmental groups* received particularly low ratings.
- Most information sources were rated moderately helpful. *Newspapers, TV, forest industry groups*, and *university researchers* received the highest ratings overall; the *internet* and *environmental groups* were rated less helpful.

Table 5: Assessment of general information sources

Information Source	No Opinion	Easy to Understand[a]	Trust-worthy[a]	Level of Helpfulness[a]		
				None	Slight	Very
Newspapers/magazines**	**13%** MN 13% WI 7% MI 19%	**92%**	**68%**	**7%**	**60%**	**33%**
TV/radio programs*	**10%**	**94%**	**67%** MN 75% WI 60% MI 65%	**9%**	**55%**	**36%**
Internet	**53%**	**71%**	**45%**	**35%**	**44%**	**21%**
Forest industry groups**	**31%** MN 28% WI 27% MI 40%	**71%**	**57%**	**21%**	**47%**	**32%**
Environmental groups**	**28%** MN 27% WI 21% MI 38%	**49%**	**22%**	**45%**	**42%**	**13%**
University researchers**	**36%** MN 32% WI 30% MI 47%	**63%**	**77%**	**12%**	**53%**	**35%**
Family and friends	**28%**	**83%**	**73%**	**18%**	**54%**	**28%**

[a] Percentages reflect responses from respondents who had an opinion about the specific information source. Scores reported for *easy to understand* and *trustworthy* are "yes" responses from a yes/no scale. Differences between states are significant at *p<.05 and **p<.01.

To further probe the area of information exchange, we asked an additional set of questions specific to forest agency communication programs. Agencies are beginning to invest more time and effort in outreach activities and this study presented an opportunity to ask local citizens about the effectiveness of these information formats. Table 6 is arranged in the same format as the previous table and includes seven common methods of communication.

Table 6: Assessment of public forest agency information sources

Information Source	No Opinion	Easy to Understand[a]	Trust-worthy[a]	Level of Helpfulness[a]		
				None	Slight	Very
Public meetings**	**41%** MN 41% WI 34% MI 51%	**75%**	**68%**	**16%** MN 10% WI 12% MI 30%	**53%** MN 52% WI 62% MI 43%	**31%** MN 38% WI 27% MI 28%
Interpretive info. at visitor centers	**36%**	**90%**	**87%**	**9%**	**53%**	**38%**
Newsletters*	**43%** MN 40% WI 39% MI 51%	**86%**	**73%**	**13%**	**57%**	**30%**
Guided field trips to forests	**50%**	**94%**	**91%**	**8%**	**40%**	**52%**
Elementary school programs	**50%**	**91%**	**81%**	**15%**	**48%**	**37%**
Brochures*	**42%** MN 37% WI 40% MI 50%	**89%**	**80%**	**9%**	**54%**	**37%**
Conversations with agency personnel*	**46%** MN 40% WI 43% MI 54%	**83%**	**78%**	**11%**	**39%**	**50%**

[a] Percentages reflect responses from respondents who had an opinion about the specific information source.
Scores reported for *easy to understand* and *trustworthy* are "yes" responses from a yes/no scale.
Differences between states are significant at *p<.05 and **p<.01.

Key findings include:

- Many respondents have little familiarity (40-50% no opinion) with most forms of agency communication; Michigan residents were the least familiar overall.
- Among citizens who have been exposed to agency programs, most gave high marks in all categories.
- *Interpretive information at visitor centers* is the most accessed information source.
- At least three-quarters of the respondents rated each information source as easy to understand.
- Similarly, most programs were highly rated for trustworthiness. Even *public meetings*, which have received low ratings in other parts of the country (Brunson and Shindler, 2002), were trusted information sources by two-thirds of respondents.
- As for overall helpfulness, all sources received good ratings with *guided field trips* and *conversations with agency personnel* rated the most useful.

Survey Findings: Public Opinion about Fire Management and Treatment Alternatives

Important Management Issues

Respondents were asked to consider the importance of various concerns identified by Forest Service personnel for managing National Forest lands. Participants rated eight items using a four-point scale (not important to very important) and then selected the one item they believed to be of greatest importance. Results have been combined for presentation purposes in Table 7.

Table 7: Importance of management issues on National Forest lands

Issue	Moderately important/ Very important	Most Important
Managing healthy forests	**96%**	**40%**
Communicating with the public	**94%**	**11%**
Reducing wildfire risk	**87%**	**12%**
Managing recreation use	**85%**	**7%**
Restoring native forest conditions (oak, white pine, etc.)	**85%**	**6%**
Managing forests for timber harvests	**84%**	**18%**
Providing adequate habitat for sensitive wildlife species	**80%**	**5%**
Maintaining road closures	**50%**	**1%**

Key findings include:

- All items except *maintaining road closures* were rated as important by at least 80% of all respondents.
- *Maintaining healthy forests* and *communicating with the public* were the most highly rated overall; *healthy forests* was the single most important concern for citizens.
- No differences exist among states on these importance measures.

Next, respondents were asked their opinions about specific forest fire considerations. Findings are reported in Table 8.

Table 8: Opinions about forest fire conditions

Statement	Agree	Uncertain	Disagree
All fires, regardless of origin, should be put out as soon as possible.*	**33%**	**18%**	**49%**
	MN 26%	MN 17%	MN 57%
	WI 35%	WI 18%	WI 48%
	MI 39%	MI 20%	MI 41%
I am not concerned about the threat of wildfire in my area.	**26%**	**14%**	**60%**
Selectively thinning dead and dying trees is better than leaving them in the forest.	**72%**	**13%**	**15%**
In my area, smoke levels from fire are not a problem.*	**65%**	**14%**	**21%**
	MN 59%	MN 15%	MN 26%
	WI 68%	WI 13%	WI 19%
	MI 70%	MI 14%	MI 16%
Jack pine has become a fire hazard in local forests.*	**24%**	**51%**	**25%**
	MN 14%	MN 56%	MN 31%
	WI 20%	WI 55%	WI 25%
	MI 38%	MI 43%	MI 20%
Much of public forestland is over-crowded with too many trees.	**36%**	**30%**	**34%**
I would support closure of some forest roads if it would reduce the fire danger in my area.	**39%**	**22%**	**39%**
Fire risks are so great in my area that managers need to use any means necessary to reduce them.**	**14%**	**29%**	**57%**
	MN 16%	MN 30%	MN 54%
	WI 10%	WI 23%	WI 67%
	MI 17%	MI 32%	MI 51%

Differences between states are significant at *p<.05 and **p<.01.

Notable findings include:

- One-third of all respondents agreed with the statement "all fires, regardless of origin, should be put out as soon as possible;" another 18% were uncertain.
- About one-fourth of respondents were not concerned about the threat of wildfire in their area.
- Almost three-fourths believe "selectively thinning dead and dying trees is better than leaving them in the forest."
- Overall, 65% agreed that smoke levels from fire are not a problem. Minnesota residents were less likely to agree.
- A majority overall were uncertain whether "jack pine has become a fire hazard in local forests." However, 38% of the Michigan residents believe this species is a fire problem.
- Respondents were equally split in their agreement about the statement "much of public forestland is over-crowded with too many trees." About one-third either agreed or disagreed, while the other third were uncertain.
- Respondents were also divided in their support for closing forest roads to reduce fire danger; 39% were in favor and a like amount opposed.
- Few people (14%) believe that "fire risks are so great in my area that managers need to use any means necessary to reduce them." While the majority disagreed with this statement, 29% were uncertain.

Preferences for the use of Fuel Reduction Practices

Next, we asked about different forms of fuel reduction being used on federal lands. Because different definitions are frequently used to describe fire management activities, care was taken to explain for respondents the key practices of prescribed fire, mechanical vegetation removal, and thinning. The following definitions were included in the questionnaire:

- **prescribed fire** – Also called controlled burning, this practice can involve 1) letting a naturally caused fire burn under close and careful watch; or 2) intentionally setting fires in ways that can be controlled to produce desired conditions.
- **mechanical vegetation removal** – Managers can use chainsaws, mowers, or other specialized machines to reduce the number of shrubs and small trees where they are so numerous that they increase the risk and size of wildfires.
- **thinning** – In some high-risk areas with numerous trees, the trees are too big for mowing machines but can be thinned out using chain saws or other harvesting equipment.

After this short description of management practices, respondents were given five response categories to voice their opinions about the use of these treatments in public forests. Findings are reported in Table 9.

Table 9: Treatment preferences

The use of this treatment on public forests is...	Prescribed Fire*	Mechanical Vegetation Removal	Thinning
...a legitimate tool that resource managers should be able to use whenever they see fit.	**38%** MN 47% WI 35% MI 31%	**50%**	**59%**
...something that should be done only infrequently, in carefully selected areas.	**44%** MN 40% WI 51% MI 42%	**26%**	**28%**
...a practice that should not be considered because it creates too many negative impacts.	**3%** MN 1% WI 3% MI 4%	**3%**	**1%**
...an unnecessary practice.	**3%**	**4%**	**3%**
...I know too little to make a judgment about this topic.	**12%** MN 10% WI 8% MI 18%	**17%**	**9%**

Differences between states are significant at *p<.05.

Key findings include:

- Overall, thinning received the most support; respondents were most cautious about prescribed fire.
- For each treatment, at least three-fourths of respondents believe that the practice is either a legitimate tool or something that should done infrequently in carefully selected areas. These sentiments generally reflect management approaches on National Forests.
- Very few people believe these practices are unnecessary.
- Minnesota residents are more likely to believe that resource managers should be able to use prescribed fire wherever they see fit. More Michigan residents said they know too little about prescribed fire to make a judgment.

Beliefs about the impacts and effectiveness of different fuel management practices will factor into respondents' stated treatment preferences. To measure this, we asked if respondents agreed with various statements about the outcomes of using prescribed fire and mechanical (Table 10).

Table 10: Beliefs about effectiveness of fuel management practices

Statement	Agree	Disagree	Don't Know
Prescribed fire has little overall effect on intensity or frequency of wildfires.*	**26%**	**54%**	**20%**
	MN 19%	MN 67%	MN 14%
	WI 33%	WI 44%	WI 23%
	MI 24%	MI 52%	MI 24%
Prescribed fire effectively reduces amounts of fuel in most forests.	**75%**	**10%**	**15%**
Prescribed fire improves habitat for wildlife.*	**68%**	**12%**	**20%**
	MN 77%	MN 7%	MN 16%
	WI 63%	WI 15%	WI 22%
	MI 63%	MI 15%	MI 22%
Prescribed fires kill a majority of large trees in a burned area.	**18%**	**58%**	**24%**
Biting insects are less of a problem in areas that are burned frequently.	**32%**	**18%**	**50%**
Prescribed fire causes unacceptable impacts on recreation uses.	**17%**	**60%**	**23%**
Mechanical vegetation removal has little overall effect on the intensity or frequency of wildfires.*	**18%**	**55%**	**27%**
	MN 14%	MN 60%	MN 26%
	WI 19%	WI 56%	WI 25%
	MI 21%	MI 49%	MI 30%
Mechanical vegetation removal causes unacceptable impacts on recreation uses.*	**10%**	**63%**	**27%**
	MN 7%	MN 67%	MN 26%
	WI 10%	WI 65%	WI 25%
	MI 15%	MI 55%	MI 30%

Differences between states are significant at *p<.05.

Key findings include:

- Just over half of the respondents recognized that both prescribed fire and mechanical vegetation removal have an effect on the overall intensity or frequency of wildfires.
- Three quarters of participants agreed that prescribed fire effectively reduces forest fuels; almost as many believe the practice also improves wildlife habitat.
- Half the respondents did not know about the effect of fire on biting insect populations.
- Relatively few individuals believe that either prescribed fire or mechanical vegetation removal caused unacceptable impacts on recreation uses.
- Minnesota had the highest level of agreement about the effectiveness of these treatments, while Michigan residents agreed less and were more likely to say they didn't know.

Potential Concerns regarding Impacts

Additional questions were used to probe potential concerns that might influence people's judgments about the use of various practices. The first was about treatment impacts on scenic quality (Table 11).

Table 11: Acceptability of impacts on scenic quality

Treatment	Acceptable	Neutral	Unacceptable
Prescribed fire*	**51%**	**35%**	**14%**
	MN 58% WI 52% MI 44%	MN 35% WI 34% MI 37%	MN 7% WI 15% MI 19%
Mechanical vegetation removal	**59%**	**31%**	**10%**
Thinning	**70%**	**23%**	**7%**

* Significant differences between states, p<=.05.

Key findings include:

- Although each practice was acceptable to a majority of respondents overall, thinning was seen as having the least impact on scenic quality.
- Minnesota residents were the most accepting of prescribed fire impacts while Michigan residents were least accepting.

Next, respondents were asked about potential effects of prescribed fire on a number of environmental features. Using a four-point scale (*none* to *great*) individuals rated their level of concern about ten items in their community. Results have been combined in Table 12 to show those who had a moderate to great level of concern.

Table 12: Concerns about potential effects of prescribed fire

Potential Effect	Moderate/Great Concern
Risk of fire going out of control	**70%**
Increased soil erosion*	**48%**
	MN 40% WI 51% MI 55%
Loss of wildlife and fish habitat**	**46%**
	MN 40% WI 45% MI 54%
Damage to private property	**45%**
Increased levels of smoke	**43%**
Reduced scenic quality**	**42%**
	MN 36% WI 41% MI 51%
Economic loss of useable timber	**41%**
Deteriorated public water supply	**38%**
Effects on recreation opportunities**	**35%**
	MN 27% WI 34% MI 48%
Lower traffic safety	**21%**

Differences between states are significant at *p<.05 and **p<.01.

Key findings include:

- The greatest concern among respondents is the risk of fire going out of control.
- Where significant differences exist, Michigan residents were the most concerned in each case; Minnesota residents expressed the least concern.

Though temporary in nature, smoke has long been recognized as a public concern associated with the use of prescribed fire, especially because of adverse effects on human health and visibility in communities and along transportation corridors. Although much research has been conducted on the biological impacts of smoke, relatively little is know about its associated impacts on citizens. We attempted to probe into concerns about smoke and results are in shown in Table 13.

Table 13: Opinions about smoke from prescribed fire

Statement	Yes	No	Not Sure
I worry about the effects of smoke on public health.	**38%**	**50%**	**12%**
I worry about the effects of smoke on travel safety.*	**32%** MN 29% WI 29% MI 38%	**56%**	**12%**
I think smoke levels can be managed acceptably.	**57%**	**16%**	**27%**

Differences between states are significant at *p<.05.

Key findings include:

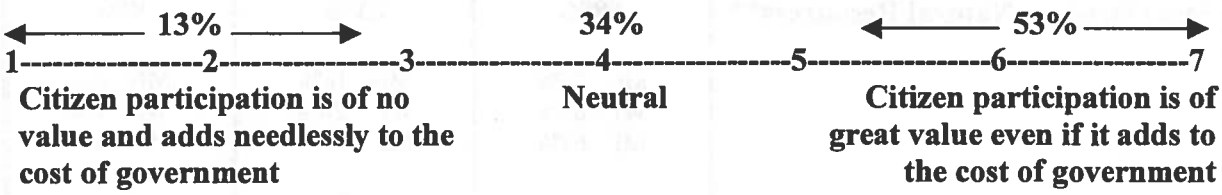
- A slight majority is not worried about the effects of smoke on public health or travel safety.
- About the same number believe smoke can be managed at acceptable levels.

Survey Findings: Citizen-Agency Interactions

Citizen Participation

Throughout the country, a preference for greater citizen participation in federal forest planning is strong. To determine the efficacy of this approach in the North Central Region, we put the question to our respondents. Using a 7-point scale, participants indicated their opinion about the value of citizen participation in public land management with consideration given to the increases in government costs that participation may cause (Figure 4).

Figure 4: Value of Citizen Participation



Key findings include:

- The majority of respondents believed that citizen participation is of substantial value even if it adds to the cost of government.
- One-third were neutral in their response, suggesting that individuals may be waiting to see how well such planning works before making a judgment about its value.

Trust in Natural Resource Organizations

Citizen trust in resource agencies is a central factor in the successful implementation of forest policies and programs. In the North Central Region, a number of organizations have a role in the stewardship of forestlands. Respondents were asked to rate their level of trust in six entities to make good decisions about fire management and fire prevention (Table 14).

Table 14: Level of trust in natural resource organizations to make good decisions about wildfires and fire prevention

Organization	Moderate/Full	None/Limited	No Opinion
City government	**29%**	**45%**	**26%**
County government**	**44%**	**38%**	**18%**
	MN 46% WI 21% MI 31%	MN 36% WI 36% MI 44%	MN 18% WI 10% MI 26%
State Dept. of Natural Resources**	**68%**	**23%**	**9%**
	MN 76% WI 65% MI 63%	MN 16% WI 28% MI 26%	MN 8% WI 7% MI 11%
Native American tribes	**25%**	**46%**	**29%**
Private timber and paper companies*	**49%**	**36%**	**15%**
	MN 54% WI 51% MI 40%	MN 33% WI 37% MI 39%	MN 13% WI 12% MI 21%
U.S. Forest Service	**72%**	**19%**	**9%**

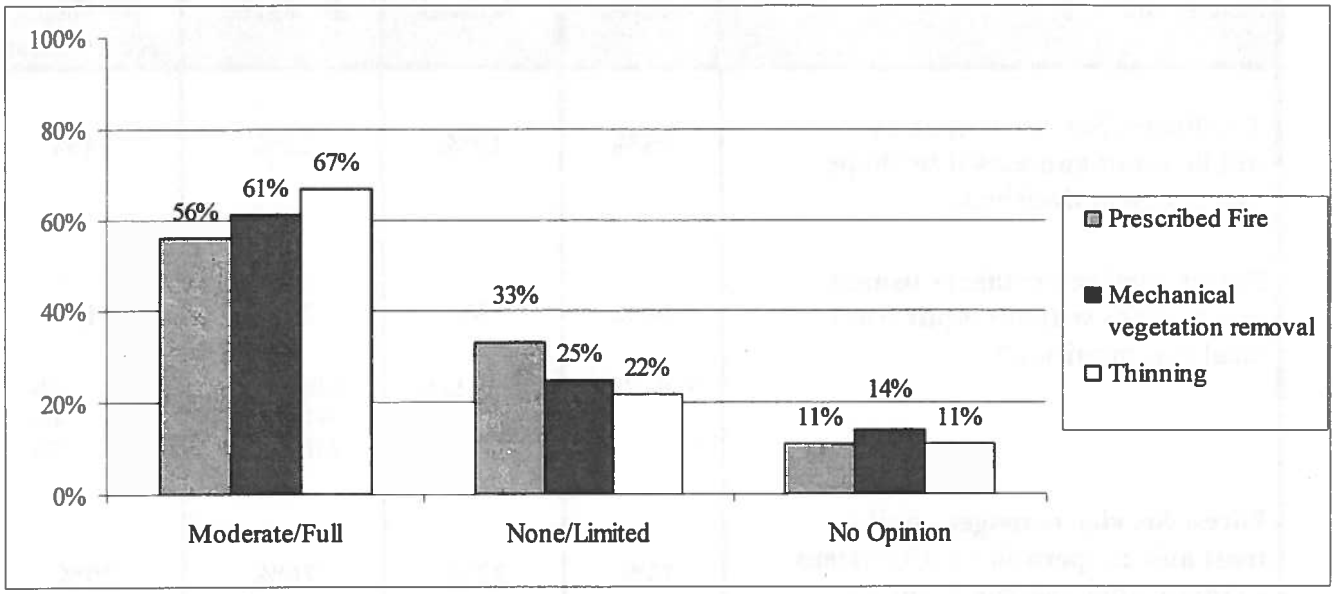
Differences between states are significant at *p<.05 and **p<.01.

Key findings include:

- The most trusted organizations are the Forest Service and State Departments of Natural Resources.
- City government and Native American tribes were the least familiar and the least trusted.
- Minnesota residents overall were the most trusting of these organizations; more Michigan residents were unable to offer an opinion.

Following on with the trust theme, we asked about public confidence in the Forest Service's ability to effectively use the three fuel reduction measures. Figure 5 reports that respondents had the most confidence in the agency to implement thinning and the least confidence in their use of prescribed fire.

Figure 5: Confidence in Forest Service to use fuel management practices in a responsible and effective manner



Interactions with Local Communities

Respondents were asked about how the Forest Service interacts with local communities for achieving management programs. Table 15 provides responses to a series of statements that reflect possible interactions.

Key findings include:

- Overall, respondents were divided about how well the Forest Service interacts with communities in the North Central area. For example, about the same number agreed and disagreed with most statements.
- There was no majority response for any positive measure of agency performance.
- The single greatest response (46%) was for the Forest Service to provide more leadership.
- Only about one-quarter believes the agency uses public input in decisions.
- Less than one-third agreed that the Forest Service managers build trust and cooperation with citizens or do a good job of providing information about management activities.
- About one-third feel local agency staff are prohibited from doing their job because of national regulations.
- An inordinately high number of individuals had "no basis for opinion" about many of these statements. This reflects on the relatively low levels of positive response in some cases and suggests plenty of room for agency staff to influence these individuals in the future. Michigan residents had the highest level of "no opinion" responses.

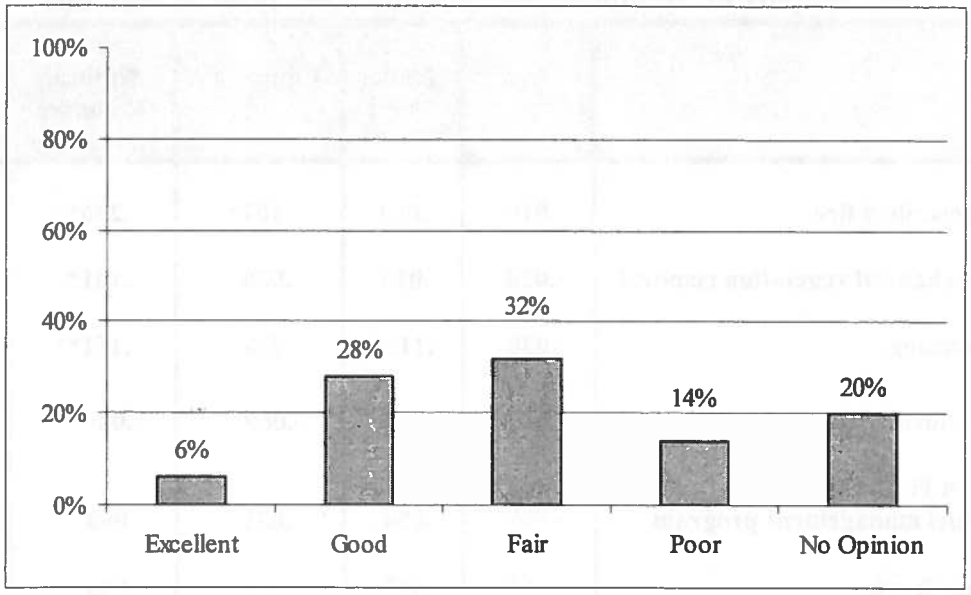
Table 15: Opinions about Forest Service interactions with local communities

Statement	Agree	Neutral	Disagree	No Basis for Opinion
The Forest Service is open to public input and uses it to shape management decisions.	**25%**	**19%**	**22%**	**34%**
Forest Service managers usually create plans without input from local communities.*	**34%** MN 29% WI 35% MI 35%	**13%** MN 13% WI 16% MI 11%	**22%** MN 25% WI 26% MI 14%	**31%** MN 34% WI 24% MI 39%
Forest Service managers build trust and cooperation with citizens so that people feel the agency is acting in their best interest.	**23%**	**22%**	**26%**	**29%**
The Forest Service does a good job of providing information about its management activities.	**27%**	**22%**	**26%**	**25%**
The Forest Service should provide a stronger leadership role.*	**46%** MN 43% WI 48% MI 46%	**21%** MN 26% WI 21% MI 18%	**8%** MN 6% WI 12% MI 6%	**25%** MN 25% WI 20% MI 30%
Local Forest Service staff are prohibited from doing their job because of national restrictions and regulations.	**31%**	**17%**	**12%**	**40%**

Differences between states are significant at *p<.05.

Finally, to further probe the point about using citizen input in decisions we asked respondents to draw on previous experiences to evaluate how well the Forest Service has incorporated public concerns into its management strategies (Figure 6).

Figure 6: How well has Forest Service incorporated public concerns into management strategies?



Overall, about one-third of the respondents gave the agency a positive report with good to excellent ratings. Far more (46%) selected the fair and poor categories.

Sociodemographic Characteristics as Influences on Beliefs and Attitudes

Public attitudes about natural resource issues are often associated with sociodemographic characteristics (Steele et al. 1997). In this section, bivariate correlations were used to test the strength and direction of associations between the respondent characteristics and support for specific treatments and other attitude variables (Table 16). For example, it is possible to test the relationship between education level and support for prescribed fire. The analysis will show if the relationship is direct (more education leads to increased support) or inverse (more education leads to decreased support).

Correlation coefficients range in value from –1 to 1; the number value of the coefficient indicates the strength of the relationship. A coefficient of 1 indicates the strongest possible direct relationship, a coefficient of -1 indicates the strongest possible inverse relationship, and a value of 0 indicates no linear relationship between variables.

The following socio-demographic characteristics were used in the correlation analysis:

- Age
- Gender
- Level of education
- Natural resource knowledge
- Length of residency in community

Table 16: Bivariate correlations between respondent characteristics and support for treatment methods and other selected variables

Measures	Age	Gender male=1 female=2	Education	Natural Resource Knowledge	Length of Residence
Supports prescribed fire	.016	.003	.107*	.236**	-.033
Supports mechanical vegetation removal	-.020	-.016	.030	.141*	.037
Supports thinning	.030	-.113*	-.070	.151**	.117**
Believes that forests are healthy	-.059	-.099*	-.069	-.029	-.047
Confidence in Forest Service to implement fuel management program	-.009	.054	.031	.090*	-.032
Trusts Forest Service	-.106*	.065	.045	.043	-.023
Trusts State Department of NR	-.109**	.018	.183**	.059	-.027
Agrees that forest managers are open to public input	.107*	.002	.105*	.052	-.021
Believes that forest managers do a good job of providing information.	.043	.035	.024	.015	.052
Agrees Forest Service provides helpful information.	-.002	.040	.100*	.060	-.046

Significant at *p<.05 and **p<.01

Notable (significant) findings for the individual characteristics are:

Age

Age was inversely related with trust in the agencies. In other words, older respondents are less likely to trust either the Forest Service or their State Department of Natural Resources. However, older individuals are more likely to agree that forest managers are open to public input.

Gender

Men are more likely than women to support thinning and to believe that local forests are healthy.

Education

Higher levels of education were strongly associated with several items. The more highly educated tend to provide greater support for prescribed fire and have greater trust in their State Department of Natural Resources. They also agree more strongly that forest managers are open to public input and that the Forest Service provides helpful information.

Natural resource knowledge

We created a variable called natural resource knowledge by using a composite score from six true/false statements used in the quiz in Table 3. The statement concerning white pine was omitted because of debate over which answer was most correct. In this analysis, there was a direct correlation between level of knowledge and support for all three fuel reduction strategies: prescribed fire, mechanical vegetation removal, and thinning.

Length of residency in community

Longevity in the local community was correlated with only one variable, support for thinning. The longer respondents had lived in the area, the more likely they were to support thinning.

Discussion of Research Highlights

This is an exploratory study designed to capture and assess the opinions of citizens in the communities adjacent to National Forests in Minnesota, Wisconsin, and Michigan. As such it provides broad-scale information about the general public in the region and can help fill research gaps remaining from previous qualitative research (i.e. Smith and McDonough 2001, Winter and Fried 2000,) and case studies undertaken in single communities (i.e. Vogt et al. 2002, Landre and Muth 1993). This information can also be used to compare citizen views with the preconceptions of management personnel about their regional public.

We mentioned previously that the research team has undertaken similar studies in six other regions where fire management and fuel reduction practices are essential concerns. Findings from this study are generally consistent with those from the other study locales. However, a few differences are noteworthy and are referenced in the discussion below.

Awareness and Understanding of Forest Conditions

- Overall, findings indicate a considerable level of citizen awareness of forestlands and a more moderate level of knowledge about them. In either case, it is likely that citizens understand more about forests than managers think they do. Public forests and forest conditions appear to be a salient issue for residents as most (87%) said they pay attention to issues and problems associated with these resources. Three-quarters of our respondents also believe their local forests are reasonably healthy, about the same percentage of residents who were asked the same question in a recent study of public forests in the Pacific Northwest (Shindler and Wilton 2002).

  Most respondents (85%) also claim to have given a good deal of thought to wildfire; not surprising given that the timing of the survey was during one of the biggest fire years in recent history, at least in the western U.S. In any case, fire is on people's minds locally and a slight majority feels that a wildfire could break out in a forest near their home sometime over the next five years. By comparison, residents in the other study regions are even more fearful about the risk of fire encroaching on their property (Brunson and Shindler 2002). Still, these findings appear relatively high for a region that traditionally has not been prone to large wildfires. Several reasons contributed to these feelings; certainly among them is the heightened concern evoked by media coverage of the 2002 fires, but another factor may be the proximity of the study group to potential wildfires—about half have homes adjacent to forestland while another 35% live within five miles.

- Lake states residents seem moderately knowledgeable about forest conditions and fire management. Overall, Minnesota respondents demonstrated greater understanding compared to those from Wisconsin and Michigan, and the former group was generally on a par with residents surveyed in the other study regions (Brunson and Shindler 2002). Although many residents are familiar with common terms and forest conditions, results suggest that specific areas where managers could focus educational efforts include 1) the historical role of fire in the region, 2) use and meaning of the terms *prescribed fire* and *fuel reduction*, 3) the cause (humans) and seasonal timing of most wildfires in the area,

4) the role of fire in controlling insect and disease outbreaks, 5) the potential for both prescribed fire and mechanical removal to effect the frequency and intensity of wildfires, and 6) habitat implications for wildlife. Fire managers can use this type of information to help call attention to important ecological concepts and to begin to develop support for practices that meet associated management objectives.

- Effective dissemination of useful information is essential in helping develop awareness about management options and agreement about their application. Findings indicate that mass media outlets, particularly newspapers and TV/radio, are relatively trustworthy and moderately helpful to citizens. Also in this category are forest industry groups and university researchers, although not as many individuals tend to access these sources.

  More directly relevant to fire managers is the importance placed on forest agencies as information providers. Fewer people are familiar with the various formats used by the agencies but among those who are, they were given generally high marks for ease of understanding, trustworthiness and overall usefulness. Reflecting results from other studies, the more interactive programs such as guided field trips and conversations with agency personnel were the most highly rated. Other forms that hold promise include interpretive information at visitor centers (which is the source most familiar to respondents) and school educational programs. It is somewhat surprising that public meetings received moderate ratings as trustworthy, helpful information sources. In other regions meetings are generally held in low esteem, particularly those that are perceived to follow traditional NEPA formats or do little to include citizens in the planning process (Shindler and Toman 2002, Brunson and Shindler 2002).

  Overall, Michigan residents would seem to benefit the most from targeted educational programs. These respondents were the least familiar with almost every information source included in the survey. However, residents in Minnesota and Wisconsin also interact much less with agencies like the Forest Service than their counterparts in the other regional studies.

- Increasing resident knowledge through public outreach is a solid investment. As with numerous other studies, data from this research indicate that more informed individuals also support fuel reduction practices—specifically prescribed fire, mechanical vegetation removal, and thinning. The findings also show that another direct benefit of increased citizen understanding of these treatments is greater confidence in the Forest Service to implement a fuel management program. Other findings suggest that the agency may not have to take on the job of information provision by itself. Other trustworthy players include the state departments of natural resources, forest industry, university researchers, and local educators. Local partnerships may be an effective means for increasing public awareness and understanding of forest problems.

Fire Management and Treatment Alternatives

- The two management issues rated most important by respondents pose an interesting juxtaposition. First and foremost, citizens are concerned about managing for forest health; but in doing so, they want agency managers to communicate with the public. This seems to suggest that people are willing to allow managers the leeway to take necessary actions, but will also be watching and waiting to see how well these steps are communicated and carried out. In the case of reducing wildfire risk (another highly rated issue) it is likely that residents will be particularly watchful, especially if treatments involve the use of prescribed fire.

- Respondent opinions about fire management raise several points worthy of consideration. First, many individuals believe that all fires should be extinguished as soon as possible. In addition to seeing fire as a threat, this view suggests a lack of awareness for the larger role of fire in ecosystem management. This may be particularly true in Michigan where 39% shared this view and another 20% were uncertain about what to think. Second, most participants did not recognize jack pine as a problem for fire managers in local forests. However, far more Michigan residents did acknowledge the concern with jack pine; this seems fitting given that Michigan appears to have a greater problem with this particular species.

  Third, many people (about one-third) believe that public forests have become overcrowded. About the same amount are uncertain about this issue. Both figures are consistent with findings in other regions (Shindler and Wilton 2002). Given the stand density of many forests in the lake states, these sentiments seem logical jumping in points for public discussion about the merits of thinning and vegetation removal. Citizens have expressed tacit support for these practices in this study and also voiced the importance of managing local forests for timber production.

  Finally, respondents seem rather laissez faire about the need to use any means necessary to reduce fire risks. Other regions felt much stronger about the need to take these steps, perhaps indicating that fire danger is more eminent in these locations. However, it may also be as Winter and Fried (2000) described: citizens are much more supportive of fire suppression efforts than they are of fuel reduction measures, especially prescribed fire. There is evidence for this latter view; the number one concern about the use of prescribed fire is the risk of it going out of control. In any case, a combination of these two reasons will make the fuel management job more difficult.

- Fire impacts on recreation opportunities and scenic quality do not seem to be as much of an issue for respondents, at least for Minnesota and Wisconsin residents. It may be that residents in these areas do not rely heavily on public forests for these amenity values; however, it is more likely that prescribed fire has not been used frequently enough to affect these qualities to any great extent. Thus, respondents do not have much experience on which to judge these impacts. The same may be true for increased levels of smoke which did not appear to be a significant problem for most respondents. This is in contrast to the other study regions where prescribed fire programs are more developed and

reaction to smoke is greater. In these settings, one certainty exists; it does not take many people who are uncomfortable with smoke levels to marshal a vocal response (Shindler and Toman 2002). Smoke can be a highly contentious issue that provides rallying point in communities.

- Even with the several caveats mentioned here, support for the use of fuel reduction practices is high. Thinning is the treatment of choice (followed by mechanical vegetation removal), but 82% of respondents also believe that prescribed fire could at least be used sparingly in carefully selected areas. This view seems consistent with current agency fire policy. It is also noteworthy that only 6% of all respondents said that prescribed fire should not be considered or is an unnecessary practice.

  The alignment of these findings also appear to be influenced by the economic benefits of harvesting forests and an awareness that overstocked stand conditions may need to be thinned prior to safely introducing fire into these systems. Overall, these opinions are the same as those found in other study regions (Brunson and Shindler 2002) where fuel reduction programs are well underway.

Citizen-Agency Interactions

- As in at least a dozen other studies conducted by the research team, citizens in the lake states recognize the value in their participation in federal forest planning. When more programs for fuel reduction and forest restoration are implemented in the region, this sentiment will become even stronger. We purposively conducted this study in communities adjacent to National Forests because these are the individuals who are the first to judge management efforts. The extent to which a practice affects personal property, alters traditional economies, or changes a special recreation place holds considerable importance for those directly involved (Shindler et al. 2002). These often become the reasons why citizens join interest groups or become active in the political process of making decisions about fire management programs.

- Perhaps the single most important factor in the agency-community relationship is trust. Overall, trust in the Forest Service is higher than for any of the other local or regional organizations—specifically for making good decisions about wildfires and fire prevention. This may reflect the agencies strong role in fire suppression and recognition of the resources that the Forest Service can bring to bear on a fire event. It could also be a residual of the Smokey Bear campaign in which the agency is so prominently featured.

  We also pointedly asked about confidence in the Forest Service to use different fuel management practices in a responsible and effective manner. Citizen confidence about these treatments, particularly prescribed fire, is sufficiently low (only 56% in the case of fire) to create concern among fire management personnel. Other regions enjoy a higher vote of confidence from their communities (Brunson and Shindler 2002). At least on the short-term, it may be best to put more resources into mechanical vegetation removal and thinning programs where confidence is greater. Local examples can help provide

evidence that management objectives can be achieved, thus reducing fears over treatment risks as well as skepticism that the agency can deliver on its prescribed fire program.

- In many other areas of the country, the most critical finding about the Forest Service has been its inability to adequately involve local citizens and to show good faith in using their input in management decisions (e.g. Cortner et al. 1996, Shindler et al. 2002). In this study the agency received weak ratings in these areas as well. In addition, there was little recognition of the agency's ability to build trust and cooperation with citizens or provide information amount its management activities. These findings are largely consistent with those from other regions. The difference in the lake states is that many individuals were unable to render an opinion because they have had little contact with the Forest Service. This should be viewed as an opportunity to (positively) influence public opinion as fire management programs become more highly developed and the agency inserts itself into the lives and interests of community residents.

- As we have discussed elsewhere (Shindler et al. 2002), it is likely sentiments about trust and confidence are influenced by general public dissatisfaction with national politics and Forest Service policies on a broad level. Overall, many Americans are frustrated with big government, big business, and the politics that surround these institutions. Although trust in agency personnel at the local level (ranger districts) is typically higher across the country, evidence of this is less clear in the lake states. Although about a third of our respondents believe that local personnel are hindered by national restrictions and regulations, many more simply have no basis for opinion on the matter. Regardless, as the agency takes on a greater presence locally in implementation of fire management programs, there will be a considerable need to build better relations in these communities.

Key differences between Minnesota, Wisconsin, and Michigan residents

The research design resulted in nearly even sample sizes between the three lake states, allowing composite summaries and comparisons between them. Overall, findings show that there are many commonalities between respondent demographics and attitudes in the region. However, several important differences also emerged.

- Minnesota and Wisconsin respondents were more likely to live adjacent to forest areas with wildfire potential, suggesting they may have more at stake than Michigan respondents.
- Michigan residents had less formal education than the other respondents, which may also have influenced their (lower) scores on the knowledge sections of the survey. This may be reflective of Michigan's rural forest communities in general, and thus suggest a greater need for information and outreach programs.
- Michigan residents also had the highest percentage of respondents with no basis for opinion about the numerous information sources. This also provides credence for focusing attention on these communities when crafting communication strategies.
- In general, Minnesota respondents were more receptive to fuel reduction treatments, especially the use of prescribed fire. This is most likely related to Minnesotans being more knowledgeable about these practices. But this may also suggest that Michigan

residents, for example, still remember the fires of previous years and are cautious about associated impacts. Another reason may be that fire managers in Minnesota have been more successful at dispelling fears and also have been more effective at implementing programs locally.

- Minnesotans also were more tolerant of the impacts from fuel reduction practices and expressed fewer concerns about their implementation. Fire managers are likely to have an easier time of attempting new or different treatments in this area.
- Michigan respondents tended to express fewer opinions regarding their level of trust in natural resource organizations. When taken into consideration with other findings, fire managers will need to tread lightly when implementing treatments. On the other hand, Michiganders were more supportive of harvesting measures; thinning activities seem to be a safer bet here than attempting to introduce prescribed fire

Conclusions

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

Although we have pointed out numerous examples of public support for fuel management practices in the lake states, as well as several specific areas of concern, we also recognize these are complex issues. Problems are often embedded within one another and sometimes are connected to factors that are beyond the control of the Forest Service. Today, the roles that agency personnel are being asked to play are much different than in the past, when citizen participation was minimal and technical expertise was the dominant theme. In this new role greater public acceptance will be achieved by being aware of, and responsive to, the suite of intertwined ecological factors and community circumstances affecting forest management. Thus, these concluding comments involve a set of basic overarching strategies that are intended to help guide agency personnel and citizens toward improving conditions in forest communities.

Build Literacy among Communities

We might describe the Great Lakes respondent group as having a relatively high level of awareness of forest conditions but also possessing, at best, a moderate level of understanding about causal components and treatment alternatives for fire management. It is likely that awareness will continue to grow as conditions worsen, the popular media covers the issue, urban dwellers continue to migrate to forest communities, recreation opportunities expand in these areas, and so on. This is no guarantee, however, that public understanding of the issues will commensurately increase. In order to for a comprehensive program of fire management and forest restoration to be successful, citizens must possess a capacity for participation. They do not come with a ready-made ability to participate in constructive, well-reasoned discussion. As the major steward of public forest lands, the primary responsibility for developing this capacity falls to the Forest Service.

Discussions with the public will be much more useful when people understand something substantive about the relevant science, the economics, and the interests that are at stake in the fire management problem. Perhaps the best-known example that has led to misunderstanding of

ecological processes and consequences is the lesson that every child has learned from Smokey Bear: that *only you* can prevent forest fires. Part of the problem is that for years this message was the only thing that most people knew about fire, and there is some indication here that this is still true for many residents, particularly those in Michigan and Wisconsin. Only recently, as people have gained more perspective on current forest conditions and how they evolved, has there been a broader public acceptance of more liberal management policies toward fire. The Forest Service will need to contribute to developing a literacy among the general public so together they can engage solutions for maintaining healthy forests.

The first hurdle is developing some common understanding about healthy forests, including the message that conditions in many areas require management action. Although we have provided information on the usefulness of information sources, the tendency of natural resource professionals is to confuse information provision with public understanding (and eventual support for practices) is a mistake. Information and knowledge are essential components of any public communication strategy; however, these alone are insufficient to produce change in the way citizens respond to forest agencies (Stankey 1995). Communicating with citizens also has a lot to do with feelings, attitudes, and establishing a meaningful context for messages. And communication is much more meaningful when it is personalized. The process of how people come to understand forest conditions and support policies for fuel reduction also needs to be an integral part of an outreach plan.

A comprehensive strategy will not only focus on the types of information disseminated, but also on how and why it is communicated. Thus, a strategy will need to structure information provision in such a way that provides for a broad-scale, common understanding of environmental complexities. Ultimately, this approach will need to include the consequences of different fuel treatment choices, including comparisons of both the short and long-term ramifications of practices such as prescribed fire, mechanical vegetation removal, and thinning. Given the various levels of knowledge and interest in communities within the Great Lakes, this can be accomplished most effectively through a multi-layered strategy to public outreach.

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

The second (sub)layer is a more targeted outreach that seeks to penetrate communities and the specific concerns that reside in particular locales. This approach recognizes that different problems exist in different settings whether they are inter-city, at the wildland-urban interface, or in more remote rural areas. Each local area has a diverse potential for fire and fuel problems (e.g., jack or red pine stand density, balsam budworm, oak savannah restoration, habitat needs for the endangered Kirtland's warbler) as well as a different capacity to respond to these problems. Communication styles will vary from setting to setting, but they will have a

common ingredient. The information provider needs to be a credible, trusted local source. In rural areas this may be personnel at the ranger district or the state extension agent. It might include members of the timber industry, watershed councils, friends groups, or local educators. In more urban settings other players in addition to agency personnel may also emerge. This might include university faculty and researchers or homeowner groups at the forest interface. In any case, it will require multiple partners carrying a similar message. And it is likely that the Forest Service's will need to play a central role in organizing these efforts.

Which communication tools are likely to be the most effective in these local settings? As in the findings reported here, research indicates that interactive approaches are much favored over one-way forms of communication (Winter et al. 2002, Cortner et al. 1998). These could involve school educational programs, guided field trips to affected sites, demonstration projects, or discussion among managers and local residents. Planning workshops and public meetings have proven effective only when they go beyond the National Environmental Policy Act (NEPA) format and allow realistic opportunities for residents to be involved in a meaningful way (Shindler et al. 2002). When plans are largely an internal function, they provide for little participation on the part of citizens and fail to achieve increased public understanding of conditions and consequences. Where genuine participation is incorporated, greater commitment also is generated among citizens for the proposed activity as well as for the process by which it was developed.

The third layer of public outreach is at the ground level. These involve hands-on, cooperative projects where the agency and communities work together to learn about and solve local fire management problems. Many good examples are beginning to spring up, most around more well developed fuel reduction programs in the west (see Shindler and Toman, in press). There also are glimmers of similar actions occurring in the lake states—for example, cooperative community efforts to deal with blowdown on the Superior National Forest or the partnership between the Forest Service and the Minnesota DNR to spread the Fire Wise message—and all have at least one thing in common. They provide citizens an opportunity to discuss forest conditions with resource professionals—district rangers, fire managers, technical specialists, and scientists—and then allow for the evaluation of real-life treatments (and results) prior to broad-scale application of projects.

Address Uncertainty and Risk

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

This means that forest agencies must be more forthcoming about difficult decisions and the choices involved. In the past, resource professionals have usually preferred one-way forms of communication that have allowed them to control the flow and content of information. Now, when citizens are more aware of resource conditions and expect to have a role in the planning

process, agencies will need to help people sort through the inherent complexities. This will involve having alternatives to compare and being sure that citizens possess adequate understanding of the alternatives. Public opinion is much more useful when people have some insight to more than one side of the question (Ehrenhaldt 1994). Merely asking citizens if they want wildfires suppressed (or budworm diseases eradicated or fewer dead trees in their local forest) does little to bring agencies closer to solving forest health concerns; one could easily predict the response to such questions. Instead, people need more pieces to the puzzle. Resource conditions and practices are more meaningful when people can equate them to local problems such as a familiar tree species that is in trouble or a recognizable place (e.g., a recreation site or forestland bordering a residential development) in need of restoration. These problems become "real" and are genuine social concerns because they affect peoples' livelihood and their quality of life.

Ultimately, this will mean that agencies like the Forest Service will need to allow greater flexibility for personnel to take risks and experiment with new ideas. Of course this is an easy route to recommend, but much more difficult to actually implement. It is unlikely that anyone involved in fuel management has not considered the tension between these treatments and the public's acceptance of lighting the woods on fire. Fuel managers and technicians have recent reminders of escapes and that on any given day, their actions could involve a career-altering decision. However, where managers are able to experiment with fuel treatments, these programs will be most effective if they play out publicly and collectively. Experimentation must include places where people can come together to learn about the uncertainties of forest health, to understand the risks involved, and weigh the tradeoffs of different alternatives (Shindler et al. 2002). This is likely to be easier in Minnesota where residents are more tolerant of fuel reduction practices. But it will be especially necessary in places like Michigan where residents are more cautious about the use of prescribed fire and more questions persist. Our conversations with personnel on the local ranger districts in these areas indicate there is a willingness to engage the public with strategies for fuel management, if not a clear picture of how to proceed.

In these settings, the Forest Service might take its cue from recent research by Wondolleck and Yaffee (1994) who assessed nearly one hundred of the agencies' community-based programs across the U.S. that were deemed to be successful by participants. The researchers found two common essential ingredients in these programs. The first is internal arrangements that *enable* personnel to develop effective strategies for community collaborations. These include developing staff capabilities through hiring mechanisms and training programs as well as policies that reinforce the importance of relationships with local citizens. The intent is to initially place motivated staff members who possess interpersonal skills into outreach positions and then provide them with resources to conduct public partnerships. Most often, effective collaborations are instigated by one or two individuals who have genuine public contact skills and have been allowed to run with good ideas.

The second step involves *encouraging* these efforts within management units. Encouraging requires that administrative leaders establish a climate for building partnerships in communities. Setting the stage and influencing attitudes are essential because opinions among personnel are widely scattered over the necessity for such programs. Staff in public contact roles are often unsure about the level of internal support they have, and as a result are hesitant in how

approaching the public. These individuals need encouragement—including the flexibility to try new things and even to fail on occasion—from an organization committed to involving the public.

We would also add a third component to this set of success attributes—*clarifying the roles* of participants. This is important for agency and citizen participants alike. The Forest Service must define its relationship with the public, including the role they are willing to let citizens play (Shindler et al. 2002). Too often people are invited to participate in public meetings, scooping events, or planning exercises without a clear understanding of the objectives for these activities or how decisions will be made. Sometimes these sessions give the appearance of just trying to make citizens "feel good" about being involved. However, citizens who volunteer are largely task oriented and often willing to contribute; they find it difficult to do so when a public process is poorly conceived. These motivated individuals are likely to be frustrated without clear direction about what their interactions mean. Alternatively, when groups begin with a jointly identified common focus their success can be measured by accomplishing objectives and reinforced by seeing results on the ground (Shindler and Neburka 1997).

Focus on Situational Context and Site-specific Conditions

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

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

In resolving the fuel reduction issue, the Forest Service needs to respond to large-scale problems across the entire region. But there can be a danger in promoting one-size-fits-all policies. When managers neglect (or simply overlook) contextual concerns, it can become a source of frustration and a loss of professional credibility in communities. In addition to a region-wide program, there is merit to thinking small and long-term. After all, these are relatively uncharted waters for the Forest Service and it may be better to put many small boats out to sea than a single Titanic (Jamieson 1994). It would be wise to consider diverse projects and approaches aimed at local problems. Projects like the blowdown cleanup on the Gunflint Ranger District and creation of a red pine old growth "wilderness" on the Manistee Ranger District are different examples of the agency addressing immediate local needs as well as long-term concerns. Some projects will not work. But in the meantime, the agency is respecting variations in the biological, social, and economic characteristics of particular places and stakeholders are learning to trust the process.

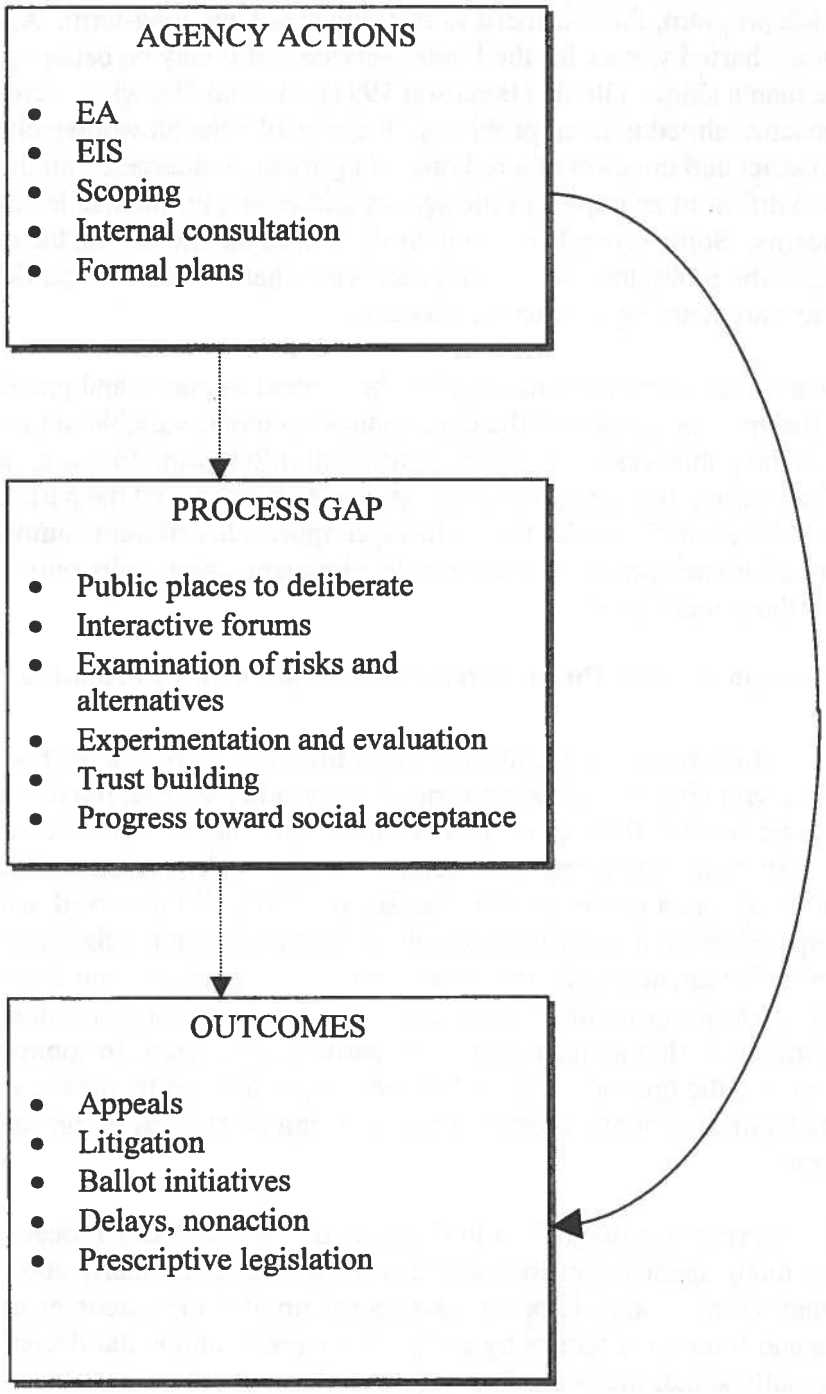
Just as managers need to consider the context of places and practices, they also should consider the appropriateness of the communication tools available to them. This study has shown that the public responds better to different information formats, suggesting that managers might select among the options depending on the situation and the particular stage of public outreach. For example, under the multi-layer approach, different communication methods are better suited for each phase—awareness development, community outreach, or for hands-on projects at the ground level.

Concentrate on Agency-Public Interactions along with Information Provision

One of the most important findings of this study involves the Forest Service's relationship with citizens. This is a central concern in that research throughout the past decade strongly indicates that feelings of distrust and disenfranchisement in communities can trump agency efforts to initiate forest management programs. In a recent problem analysis on the social acceptability of forest practices, Shindler and others (2002) observed that public acceptance is often hampered by an agency focus on decisions rather than the decision-making process. Their premise was that agencies like the Forest Service are quick to jump from the formal steps of the decision stage to program implementation without recognizing the value in more deliberative planning strategies that include the public, particularly citizens in communities where programs will play out on the ground. The in-between step—frequently missed, overlooked, or ignored—represents legitimate public process where learning most often occurs and trust is built among constituents.

This scenario is diagramed in Figure 8, the Forest Policy Process Gap. It depicts the gap existing in many agency decisions where managers are particularly good at meeting procedural requirements (formal steps in box 1) and ending up with the outcomes in box 3—formal policy directives and frequent attempts by citizens to override unpopular decisions. Although decisions may eventually stand, many are delayed, altered, or otherwise derailed. In the end, little of this activity is conducive to learning about the alternatives themselves or building relations within communities.

Figure 4. Forest Policy Process Gap (from Shindler et al. 2002)



The relevance for designing a communication strategy for fire management and restoration programs should be clear. Any such plan must include measures to plug the process gap. Agency staff have become particularly adept at meeting the NEPA requirements depicted in box 1 (writing environmental analyses and hosting traditional scoping events), but the public repeatedly has indicated that these are poor methods for communicating information (Cortner et al. 1998). These traditional forms of communication lack the substance citizens expect from agency leaders. Greater attention will need to be placed on the process of how people come to understand forest conditions and develop support for forest initiatives. In the case of fire and fuel management, these include providing forums for people to deliberate, places to examine risks and the consequences of management practices, and methods for working out acceptable approaches. A comprehensive communication strategy will not only focus on information, but also on how and why it is communicated.

It is one thing to emphasize collaborative methods for communication and another to be realistic about the abilities and skills to carry out the job. On local ranger districts, for example, resources are limited and personnel must use their time and talents judiciously. However, from studies of collaborations throughout the North Central region (Winter et al. 2002, Smith and McDonough, Landre and Knuth 1993) and elsewhere (Shindler and Neburka 1997) researchers have identified many of the attributes common to productive outreach strategies. They are worth detailing here because of their relevance to designing strategies for fire management and forest restoration. The characteristics of successful agency-community interactions include:

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

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

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Appendix: Summary Survey Responses

FIRE CONDITIONS ON PUBLIC FORESTS

A SURVEY OF CITIZENS IN MICHIGAN, MINNESOTA, AND WISCONSIN

This questionnaire has been developed by researchers at Oregon State University in cooperation with the U.S. Forest Service. It is designed to help forest managers and researchers understand what citizens in Michigan, Minnesota, and Wisconsin think is important for managing public forest lands.

We are particularly interested in your opinion about fire conditions in your area and the practices that resource professionals could use to manage forests. Even if you are unfamiliar with certain items, it is important that you tell us that as well. For each question, please choose the answer that most closely reflects your beliefs. Your answers and comments are strictly confidential.

1. How much attention do you pay to issues or problems on public forests?

Not Much 4%----------9%----------38%----------28%----------21% **A great deal**

moderate amount

2. Prior to this survey, how much had you thought about wildfires in forests or grasslands?

None 3%----------12%----------30%----------29%----------26% **A great deal**

moderate amount

3. About how far is it from your home to a natural area where a wildfire might burn?

49% adjacent land
11% less than one mile
24% 1-5 miles
15% more than five miles

4. In your opinion, how would you rate the likelihood that a wildfire could break out in the forests or grasslands near your home in the next five years?

13%----------38%----------30%----------10% **Don't know 9%**

very likely **somewhat likely** **somewhat unlikely** **very unlikely**

5. In general, how would you rate the overall condition of the public forests in your area?

3%----------14%----------50%----------25% **Don't know 8%**

very unhealthy **somewhat unhealthy** **somewhat healthy** **very healthy**

6. Public trust in natural resource organizations is essential to the success of fire protection programs. Please indicate your level of trust in the following to make good decisions about wildfires and fire prevention. If you have no basis for judgment, please mark "no opinion."

	----------Level of Trust----------		
	Moderate/Full	**None/Limited**	**No Opinion**
City government	**29%**	**45%**	**26%**
County government	**44%**	**38%**	**18%**
State Dept. of Natural Resources	**68%**	**23%**	**9%**
Native American tribes	**25%**	**46%**	**29%**
Private timber and paper companies	**49%**	**36%**	**15%**
U.S. Forest Service	**72%**	**19%**	**9%**

7. There has been a good deal of discussion lately about forest management, but some terms used by resource professionals may not be familiar to many people. Please tell us how familiar you are with the following.

	I **know** the meaning of the term	I've **heard the term,** but don't know the meaning	I've **never heard** of the term
a. controlled burn	**96%**	**3%**	**1%**
b. ecosystem management	**63%**	**25%**	**12%**
c. native vegetation	**84%**	**11%**	**5%**
d. threatened & endangered species	**94%**	**5%**	**1%**
e. prescribed fire	**62%**	**25%**	**13%**
f. blowdown	**70%**	**15%**	**15%**
g. pine barrens	**39%**	**28%**	**33%**
h. fuel reduction	**65%**	**21%**	**14%**

8. We're interested in learning more about what citizens think about wildfires. Please respond to each statement to the best of your ability by indicating whether you believe it is **generally true, generally false,** or that you are **not sure**.

	Generally True	**Generally False**	**Not Sure**
Humans cause most of the wildfires in my state.	**68%**	**16%**	**16%**
Most forest fires in my area occur in the Fall.	**13%**	**59%**	**28%**
Years of fire suppression have increased the risk of severe wildfire in the region's forests.	**42%**	**18%**	**40%**
Fires play an important role in controlling insect and disease outbreaks in forests.	**48%**	**17%**	**35%**
Fires are important for maintaining habitat for deer and game birds.	**52%**	**26%**	**22%**
White pine trees grow better in open, sunny areas than in shaded ones.	**45%**	**12%**	**43%**
Many plants require occasional fires so that new seeds or seedlings can sprout.	**73%**	**12%**	**15%**

The next few questions ask for your opinions about specific practices resource managers can use to change environmental conditions in public forests. Please read the following paragraphs, then answer the questions below.

For nearly a century, natural resource managers tried to put out all wildfires. However, scientists have learned in recent years that wildfires are an important part of how nature works. Conditions in many forests now differ from those the pioneers encountered. In some places leaves, dead branches, and other debris have built up over time, creating "fuel" that promotes hotter, larger, and more frequent fires. In many forests, trees are more numerous than before but also smaller, so they are more likely to burn in a fire.

These situations can create greater risk to lives, property, and healthy natural environments. Public resource managers now seek ways to allow fires to burn more naturally and less dangerously in forests. To do this, they want to change the amount and types of plants to create conditions more like the lands encountered by the pioneers. Some practices that can do this are:

- **Prescribed fire** – Also called controlled burning, this practice can involve 1) letting a naturally caused fire burn under close and careful watch; or 2) intentionally setting fires in ways that can be controlled to produce desired conditions.
- **Mechanical vegetation removal** – Managers can use chainsaws, mowers, or other specialized machines to reduce the number of shrubs and small trees where they are so numerous that they increase the risk and size of wildfires.
- **Thinning** – In some high-risk areas with numerous trees, the trees are too big for mowing machines but can be thinned out using chain saws or other harvesting equipment.

9. In my opinion, intentionally setting **PRESCRIBED FIRES** on public forests is:

38% a legitimate tool that resource managers should be able to use whenever they see fit.
44% something that should be done only infrequently, in carefully selected areas.
3% a practice that should not be considered because it creates too many negative impacts.
3% an unnecessary practice.
12% I know too little to make a judgment about this topic.

10. In my opinion, **MECHANICAL VEGETATION REMOVAL** on public forests is:

50% a legitimate tool that resource managers should be able to use whenever they see fit.
26% something that should be done only infrequently, in carefully selected areas.
3% a practice that should not be considered because it creates too many negative impacts.
4% an unnecessary practice.
17% I know too little to make a judgment about this topic.

11. In my opinion, **THINNING** trees to reduce fuel on public forests is:

59% a legitimate tool that resource managers should be able to use whenever they see fit.
28% something that should be done only infrequently, in carefully selected areas.
1% a practice that should not be considered because it creates too many negative impacts.
3% an unnecessary practice.
9% I know too little to make a judgment about this topic.

12. Not everyone agrees about the effectiveness of fuel management practices. We'd like to know what *you* believe about the practices described below. Please circle the number that best reflects your belief about the accuracy of each statement. You are not being judged on right or wrong answers – we are interested in your opinion. If you feel you do not know enough to give an opinion, circle the letters DK for that statement.

	Agree/ Strongly Agree	Disagree/ Strongly Disagree	Don't Know
Prescribed fire has little overall effect on the intensity or frequency of wildfires.	**26%**	**54%**	**20%**
Prescribed fire effectively reduces amounts of fuel in most forests.	**75%**	**10%**	**15%**
Prescribed fire improves habitat for wildlife.	**68%**	**12%**	**20%**
Prescribed fires kill a majority of large trees in a burned area.	**18%**	**58%**	**24%**
Biting insects are less of a problem in areas that are burned frequently.	**32%**	**18%**	**50%**
Prescribed fire causes unacceptable impacts on recreation uses.	**17%**	**60%**	**23%**
Mechanical vegetation removal has little overall effect on the intensity or frequency of wildfires.	**18%**	**55%**	**27%**
Mechanical vegetation removal causes unacceptable impacts on recreation uses.	**10%**	**63%**	**27%**

13. The use of prescribed fire may create concerns for some people. Please tell us how concerned you are about the following possible effects.

	Moderate concern/ Great concern	Not a concern/ Slight concern
a. Risk of fire going out of control	**70%**	**30%**
b. Increased soil erosion	**48%**	**52%**
c. Loss of wildlife and fish habitat	**46%**	**54%**
d. Damage to private property	**45%**	**55%**
e. Increased levels of smoke	**43%**	**57%**
f. Reduced scenic quality	**42%**	**58%**
g. Economic loss of useable timber	**41%**	**59%**
h. Deteriorated public water supply	**38%**	**62%**
i. Effects on recreation opportunities	**35%**	**65%**
j. Lower traffic safety	**21%**	**79%**

14. To further help natural resource managers make decisions, please tell us how you feel about the following by circling the number that best matches your agreement with each statement.

	Agree/ Strongly Agree	Uncertain	Disagree/ Strongly Disagree
All fires, regardless of origin, should be put out as soon as possible.	**33%**	**18%**	**49%**
I am not concerned about the threat of wildfire in my area.	**26%**	**14%**	**60%**
Selectively thinning dead and dying trees is better than leaving them in the forest.	**72%**	**13%**	**15%**
In my area, smoke levels from fire are not a problem.	**65%**	**14%**	**21%**
Jack pine has become a fire hazard in local forests.	**24%**	**51%**	**25%**
Much of public forestland is over-crowded with too many trees.	**36%**	**30%**	**34%**
I would support closure of some forest roads if it would reduce the fire danger in my area.	**39%**	**22%**	**39%**
Fire risks are so great in my area that managers need to use any means necessary to reduce them.	**14%**	**29%**	**57%**

15. We'd like to know what you think about the scenic impacts of fuel management practices. Please circle the number that best describes how acceptable you believe the likely impacts are.

	Scenic Impacts		
	Acceptable	Neutral	Unacceptable
Prescribed fire	**51%**	**35%**	**14%**
Mechanical vegetation removal	**59%**	**31%**	**10%**
Thinning	**70%**	**23%**	**7%**

16. Please tell us your opinions about the potential of smoke from prescribed fire?

	Yes	No	Not sure
a. I worry about the effects of smoke on public health.	**38%**	**50%**	**12%**
b. I worry about the effects of smoke on travel safety.	**32%**	**56%**	**12%**
c. I think smoke levels can be managed acceptably.	**57%**	**16%**	**27%**

17. People get information about forests from a variety of places. How helpful have the following sources of

information been to you? By helpful, we mean sources that are credible and provide good information.

	No Opinion	Easy to Understand*	Trustworthy*	How helpful is the information to you?*		
		yes	*yes*	*Not*	*Slightly*	*Very*
newspapers/magazines	**13%**	**92%**	**68%**	**7%**	**60%**	**33%**
TV/radio programs	**10%**	**94%**	**67%**	**9%**	**55%**	**36%**
internet	**53%**	**71%**	**45%**	**35%**	**44%**	**21%**
forest industry groups	**31%**	**71%**	**57%**	**21%**	**47%**	**32%**
environmental groups	**28%**	**49%**	**22%**	**45%**	**42%**	**13%**
university researchers	**36%**	**63%**	**77%**	**12%**	**53%**	**35%**
family and friends	**28%**	**83%**	**73%**	**18%**	**54%**	**28%**
Public forest agencies...						
• **public meetings**	**41%**	**75%**	**68%**	**16%**	**53%**	**31%**
• **interpretive information at visitor centers**	**36%**	**90%**	**87%**	**9%**	**53%**	**38%**
• **newsletters**	**43%**	**86%**	**73%**	**13%**	**57%**	**30%**
• **guided field trips to forests**	**50%**	**94%**	**91%**	**8%**	**40%**	**52%**
• **elementary school programs**	**50%**	**91%**	**81%**	**15%**	**48%**	**37%**
• **informational brochures**	**42%**	**89%**	**80%**	**9%**	**54%**	**37%**
• **conversations with agency personnel**	**46%**	**83%**	**78%**	**11%**	**39%**	**50%**

***Percent of respondents who had an opinion about the information source.**

18. U.S. Forest Service managers are faced with numerous concerns on National Forest lands. Please tell us how important the following management issues are to you.

	Moderately important/ Very Important	Not important/ Slightly important
1) **Maintaining healthy forests**	**96%**	**4%**
2) **Communicating with the public**	**94%**	**6%**
3) **Reducing wildfire risk**	**87%**	**13%**
4) **Managing recreation use**	**85%**	**15%**
5) **Restoring native forest conditions (oak, white pine, etc.)**	**85%**	**15%**
6) **Managing forests for timber harvests**	**84%**	**16%**
7) **Providing adequate habitat for sensitive wildlife species**	**80%**	**20%**
8) **Maintaining road closures**	**50%**	**50%**

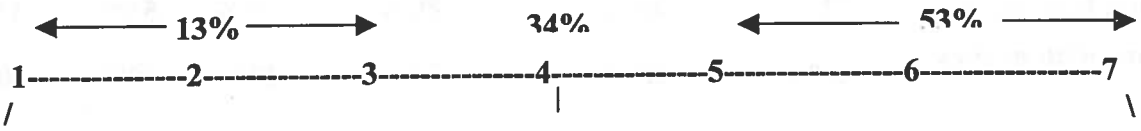
19. Please circle one item from the question above that you feel is the most important concern facing Forest Service managers in your area.

40% Maintaining healthy forests
18% Managing forests for timber harvests
12% Reducing wildfire risk
11% Communicating with the public
7% Managing recreation use
6% Restoring native forest conditions (oak, white pine, etc.)
5% Providing adequate habitat for sensitive wildlife species
1% Maintaining road closure

20. How much confidence do you have in the Forest Service to use the following practices as part of a responsible and effective fuel management program for your area?

	Moderate/Full	None/Limited	No Opinion
Prescribed fire	**56%**	**33%**	**11%**
Mechanical vegetation removal	**61%**	**25%**	**14%**
Thinning	**67%**	**22%**	**11%**

21. Recently there has been considerable debate over efforts to increase citizen participation in public land management. Where would you place yourself regarding these efforts?



Citizen participation is of no value and adds needlessly to the cost of government.

Neutral

Citizen participation is of great value even if it adds to the cost of government.

22. In your opinion, how well has the Forest Service incorporated public concerns into its management strategies?

6% EXCELLENT, public concerns are always considered.
28% GOOD, public concerns are usually considered.
32% FAIR, public concerns are sometimes considered.
14% POOR, public concerns are rarely or never considered.
20% I have no basis for an opinion on this topic.

23. Please give us your opinion about how the Forest Service interacts with communities in your area. If you have no opinion about any item, it's important that you mark the "no basis for opinion" space.

	Agree/ Strongly Agree	Neutral	Disagree/ Strongly Disagree	No Basis for opinion
The Forest Service is open to public input and uses it to shape management decisions.	**25%**	**19%**	**22%**	**34%**
Forest Service managers usually create plans without input from local communities.	**34%**	**13%**	**22%**	**31%**
Forest Service managers build trust and cooperation with citizens so that people feel the agency is acting in their best interest.	**23%**	**22%**	**26%**	**29%**
The Forest Service does a good job of providing information about its management activities.	**27%**	**22%**	**26%**	**25%**
The Forest Service should provide a stronger leadership role.	**46%**	**21%**	**8%**	**25%**
Local Forest Service staff are prohibited from doing their job because of national restrictions and regulations.	**31%**	**17%**	**12%**	**40%**

24. How long have you lived in the community where you now live? **30 years (mean)**

25. How long have you lived in the same state? **48 years (mean)**

26. Which of the following best describes the community where you live?

2% urban area **41% small town**
2% suburban area **55% rural area**

27. Are you? **76% male** **24% female**

28. What is your age? **58 years (mean)**

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

11% some high school **12% bachelor's degree**
30% high school graduate **7% some graduate school**
30% some college **10% completed graduate degree**

30. Do you, or does anyone in your household, suffer from a respiratory ailment?

27% Yes **73% No**