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Fuel Reduction Strategies in Forest Communities

A Longitudinal Analysis of Public Support

Bruce Shindler and Eric Toman

ABSTRACT

This study uses panel data from a mail survey administered to the same individuals in 1996 and 2000 to measure change in public attitudes toward fire management programs on federal lands in eastern Oregon and Washington. Findings were generally similar between 1996 and 2000, but three noteworthy changes occurred over the four-year interval. First, the number of citizens who view smoke as a problem has risen. Second, citizens gave Forest Service information programs lower ratings and considered other sources of information more reliable. And finally, the relationship between the Forest Service and residents in the region appears to have eroded. Nevertheless, respondents continued to support prescribed fire and mechanized thinning for fuel reduction purposes in local forests.

Keywords: fire; policy; public perception; wildland-urban interface

Above: **Fuel reduction treatments in eastern Oregon. Photos courtesy of Oregon State University Forestry Media Center.**

Fire suppression has created dense stands and declining health in most forest regions of the United States. In response, public agencies have sought to reduce forest fuels and improve conditions using prescribed fire and mechanized thinning. Success requires a supportive local constituency—particularly when practices involve igniting fires near residential areas or cutting trees in places that people care deeply about.

Although ecologists have tracked forest conditions over long periods and evaluated how ecosystems respond to both natural and human influences, longitudinal research in the social sciences has been slower to evolve (Beck-

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ley and Korber 1995). Social science methods usually consist of one-time, cross-sectional studies that Babbie (1995, p. 95) describes as attempting to "determine the speed of a moving object on the basis of a high-speed, still photograph." Consequently, we have limited ability to measure change in public opinion about forest conditions or monitor citizens' support for practices used to treat problem areas.

This article describes a longitudinal (panel) study designed to help fill this void. The study replicates research conducted in 1996 by Shindler and Reed about the use of prescribed fire and mechanized thinning on national forests in the Blue Mountains of eastern Oregon and Washington. The followup study was conducted in 2000 using the same measures and participants and sought to examine changes in public attitudes on four issues:

- The usefulness of information sources about forest management.
- Support for fuel reduction activities.
- Factors that influence how citizens respond to fuel reduction programs.
- Interactions between the Forest Service and local communities.

Management and Research Context

The forests of the Blue Mountains have been cited as an example of the complexity of federal land management (Langston 1995). Historically, these forests were open, parklike stands of ponderosa pine. As in many other western forests, past management practices—particularly fire suppression efforts—have resulted in overstocked stands, declining forest health, and increased risk of wildfire (Tanaka et al. 1995). Resource managers on three national forests within the study area are attempting to reduce hazardous fuels and restore forest health using a combination of prescribed fire and mechanized thinning.

Fuel reduction activities are typically well-coordinated, but community acceptance of large-scale application of such treatments is often less certain. Although there is a general lack of longitudinal research, in the case of prescribed fire three studies (McCool and Stankey 1986; Bright et al. 1993; Loomis et al. 2001) have examined the role information plays in citizens' support for these practices. Collectively, this research substantiated strong associations between educational messages and increased public knowledge, and a corresponding increase in acceptance of prescribed fire. Nevertheless, single case studies (e.g., Shelby and Speaker 1990; Beebe and Omi 1993) indicate that citizens still have concerns about the risks of management-ignited fires, including damage to private property, smoke, and effects on water supply and wildlife habitat.

Comparatively few studies have been conducted on public perceptions of mechanized thinning to reduce hazardous fuels; however, some insight can be gained from the literature assessing attitudes toward alternative harvesting techniques. Most studies find that people prefer stands with little or no modification over highly manipulated forest stands (e.g., McCool et al. 1986; Brunson and Reiter 1996). However, Ribe (1999) documents positive public responses to ecosystem-based harvests when photographs and detailed descriptions of Forest Service objectives are provided. More often, citizens have expressed reservations about how much license managers will take when using thinning treatments to reduce fuel loads. Many are concerned that the agencies will revert to business-as-usual harvesting techniques (Brunson 1993).

Recent research suggests that the public acceptance problem runs much deeper and is more complex than a simple *for* or *against* a specific forest treatment. For example, citizens frequently make judgments based on their interactions with forest agencies and their level of trust with local managers (Shindler et al. 2002). Similarly, Winter et al. (2002) found that acceptance of fuel treatments hinges on citizens' confidence that the agencies will effectively manage risk as well as conduct a planning process that includes them.

Research Design

Our 1996 study utilized a mail-back questionnaire to survey a stratified random sample of 533 residents from communities adjacent to the Malheur, Umatilla, and Wallow-Whitman National Forests. This group was treated as a panel for purposes of the followup study. Panel research involves evaluations of the same individuals using the same measures at different points in time. Responses from individual participants can be paired, or linked, over the separate data collection points to identify shifts in attitudes.

We based the followup survey design on the 1996 questionnaire and added new questions to address current concerns. To provide a common reference for the treatments in question, prescribed fire was defined:

> Management-ignited prescribed fire is used to accomplish an objective—to control forest diseases, insects, and excessive buildup of trees—and managers schedule these burns around the weather, fuel loads, season, and their ability to maintain control of the fire.

We also described the thinning program:

> Mechanized thinning involves a range of mechanized harvesting methods to control disease, insects, and excessive buildup of trees. Currently, managers use ground-based harvesters and skyline (above-ground) yarding systems to remove standing dead and dying trees less than 15 inches in diameter from selected forest sites.

In 2000 we located 455 of the original 533 participants. Of these, 29 were deceased or incapacitated for health reasons, and three had moved from the area. From the usable sample of 423 re-

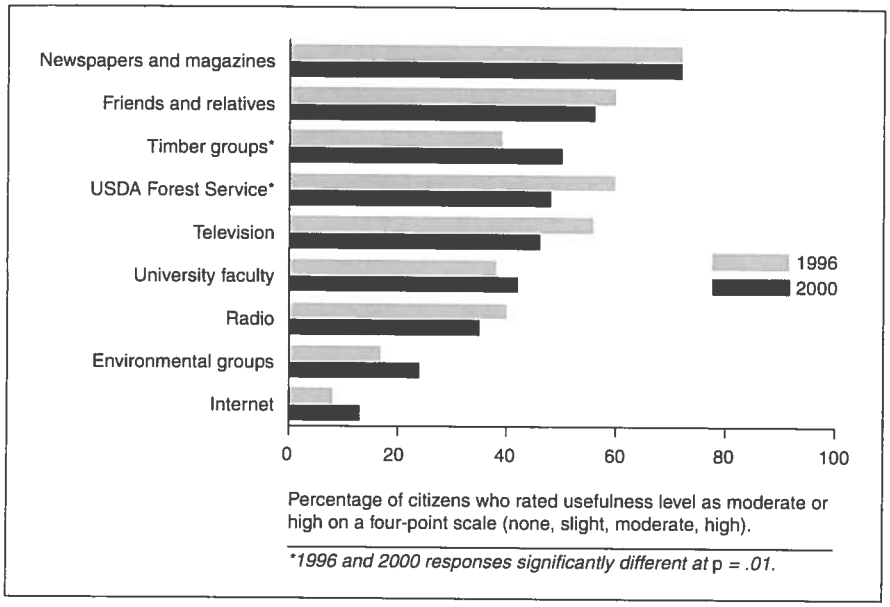

Figure 1. **Usefulness of information sources about forest management.**

spondents, 323 completed questionnaires, for a 76 percent adjusted-response rate. In the tables, data from replicated questions are compared utilizing paired *t*-tests, and significant differences in responses are noted.

The 1996 study (Shindler and Reed) reported that Blue Mountains respondents were attentive to national forest issues and largely supportive of both prescribed fire and thinning treatments. However, citizens' trust in the Forest Service to implement effective treatment programs was mixed, with roughly half the respondents giving the agency a vote of confidence to proceed. Given these findings, as well as related literature indicating that more knowledgeable publics accept fuel reduction strategies, we expected to find higher levels of support in the 2000 study. We also anticipated that this support would be associated with knowledge about treatment effects and be influenced by the relationship between citizens and the Forest Service.

Findings

Rural communities within the Blue Mountains have a long history of economic reliance on natural resource industries. Study participants had lived in the Blue Mountains area for an average of 41 years—time to develop long-term connections to the national forests surrounding their communities. Responses from both surveys indicate an attentive and knowledgeable public: 90 percent of respondents said they paid a moderate to great deal of attention to national forest issues and more than 80 percent considered themselves moderately or well informed about forest conditions.

In both surveys respondents rated the usefulness of nine sources of information on forest management. Findings are displayed in *figure 1*. Newspapers or magazines and friends or relatives were the most useful sources and the only ones to receive a moderate to high rating by a majority of respondents in both 1996 and 2000. Overall, the lowest ratings were for environmental groups and the Internet. Of particular interest are scores for timber groups and the Forest Service, which changed significantly. The usefulness rating of timber groups rose from 39 percent to 50 percent, but opinions of the Forest Service fell from 60 percent to 48 percent.

Attitudes about treatments. Responses in *table 1* show that overall support for prescribed fire and mechanized thinning in the Blue Mountains remained fairly constant. Given four choice categories, most citizens supported some use of prescribed fire. In 2000, 39 percent believed the Forest Service should have full discretion for its use, and an additional 50 percent said the agency should use prescribed fire only in carefully selected areas. Support was even higher for mechanized thinning; overall, 97 percent of respondents supported some level of thinning, with more than two-thirds giving the agency full discretion.

However, the last item in *table 1* raises a cautionary point. In both studies, citizens voiced relatively low levels of trust in the Forest Service to implement a responsible and effective program. For prescribed fire especially, trust in the agency decreased significantly—from 52 percent to 43 percent—over the four-year interval. Although trust levels were slightly higher for mechanized thinning (and responses for this treatment did not significantly change), only a slim majority (52 percent) expressed confidence in the agency in 2000.

Table 2 provides evidence that concerns over smoke from prescribed fire are increasing. In 1996 a substantial majority of respondents indicated that smoke was not a problem in their area, particularly if treatments resulted in a healthier forest. Although the majority of respondents still held that view in 2000, significantly more people considered smoke a problem regardless of its beneficial effects. The change may have occurred because the agency has been more active in its burning program or because citizens have a lower tolerance for smoke overall. But for managers, a simple majority is probably an insufficient level of public approval. Smoke is a highly contentious issue the provides a rallying point in communities.

Citizen–agency interactions. Throughout the West, a preference for greater citizen participation in forest planning is strong (Steel et al. 1997). We asked about this in both surveys, with the same results. Nearly two-thirds (65 percent) placed a high value on citizen participation even if it increased the cost of government, and very few (11 percent) considered it of little or no value.

Table 3 shows that opinions about citizen–agency interactions were mixed; however, if viewed as a citizens' report card on agency effectiveness, the scores indicate areas of concern. Significantly fewer respondents—just 27 percent in 2000—agreed that the Forest Service did a good job of providing

Table 1. Public opinion about the legitimacy and implementation of fuel reduction practices.

Statement	Prescribed fire 1996	Prescribed fire 2000	Mechanized thinning 1996	Mechanized thinning 2000
The use of fuel treatments in the Blue Mountains ...				
Is a legitimate management tool that the Forest Service should have the discretion to use for improving forest conditions.	44%	39%	68%	69%
Should be used sparingly by the Forest Service and only in carefully selected areas.	45	50	28	28
Creates too many impacts and should not be considered as a management alternative.	6	7	2	2
Is unnecessary and should not be utilized.	5	4	1	1
Citizens' trust in the Forest Service				
I trust the Forest Service to implement a responsible and effective program.	52*	43*	59	52

**1996 and 2000 responses significantly different at* p = .05.

information about its management activities. Despite greater recognition of managers' efforts to collect input from local communities, it is curious that there was a decrease (41 percent to 31 percent) in the number who agreed that the Forest Service was open to and used public input to shape management decisions. These apparently contradictory shifts coincide with recent findings from forest communities—that citizens recognize that the Forest Service now solicits more public comments but believe the agency does not use this input in forming management plans (Shindler et al. 2002).

Responses to new items on the 2000 questionnaire provide additional cause for concern. Few people thought Forest Service actions built trust and cooperation with citizens; in fact, a majority disagreed with this statement. About two-thirds indicated they trusted local Forest Service personnel but distrusted government at the national level and believed that regulations hindered individuals on ranger districts from doing their jobs. These sentiments are representative of a growing set of frustrations in the western United States (Shindler et al. 2002).

Roughly one-fourth of participants selected the neutral midpoint (omitted from this table). Because a "don't know" response was not offered, many of these individuals may have had little personal experience with the Forest Service. As more people become interested and involved in fire management activities, the agency will have an opportunity to (positively) influence this segment of the public.

Table 2. Citizens' evaluations of smoke from prescribed fire.

Statement	Agree 1996	Agree 2000
In my area, smoke levels from fire are not a problem for me or my family.*	76%	61%
Smoke levels are acceptable if [the fire] results in a healthier forest.*	68	58

**1996 and 2000 responses significantly different at* p = .05.

Table 3. Experiences and interactions with the Forest Service.

Statement	Agree 1996	Agree 2000	Disagree 1996	Disagree 2000
The Forest Service does a good job of providing information about its management activities.*	33%	27%	35%	43%
Forest managers usually create plans without input from local communities.**	55	46	22	30
The Forest Service is open to public input and uses it to shape management decisions.**	41	31	34	42
New statements from 2000 survey				
Federal forest managers build trust and cooperation with citizens so that people feel the agency is acting in their best interest.		23		52
I trust the local Forest Service staff, but I don't trust government at the national level to let them do their job.		65		16
Local Forest Service staff are prohibited from doing their job because of national restrictions and regulations.		68		8

*Notes: Responses on a five-point scale ranged from "strongly agree" to "strongly disagree" with a neutral midpoint; neutral responses are omitted. 1996 and 2000 responses significantly different at *p = .05 and **p = .01.*

Sociodemographic variables. Numerous studies indicate that public attitudes about natural resource issues are often associated with sociodemographic characteristics (e.g., Steel et al. 1997). Gender, income, education, and knowledge are common correlation measures. In our 2000 study, we gauged citizens' knowledge about the use of prescribed fire and thinning by asking respondents to complete a 15-item true-false quiz. Although quiz scores were slightly higher for the thinning questions, overall results suggest that study participants were generally knowledgeable about both treatments. Individual quiz scores are not reported here; however, composite scores were calculated and used as one of the variables for the correlation analysis re-

Communication Strategies for Fire Management

Across public lands several innovative outreach efforts are underway that offer citizens an opportunity to evaluate the range of information about fuel management and the tradeoffs of different treatment options. Two examples from the Sisters Ranger District on the Deschutes National Forest in central Oregon are the Heritage Forest Demonstration Area and a partnership with the Black Butte Resort Homeowners Association.

The Heritage Demonstration Project is a collaboration between the Sisters R.D. and a local citizen group, Friends of the Metolius, that consists of 13 treatment plots designed to showcase multiple fuel reduction treatments near high-use recreation areas and residential property. Along with agency personnel, the Friends group has played a key role from the outset. They have been engaged in each planning phase and carried the message to local property owners. Once work was initiated, they erected interpretive signs to accompany the treatments and led public tours to demonstration sites. The project has been instrumental in providing citizens with an opportunity to discuss forest conditions and fuel management and evaluate real-life scenarios prior to a planned broad-scale application of treatments in the area. On Black Butte Ranch the homeowners association is working cooperatively with Forest Service personnel to thin the forest interface between public and private lands; once they are trained, property owners do much of the work themselves.

Although cooperative programs require greater initiative on the part of citizens and land managers, experiences like those described here suggest that projects can be made more convenient and more effective by organizing them around other local activities such as property owner meetings, watershed council activities, and specific interest group projects. In forest communities, these groups are greatly concerned about conditions and have a real stake in the outcomes. Lessons from management experience show that public understanding and support are more likely to develop in the context of local problems that are relevant to citizens' daily lives.

It is imperative that fire management professionals specify conditions and engage citizens in discussion about the nature of the options. Agency personnel can choose the type of participatory experiences that best suit the local situation. Research from forest communities by Shindler and Neburka (1997) and Winter et al. (2002) indicate that public responses are more positive when these communications include

- Legitimate opportunities for citizen participation.
- Language and terms that are defined for common use.
- Current, accurate, and understandable information that comes from a reliable source.
- Prescribed fire plans that specifically account for conditions such as weather, proximity to homes, and timing of events.
- Mitigation measures to reduce treatment impacts on air quality, aesthetics, and other values.
- Contingency measures for escapes.
- Cost comparisons of various treatment alternatives.
- Opportunities to see the result of treatments on the ground (preferably at different time scales).
- Specific details about whom to contact with questions and concerns.

tempts to initiate fuel reduction activities, regardless of their scientific merit (Shindler et al. 2002). Although support for prescribed fire and thinning is strong in the Blue Mountains, public skepticism about management intentions—here and elsewhere—limits agency effectiveness. But this study suggests that citizens' negative feelings arise from frustration with the federal bureaucracy in general and not necessarily with Forest Service personnel in the Blue Mountains.

Findings from this study also suggest a remedy. The region has knowledgeable residents with positive attitudes toward treatment alternatives who may lend support to fuel reduction programs. The key in places like the Blue Mountains is likely to be how well projects target site-specific problems and whether they incorporate the concerns of residents (Winter et al. 2002), including the degree to which citizens feel they were represented in the planning process (Lawrence et al. 1997).

Acceptance of fire management practices often depends on the level of uncertainty about outcomes and public understanding of the risks involved. People want to know how serious conditions are, what will happen and when, and who will be affected. Answers to these questions are neither simple nor consistent across settings. But to be relevant to citizens, fire management policies need to be placed in context (Loomis et al. 2001). Managers need to provide scenarios that depict changes in forest conditions, explain how soon they could occur, and allow citizens to discuss the consequences of changes for forest ecosystems and surrounding communities. People are capable of assessing the tradeoffs, including positive and negative choices, and welcome the chance to do so. When given a set of choices—even ones that are limited or imperfect—citizens often choose the lesser of the two evils (Ehrenhalt 1994). As effective treatments are implemented and public awareness grows, so too will belief that the Forest Service can be trusted with the risks of fire and fuel management.

Conclusions

Public acceptance is essential to virtually every resource management decision facing public agencies today. Given the risks and uncertainties, fire

management and forest health are particularly subject to scrutiny. This study suggests that public acceptance of fire and fuel management is a product of the interactions between citizens and resource managers over time.

A central conclusion from this longitudinal analysis is that public judgments are provisional. As citizens become more aware of the factors involved in fuel management—the choices and consequences, the costs involved, how and why decisions are made, and so on—what seemed reasonable in the past may be deemed less appropriate today (Shindler et al. 2002). By its nature, then, winning public acceptance of fire policies and resulting forest conditions is a continuing process—long-term and rarely final or absolute (Cortner et al. 1998). Thus effective, inclusive communication strategies must not only provide information but also focus on how people come to understand forest conditions and support policies for fuel reduction.

The question remains whether longitudinal data on Blue Mountains residents can be generalized to other regions. Several studies have identified greater sophistication among fire-affected communities, compared with the general population, in both their understanding and their acceptance of fire management techniques (Manfredo et al. 1990; Shindler and Brunson 2001). Additional work in fire-prone areas indicates that similar factors influence public support for fuel treatments despite geographic and economic differences (Winter et al. 2002). Findings from the Blue Mountains may therefore be particularly relevant for other western communities where fire professionals are attempting to implement similar practices to combat similar problems.

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Bruce Shindler (bruce.shindler@orst.edu) is associate professor and Eric Toman is research assistant, Department of Forest Resources, Oregon State University, Corvallis, OR 97331.