

Final Project Report
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**Evaluating Communication Strategies and
Local Partnerships: Methods for Reducing Fuels, Sharing
Responsibility and Building Trust**

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- Appendices: frequency reports from field studies

EXECUTIVE SUMMARY

This report provides a detailed summary of research conducted in multiple forest communities throughout the U.S. by forest social scientists at Oregon State University. Project work was supported by the USDA/USDI Joint Fire Science Program (JFSP) in cooperation with the USDA Forest Service, Pacific Northwest Research Station. This study was prompted by the needs of agency professionals to communicate the rationale behind fire and fuel management strategies and develop partnerships with citizens to build fire-safe communities. Accordingly, research was conducted at the community level where federal fire personnel have begun to work cooperatively with local jurisdictions and citizen groups to gain acceptance for agency programs and build joint responsibility for fire management activities. This information will be useful as federal forest management personnel develop outreach strategies and interact with citizens regarding treatment alternatives.

Interagency planning efforts have resulted in a national strategy to reduce wildfire risks while restoring ecosystem health and protecting communities. Public support is a basic requirement to project implementation and various strategies are being used to communicate with citizens. In many locations federal agencies already have focused their efforts on outreach activities promoting defensible spaces and Fire-Wise communities. Traditional formats (e.g., brochures, public meetings, interpretive programs) have been in use for years, while other forms of information exchange (e.g., videos, demonstration sites, field tours) have also begun to emerge as personnel begin to expand the message and become more creative in their interactions with the public. In some cases, management units are recognizing the power of community partnerships and have begun to collaborate with local organizations and citizen groups to achieve common fire management goals.

The purpose of this project is to help identify and prioritize the elements of successful communication strategies so that agency personnel can adapt them to their own situation for meeting management objectives. Preferred outcomes include partnerships with local organizations for reducing fuels, shared responsibility for making good choices about forest conditions, and trust among stakeholders. Specific objectives included:

1. Identify partnership arrangements and public outreach programs that hold promise as relatively new or innovative techniques.
2. Establish cooperative relationships with agency personnel and local partners to allow for monitoring and evaluation of communication activities.
3. Design and implement measures to assess program effectiveness and outcomes in each setting.
4. Develop a framework for implementing public communication strategies that meet management objectives.
5. Create tech transfer materials that provide information to managers in easily accessible and useful formats.

Project Stages

Overall, more than 1,300 citizens from nine study locations participated in this research. A triangulation of social assessment techniques, including survey and interview methodologies, was used to examine public responses to wildland fuel strategies and outreach programs. Research was conducted in three stages. The first stage of research consisted of a mail survey to residents in four states, Arizona, Colorado, Oregon, and Utah. The surveys probed participant attitudes and understanding of fuel management practices. A portion of the questionnaire included citizen evaluations of eleven agency outreach activities commonly used to provide fire and fuel information.

The second stage of research focused on participant evaluations of five specific outreach and communication activities. Three of these involved interpretive programs at Sequoia and King's Canyon National Parks, a prescribed fire interpretive trail at the High Desert Museum on Oregon's Deschutes National Forest, and a fire exhibit at the World Forestry Center in Portland, Oregon. A survey protocol was designed to assess how participants responded to the different forms of information. The fourth outreach activity involved a summer long series of fire-related ads and articles in the local newspaper in Coeur d'Alene, Idaho. Finally, we assessed the outcomes and influences of an agency guided field trip following the B&B fire in central Oregon.

The third stage draws on our field research and analysis to provide tools for managers to plan their outreach activities with local communities. The first is a conceptual framework that outlines a comprehensive communication strategy. It provides guiding principles and steps to plan, implement, and monitor activities. The second is a DVD designed to assist management personnel in planning collaborative programs with citizens for fuels reduction. *Communication Strategies for Fire Management: Creating Effective Citizen-Agency Partnerships* depicts examples from successful agency programs (Forest Service, BLM, and National Park Service) to highlight effective approaches. A companion document—*A Practical Guide to Citizen-Agency Partnerships*—provides viewers with hands-on materials for planning and implementation. It is designed to be used as a step-wise guide for practical application in the field.

Key Study Results

Findings illustrate the complexity of citizen attitudes and understanding about fire management and reinforce the importance of developing a well organized approach to communication. Overall, participants demonstrated a relatively high level of awareness and supportive attitudes toward fuel treatments. Results also illustrated the effectiveness of particular communication activities and suggest factors that contribute to outreach success. Notable findings include:

Awareness and attitudes toward fuel treatments

- There is considerable public awareness of issues on federal forestlands; fire and fuel management are important issues for participants.

- Participants are knowledgeable about the rationale behind, and outcomes of, fuel treatments. Indeed, participants performed better on many knowledge questions than previously reported in other studies suggesting a general increase, at least among forest users, in citizen understanding of these issues.
- Overall, participants were supportive of agency-implemented fuel programs. A large majority expressed positive attitudes toward treatments even prior to exposure to outreach activities. In the five-site specific cases involving participant evaluations, outreach activities contributed to citizens' support for treatments.
- Participants also expressed high levels of confidence in the ability of agency professionals to implement fuel treatment programs.

Information sources and the effectiveness of delivery systems

- Ratings of agency outreach methods were generally consistent across locations, despite differences in the emphasis of local management units or content of information activities.
- On balance, certain program formats appeal to citizens regardless of location. Citizens generally preferred more interactive forms (i.e. school educational programs, interpretive centers, guided field trips, conversations with agency personnel) over unidirectional programs such as newspaper inserts, brochures, or internet web sites.
- Notable is that public meetings, a common form of information provision, were rated particularly low. In many cases, citizens characterized traditional meeting formats as offering limited meaningful interaction with personnel or opportunities to contribute to agency decisions. In particular, many expressed dissatisfaction with being "talked at" by agency personnel who they view as already having made up their minds prior to the meeting.
- Overall, both unidirectional and interactive formats were judged useful by participants. Each has a role in a comprehensive communication program. It is important to recognize the strengths and limitations of each method at achieving a particular outreach objective (e.g., awareness-building, knowledge or attitude change).

Changes following outreach activity

- Overall, participants judged the programs evaluated here as contributing to their understanding of fire programs and fuels management. Following outreach activities, 40% or more of participants in each location expressed greater awareness about fire risk as well as a greater understanding of fuel treatments and the ecological role of fire.
- A substantial number of participants in each location indicated they had greater confidence in resource managers to implement an effective fuel reduction program as a result of their outreach experience.

- Forty percent or more expressed greater support for agency fuel reduction programs. Specific support was shown for both prescribed fire and thinning treatments.
- Similar to previous research, findings here showed a link between increased understanding and support for fuel treatments.
- In the case of public service announcements about defensible space in the Coeur d' Alene newspaper, one-third of the participants were prompted to take action to protect their home from wildfire.
- The agency led post-fire (B&B) tour provided the most positive change in participant attitudes. Not only were a majority of respondents now more confident in the ability of the Forest Service to implement an effective fuel reduction program, 84% were also more confident that the agency would incorporate citizen concerns into future plans.

Message delivery and design

A number of different communication methods are necessary to reach all segments of the community. Each specific method is based on the communication objective, the needs of the audience, and contextual influences of the local situation. It is useful to think of delivering the fire message at three levels; each with its own role.

- *Awareness building* is used to generate increased recognition of an issue, deliver one or two primary ideas, and sensitize the audience to subsequent messages. Using mass media or other one-way communication methods (.e.g, brochures, news releases, television PSAs, websites) are typical formats.
- *Increasing public acceptance* is used to help build understanding of the options and acceptance of agency fuel practices. The format used for these messages (e.g., guided field trips, demonstration sites, meetings with property owners or organized groups) target particular audiences to help explain treatments and develop support for the rationale behind specific management approaches.
- *Encouraging behaviors* is the step that provides in-depth understanding of management practices. This may also help provide citizens with skills needed to take responsibility for fuel reduction on private property. Methods include small group workshops, demonstrations on defensible space, joint projects with homeowner associations, and partnerships with established groups. These methods target local audiences and focus on relevant places like neighborhoods or recreation sites.

Tools and strategies

Our Practical Guide to Citizen-Agency Partnerships (included herein) offers a priority based approach to managers seeking ways to build (or improve) a public outreach program in their own community. The guide also provides a set of expected outcomes from each action. Highlights from the seven basic steps include:

- Organize an outreach plan within the management unit before approaching the public. This initial step involves creating a plan that allows agency personnel to agree on how community members will be included and how to communicate with them in an organized and effective manner.
- Choose the right people for the outreach job and then support them. The ability to make genuine connections with citizens is a special talent; not everyone is adept at this aspect of the job. However, it is these personal relationships that form the foundation of successful partnerships.
- Take advantage of existing resources and build the fire message. Local residents already know each other and usually have defined accepted forms of communication in their community. In many cases, they also have figured out how to work together for a common purpose.
- Create opportunities to meet the local community in their setting. It is important to meet with citizens in their “backyards” and other familiar places where they have a stake in the outcomes. When projects are relevant to citizens as well as agencies, people can work together to accomplish mutual objectives.
- Let your actions speak for your intentions. People respect and respond to individuals they view as trustworthy. Citizens are looking for leaders who share their concerns. A manager’s actions and professional competence are the criteria by which people judge the sincerity of your efforts.
- Stay in it for the long-term. Building and maintaining partnerships requires a sustained commitment. Effective partnerships reflect an iterative process; one that builds on itself, one interaction or one project at a time. Success is achieved by organizations that promote trust and relationship-building as the long-term goal of public interactions.

Summary of conclusions

Findings support the premise that effective communication is essential to building citizen understanding and acceptance of fuel management programs. Results here suggest two basic forms of communication are useful. One is general information dispersal; this usually involves broad messages that can be conveyed by unidirectional, mass communication formats such as newspapers, brochures and public service announcements. Messages delivered through this format are typically created for general public consumption and, as such, provide few opportunities to target specific audiences. Because it is difficult to ensure that information is received and understood, their effectiveness as an educational tool is limited. However, these programs can still be beneficial; they are typically inexpensive and can contribute to building awareness for important issues or projects (Atkin 2001, Jacobson 1999). Moreover, unidirectional activities can influence citizens to acquire more information or, in some cases, prompt action.

The second form of communication is more focused in scope and usually includes opportunities for interaction at the community or individual level. Because such outreach activities target local priorities and specific environmental contexts, they will likely be more effective at influencing citizen understanding and acceptance (Brunson and Shindler 2004; McCaffrey 2004). Indeed, as citizen understanding of fire management becomes increasingly sophisticated, the flexibility of interactive activities will become even more important for changing attitudes and behaviors. Effective outreach goes beyond simply using standardized, off-the-shelf tools to provide information.

Results here suggest four principles of successful outreach programs.

- ***Principle 1: Effective communication is a product of effective planning.*** As with other management issues, successful outreach is based on developing a sound plan. Prior to implementation, agency personnel should determine outreach objectives and organize an appropriate communication approach based on audience needs and internal resources.
- ***Principle 2: Both unidirectional (one-way) and interactive approaches to communication have a role in public outreach. Utilize the strengths of each to build a program.*** Mass, unidirectional outreach methods are best suited to building awareness and sensitizing participants to further messages. On the other hand, interactive methods are more effective at influencing citizen attitudes and confidence in agency practitioners. Both approaches can be used as part of a comprehensive communication program.
- ***Principle 3: Communication activities that focus on local conditions and concerns can decrease the uncertainty that citizens associate with fire management and build their capacity to participate in solutions.*** Citizen assessments are strongly influenced by the local context. Outreach programs that address local concerns and account for recognition of locally-important places will be more successful.
- ***Principle 4: A comprehensive communication strategy will emphasize meaningful interaction among participants and build trust along the way.*** Successful outreach programs not only focus on the types and content of the information disseminated, but also on how and why it is communicated. Programs that engage citizens in discussion about the nature of treatment options and outcomes can not only reduce uncertainty but can also enhance trust in resource agencies.

Principal Investigator Presentations at Conferences, Workshops, and Symposia

- Society of American Foresters Annual Symposium. Bend, OR. May 2007.
- International Association of Wildland Fire Conference. Sandestin, FL. March 2007.
- Oregon State University Conference: Managing in a Post-fire Environment. Corvallis, OR. March 2007.
- Deschutes National Forest Fire Management Workshop. Sisters, OR. September 2006.
- Australasian Fire Authorities Council Symposium. Melbourne, Australia. August 2006.
- Social Science Fire Research in the United States. Research seminar with scientists at Charles Sturt University, Albury, New South Wales, Australia. August 2006.
- Central Cascades Adaptive Management Workshop. USDA Forest Service PNW Research Station. May 2006.
- International Association of Wildland Fire Conference. Portland, OR. April 2006.
- B.C. Forum on Forest Economics and Policy. University of British Columbia, Vancouver, BC. January 2006.
- International Symposium on Society and Resource Management, Vancouver, BC. June 2006.
- Public Outreach Personnel Training Workshop: National Park Service and the Bureau of Land Management. Sacramento, CA. March 2005.
- USDA Forest Service, Region 6, District Ranger Summit. Tacoma, WA. April 2005.
- International Symposium on Society and Resource Management. Keystone, CO. June 2004.
- Oregon State University Symposium: Creating Fire Resilient Landscapes. Medford, OR. March 2004.
- National Park Service Workshop for Agency Public Outreach Personnel. Sequoia-Kings Canyon National Park. February 2004.
- Society of American Foresters Annual Symposium. Bend, OR. October 2003.

INTRODUCTION

Wildfire impacts have increased in extent and severity in recent years (National Interagency Fire Center 2005). For example, the average acres burned annually from 1995 to 2004 increased by 33% (to 5.3 million acres) over the previous 10-year period. Over this same time period, suppression costs exceeded \$1 billion three times, in 2000, 2002, and 2003. Additionally, more than nine thousand structures have been lost to wildfire damage in the past three years (2002-2004); more than 5,000 were burned in 2003 alone. In response, resource agencies are seeking to reduce the risk of fire through fuel treatments such as prescribed fire and mechanized thinning. As research throughout this period has recognized, citizen support is a basic requirement to project implementation and long-term success.

Research indicates that citizen knowledge and understanding of the rationale behind management practices are central to public acceptance of agency programs (Shindler et al. 1999). Accordingly, a number of federal forest management units have focused their communication strategies on community outreach activities to influence citizens' attitudes and understanding about fuel reduction and forest restoration practices. Approaches have ranged from traditional text materials and graphic displays, such as brochures and exhibits, to more targeted activities, including demonstration areas and guided field tours. However, few studies have evaluated these efforts resulting in a lack of available information to guide the outreach decisions of resource professionals.

This report presents a summary of research conducted between 2003 and 2007 by forest social scientists at Oregon State University. This project was designed to provide an in-depth understanding of the role of information programs in fire management and the usefulness of different communication techniques. Research was conducted in fire-prone locations in Arizona, California, Colorado, Idaho, Oregon and Utah. Citizen reactions to fuel treatments and outreach programs were studied across settings.

Federal agencies have many options for communicating with the public (e.g., brochures, newspapers, websites, public meetings, demonstration sites), but often have limited resources for completing the outreach job. Ultimately, agency professionals have to make difficult choices about the most effective use of personnel and financial resources. The purpose of this report is to help identify and prioritize the elements of successful communication strategies so that agency personnel can adapt them to their own situation for meeting management objectives. Specific objectives include:

MANAGEMENT CONTEXT

Several recent federal initiatives (e.g., the National Fire Plan, Ten Year Comprehensive Strategy, Healthy Forests Restoration Act) have focused on fire and fuel management. Two main themes run through these initiatives. First, they emphasize the use of fuel treatments, such as prescribed fire and mechanized thinning, to reduce the risk of fire. Throughout much of the previous century federal fire policy was directed at excluding fire from the landscape. In recent years, resource managers and scientists have increasingly recognized the complex and often beneficial role that fire plays in forest and rangeland ecosystems. In many locations, fire exclusion has resulted in ecological changes, such as shifting species composition, increasing vegetative density, and declining ecological health (e.g., Langston 1995, Agee 1997). These changes have

greatly increased the risk of large wildfires. Thus, in addition to suppression activities, contemporary fire management aims to proactively manage forest structure with two main objectives, reduction of fire risk and restoration of forest health (Mutch et al. 1993, Agee 1997).

Second, these policies recognize the wildland fire problem is extensive and solutions will require an unprecedented degree of collaboration with a broad array of stakeholders. Indeed, these policies encourage, and in some cases require, local partnerships to identify and accomplish fuel management objectives. Thus, resource professionals need tools to help them communicate the fire message within communities and encourage others to share the responsibility of fuel management. Agency outreach activities will play an important role in these efforts.

Outreach programs provide opportunities to influence citizen understanding and behavior. Sharpe (1982) identified three primary objectives of such programs, 1) to assist in developing a keener awareness, appreciation, and understanding of a place, 2) to accomplish management goals through encouraging thoughtful use of natural resources and minimizing human impacts to these systems, and 3) to promote public understanding and support of agency objectives. Indeed, recent studies (Brunson and Reiter 1996, Loomis et al. 2001) have found that public judgments can change when people are given information about the scientific basis for an unfamiliar policy or practice, understand the rationale for its implementation, and recognize the potential outcomes. These findings are particularly relevant to fire managers given the complexities and high stakes involved in treating forest fuels.

Yet information alone is rarely sufficient for addressing these problems. Research indicates citizen understanding of resource conditions is influenced by a suite of factors beyond mere technical knowledge. Stankey (1996) observed that because decisions about the environment are formed by various factors in addition to scientific information, it is unlikely that people's judgments will change solely on the basis of technical enlightenment. In outreach programs, people not only respond to the information itself but also to tangential factors (e.g., the credibility of the information provider, the personal context people associate with the treatment area). Thus, the communication process is recognized as particularly important to information transfer and citizen learning (Shindler et al. 2002). Traditional information programs often have consisted of a one-way flow of information from natural resource agencies to the public. In recent years these programs have been expanded to include colorful newsletters, brochures, visitor centers, field trips, public meetings, and so on; however, most continue to be unidirectional communication devices with the goal of "educating" the public about agency programs (Brunson 1992, Shindler and Neburka 1997). Cortner et al. (1998) argued that people do not respond well to traditional information provision formats. Thus, many natural resource agencies have begun to look for more effective, more innovative formats for communicating with their publics.

Much of the previous research on fuel reduction activities has focused on public opinion about the use of prescribed fire, thinning treatments, and associated aesthetic impacts. Two important findings, particularly relevant to outreach programs, emerge from these studies. First, decades of research shows that citizens with higher fire-related knowledge are more supportive of fuel management activities such as prescribed fire and thinning programs (e.g., Stankey 1976, Carpenter et al. 1986, Manfredo et al. 1990); these findings have been verified in recent work conducted by the investigative team (Shindler and Toman 2003). Moreover, overall public understanding and acceptance of fuel treatments is on the rise. Early studies found that citizens generally overestimated the negative impacts of fire; not surprisingly, a majority preferred

complete fire suppression (Stankey 1976). But over the last several years, an increasing number of citizens recognize the role of fire on the landscape (Loomis et al. 2001, Shindler and Brunson 2003).

Second, although only a few evaluations of fire-related communication have been conducted, they demonstrate agency outreach can positively influence citizen understanding and attitudes. A brief summary of these studies is presented in Table 1. The authors have evaluated responses following exposure to various communication activities (brochures, slide shows, workshops, etc.). These activities can be classified as unidirectional or interactive based on the type of outreach experience they provide. Unidirectional methods consist of a one-way flow of information from agency personnel to the public while interactive activities allow for two-way communication. For example, brochures, news releases, and displays at kiosks represent unidirectional approaches, while interpretive programs, guided visits to demonstration sites, neighborhood meetings and agency workshops are typically interactive in nature. Table 1 shows that both unidirectional and interactive methods have successfully increased participant understanding and, in many cases, resulted in more supportive attitudes. In this report, we explore a variety of outreach methods, assess the factors that influence their success, and provide a planning framework to decide which of the outreach options may be most effective in a given situation.

Table 1. Outcomes of outreach activities and methods

	Increased understanding	More supportive attitudes
Brochures		
Taylor and Daniel 1984	X	
Loomis et al. 2001	X	X
Slide presentation		
Nielsen and Buchanan 1986	X	X
Interpreter guided walk		
Nielsen and Buchanan 1986	X	X
Field visit to affected sites		
Self-guided: Toman et al. 2004 ¹		X
Agency-led: Shindler et al. 2005 ¹		X
Interactive, hands-on workshop		
Parkinson et al. 2003	X	X
Communication campaigns		
<i>Unidirectional methods only:</i>		
posters, brochures, news releases (Marynowski and Jacobson 1990)	X	
<i>Unidirectional and Interactive methods:</i>		
newspapers, personal contact, group presentations, neighborhood meetings (McCaffrey 2004) ²	X	X
interpretive centers, brochures, interpreter-guided walk (Toman and Shindler 2005)	X	X

¹ Understanding not measured.

² Educational materials were more effective if delivered via personal contact.

Methods

Research for the current study was conducted in three stages. The first stage of research consisted of a mail survey to residents in four states, Arizona, Colorado, Oregon, and Utah. The surveys probed participant attitudes and understanding of fuel management practices. A portion of the questionnaire included citizen evaluations of eleven agency outreach activities commonly used to provide fire and fuel information. The second stage of research targeted participant evaluations of five specific outreach and communication activities. Three of these involved interpretive programs at Sequoia and King’s Canyon National Parks, a prescribed fire interpretive trail at the High Desert Museum on Oregon’s Deschutes National Forest, and a fire exhibit at the World Forestry Center in Portland, Oregon. The fourth outreach activity involved a series of fire-related ads and articles in the local newspaper in Coeur d’Alene, Idaho. Finally, we assessed the outcomes of an agency guided field trip following the B&B fire in central Oregon. Overall, 1,300 citizens participated in this research.

Report Organization

This research is presented in six chapters. The first four introduce and report analysis from field research described in the methods section above. The fifth chapter provides a concluding summary of research findings, including a set of principles. The sixth chapter offers a conceptual framework for effective communication in wildland fire settings. The basis for this discussion draws on the research literature and findings from our work here. Following this chapter is a series of articles from our research, produced for various publications including academic journals, general technical reports, book chapters, and management summaries. Next, a set of appendices provide frequency reports from each of the surveys conducted at the field sites. Finally, we include a copy of the Practical Guide to Citizen-Agency Partnerships as well the DVD, Communication Strategies for Fire Management.

CHAPTER 1

THE EFFECTIVENESS OF COMMON AGENCY OUTREACH ACTIVITIES

Introduction

The first stage of research uses an exploratory approach to examine citizen evaluations of agency outreach methods commonly used to communicate the wildland fire message. Research was conducted at four locations across the western U.S. Selection of study sites was based on the following criteria suggesting that wildland fire management would be a locally salient issue:

- Wildland fire is a significant ecological disturbance agent in adjacent wildlands.
- Federal land management agencies in the area have proposed to reduce wildland fuel levels using prescribed burning, thinning, brush removal, and/or livestock grazing.
- The agencies have launched public outreach/education programs to raise awareness of wildfire hazard and fuels issues.
- Population growth exceeds national averages in all or part of the locales, with significant growth in the wildland-urban interface.

Numerous communities meet these criteria. Indeed, over 11,000 communities have been designated as communities-at-risk to wildfire (Federal Register 2001b). Thus, site selection was also based on evaluating a range of communication activities, targeted participants, and contextual differences. The research team began site selection by contacting agency personnel expected to be familiar (either because of their position or a known affiliation with a specific outreach activity) with ongoing and planned communication activities. These contacts provided information into the management issues facing fire personnel, descriptions of local outreach activities, and contact points for additional potential locations. Following these initial discussions, the research team traveled to potential study locations. The purpose of these trips was two-fold. Our first objective was to meet the project cooperators, establish a working relationship, and identify interest and level of support for the proposed research activities. Second, these trips also enabled direct observation of the identified outreach activities and preliminary investigation of contextual conditions. Study sites in Arizona (Yavapi county), Colorado (Boulder and Larimer counties), Oregon (Jefferson and Deschutes counties), and Utah (Salt Lake and Tooele counties) were selected following these visits.

Related research

As a primary objective of agency outreach is to increase citizen understanding of ecological conditions or management activities we draw upon concepts from the field of adult learning to provide a framework to interpret participant responses. This literature provides insight into the manner that outreach participants interpret, make sense of, and decide to incorporate or act on new information. Accordingly, findings from this field can help inform how outreach and communication programs can be structured to deliver information more effectively. A particularly useful idea from the adult learning literature is the concept of *andragogy* (Merriam and Caffarella 1999). Andragogy is built around the following six central principles (Knowles et al. 1998).

- 1) *The learner's need to know:* Adult learners want to understand why the new information is important before seeking to learn it; they need to see its relevancy.
- 2) *The learner's self-concept:* Adults value opportunities to participate in the learning process and evaluate information, at least in part, based on the credibility of the information provider.
- 3) *The role of the learner's experience:* Adults come to the learning situation with rich and diverse experiences.
- 4) *Readiness to learn:* Adult learners are more inclined to listen when they perceive the information is applicable to their real-life situation.
- 5) *Orientation to learning:* Adults take a problem-centered approach to learning; to what extent does something need fixing?
- 6) *Motivation:* Adult learners are motivated primarily by internal (improved quality of life or job satisfaction) rather than external incentives (high test scores or awards).

These can be consolidated into three main ideas: adults have a range of prior experiences and knowledge levels that influence their response to outreach activities, they take a problem-based approach to learning, and are more likely to believe information from a trusted source. Accordingly, agency outreach and communication methods are likely to be more effective when they are tailored to their prior knowledge and experiences and local conditions, illustrate the relevance of the new information to participants (identify the problems/concerns the information addresses), and come from a source perceived as credible and trustworthy. We use principles below to explain participant evaluations of agency outreach methods reported in this paper.

Methods

Findings come from responses to a mail survey sent to a random sample of households in the four study locations. Questionnaire design was informed by semi-structured interviews (with agency personnel and local citizens) as well as prior survey work (e.g., Shindler and Toman 2003, Toman et al. 2004). The survey was composed of four sections; two dedicated to general resource management, one to fire and fuel management on public lands (including citizen evaluations of commonly used communication methods), and another to demographic information.

Given our emphasis in this report, we focus our presentation on citizen responses to agency outreach methods. Participants evaluated eleven methods trustworthiness and overall level of helpfulness. Respondents were asked how helpful the various message formats are for understanding management actions such as fire prevention, prescribed burning, and thinning hazardous fuels

Data collection

The survey was conducted between January and March 2001 using a modified version of the "total design method" (Dillman 1978). A complete survey packet (cover letter, questionnaire, and stamped return envelope) was first sent to all respondents, this was followed by a reminder postcard and two complete packets at two week intervals. Of the 1,561 participants contacted, 732 responded for a 47% response rate (see Table 2). To test for non-response bias, 10% of non-respondent households were randomly selected to complete an abridged, telephone version of the survey; no evidence of differences between respondents and non-respondents was found.

Table 2: Study locations and response rates

State	Counties surveyed	Surveys Delivered	Surveys received	Response rate
Arizona	Yavapai	367	173	47%
Colorado	Boulder, Larimer	346	164	47%
Oregon	Jefferson, Deschutes	372	192	52%
Utah	Salt Lake (western suburbs), Tooele	476	203	43%
	Total	1561	732	47%

Findings

Study findings are presented in two sections. The first section contains a description of participant demographic characteristics and the second examines citizen responses to agency outreach activities.

Demographic characteristics

The descriptive characteristics displayed in Table 3 provide a composite picture of survey respondents; significant differences in responses between locations are noted. Respondents averaged between 49 and 60 years old. Most respondents were male, a common finding in natural resource surveys. Despite the rapid population growth in the study locations, respondents have lived in their communities for an average of 15 to 21 years. A majority of participants in each location lived in a small town or rural area; however, a substantial number of Utah participants lived in a suburban location. Respondents were generally well educated with three-fourths having at least some college education. Colorado participants were the most well-educated, over 60% had a college degree or some graduate education. Lastly, at least one-fourth of respondent households had someone who suffered from a respiratory ailment; this number increased to 40% in Utah.

Table 3: Respondent characteristics

	Arizona	Colorado	Oregon	Utah
Mean age* (years)	60	51	54	49
Gender (%)				
Male	67	60	68	67
Female	33	40	32	33
Mean residency in community (years)	15	18	15	21
Community of residence* (%)				
Rural area	28	52	40	16
Small town	59	17	35	39
Suburban	10	22	14	40
Urban	3	9	11	5
Education* (%)				
High school only	22	14	21	25
Some college	45	25	43	39
College graduate	12	25	14	20
At least some graduate school	21	36	22	17
Someone in household suffers from a respiratory ailment* (%)	25	25	30	38

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

Outreach evaluation

Table 4 displays ratings of each communication program across all four study locations. Programs are categorized into unidirectional and interactive formats here for presentation purposes (they were randomly ordered on the questionnaire). Displayed percentages first indicate those individuals who had experience with the specific communication method. Respondents who were familiar with the method then went on to rate the degree to which each was trustworthy (yes or no; yes percentages displayed) and helpful for understanding fire management (not, slightly very; only “very helpful” responses displayed). Scores in Table 4 reflect ratings of participants who had experience with each specific method. Significance tests indicate few differences in trustworthy and helpfulness ratings between study sites.

As might be expected, exposure levels varied among the communication methods; probably reflecting the traditional nature of some and others that are relatively new or require specific opportunities for participation. Of the six unidirectional methods, a majority of respondents had experienced all but one (the Internet). Exposure to interactive approaches was considerably lower; only two (interpretive centers and conversations with agency employees) were familiar to a majority. Overall, Smokey Bear was the most widely recognized method. Exposure rates were remarkably similar across the four study sites. Experience with the individual methods was the same between states except for two methods (significance not reported in the table): Utahans had greater exposure to elementary school programs and less experience with brochures.

Regarding trustworthiness, respondents overall were highly positive in their ratings of agency outreach activities. Cumulative scores across all sites (total column) indicate all but one method (public meetings) were seen as trustworthy by at least 70% of participants, while all but two (internet web pages, conversations with agency personnel) were rated as trustworthy by 90% or more.

Total ratings indicate that unidirectional methods were rated as very helpful by a moderate amount of respondents; scores ranged from 44% to 49% with only Internet web pages rated lower at 29%. Interactive methods were generally rated higher, with interpretive centers, elementary school programs, and guided field trips all registering at 60% or more. However, government public meetings (28%) received the lowest rating of any program.

Table 4: Ratings of communication methods by type and study site

Exposure			Percent rating program as very helpful or trustworthy ¹			
			AZ	CO	OR	UT
Unidirectional						
Smokey Bear	92	Trustworthy	96	92	93	98
		Helpful*	54	33	47	54
TV public service messages	84	Trustworthy	92	87	91	92
		Helpful	50	45	46	47
Brochures	73	Trustworthy	92	96	91	97
		Helpful	52	60	46	40
Special sections in newspapers	61	Trustworthy	91	92	86	89
		Helpful	54	54	45	38
Regular newsletters	51	Trustworthy	89	92	82	95
		Helpful	47	50	43	37
Internet web pages	33	Trustworthy*	68	87	59	66
		Helpful*	41	44	17	16
Interactive						
Interpretive centers	88	Trustworthy	96	95	94	94
		Helpful	67	68	66	74
Conversations with agency employees	51	Trustworthy*	70	90	71	83
		Helpful*	49	63	46	39
Elementary school programs	48	Trustworthy*	90	90	86	99
		Helpful	56	56	58	65
Guided field trips	45	Trustworthy	90	95	92	100
		Helpful	68	67	61	68
Government public meetings	42	Trustworthy	58	63	47	50
		Helpful*	40	35	23	17

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

¹ Only respondents who had experience with the program.

Responses also were tested for differences in participant ratings across study sites. Ratings were similar with a few exceptions. Among unidirectional methods, Smokey Bear was very helpful to 54% of respondents in Arizona and Utah but only 33% of the participants from Colorado. The

Internet also received different ratings; Colorado residents tend to view this format as more trustworthy and Oregonians and Utahans saw it as much less helpful. As for interactive methods, conversations with agency employees were both rated as more trustworthy and helpful among Colorado participants. Almost all Utahans (99%) rated elementary programs as trustworthy. And while helpfulness ratings for public meetings were low overall, this was particularly the case in Oregon and Utah.

Two other findings emerged from the totals category in Table 4. The two most highly rated methods for trustworthiness—interpretive centers and guided field trips—also garnered the top rating for helpfulness. The same is true at the other end of the scale. Two methods—Internet web pages and public meetings—received the lowest scores in each category.

Discussion

This phase of research was an exploratory evaluation of agency communication strategies. Effective message delivery is particularly important for outreach activities that target fire and fuel management, given the high levels of risk and uncertainty the public associates with these practices (Shindler et al. 2002). Several key findings emerge from this study.

First, outreach activities received relatively consistent ratings across the four study sites. Although each site offered all forms of information exchange, the emphasis given by fire managers and educators at each location was different. For example, the agencies in Colorado had recently utilized a campaign involving a Sunday newspaper insert, while guided trips to project sites were more prevalent in Oregon. Despite this variation, few differences surfaced in exposure levels or trustworthiness and helpfulness ratings across study sites.

On balance, it may be that certain program formats appeal to citizens regardless of location. For example, visitor and interpretive centers are part of the American recreation experience—they are prominent, easily accessible, and place few demands on the visitor. As for TV public service announcements and informational brochures, they are largely inescapable in today's society. Ultimately while a greater proportion of participants were familiar with unidirectional methods, interactive approaches appeared to be more helpful. As suggested by principles of adult learning, outreach methods are likely to be more effective when they account for, and incorporate the prior knowledge and experiences of participants. Unidirectional and interactive programs differ in their ability to do so. The one-way flow of information in unidirectional, expert-based programs may sometimes intersect and reinforce the knowledge held by certain individuals, but more often this format precludes the inclusion of most citizens' experiences. The larger participatory role offered by interactive programs allows individuals to self select from their prior experiences and incorporate relevant information for solving specific problems. For example, they might observe proposed activities on-the-ground at visitor centers or on field trips to demonstration sites and then extrapolate the outcomes onto familiar areas.

Findings elsewhere suggest that interactive methods can be more effective at encouraging attitude or behavior change (Rogers 2003, Erwin 2001). In a review of multiple fire-related outreach methods, McCaffrey (2004) found that interaction contributed substantially to communication success. Indeed, educational materials, including unidirectional items, were more effective if delivered via personal contact. Principles of adult learning suggest information that addresses citizen concerns is more likely to be perceived as helpful. Citizens seek specific information, particularly how proposed management activities will affect them or places they

care about (Wondolleck and Yaffee 2000, Shindler et al. 2002). Thus, communication activities that target local conditions and public concerns about the rationale behind specific practices, potential outcomes, and implementation scenarios are more likely to resonate with participants. Although this can be accomplished in varying degrees with many forms of outreach, programs that allow for interactive exchanges, such as guided field trips to project sites and conversations with agency personnel, are better suited to problem-centered learning. One limitation of many unidirectional methods (e.g., brochures, newspaper sections, television messages, or newsletters) is that they rely on fixed messages, whereas interactive formats include citizens in the discussion and can adapt to the concerns and interests of the parties involved.

Substantial research has indicated the importance of trustworthy citizen-agency relationships to successful management (e.g., Hoover et al. 1997, Jacobson and Marynowski 1997). Among the various communication strategies agencies could employ, trust is more likely to develop in the context of personal relationships than in anonymous information provision (Jamieson 1994). Ultimately, the give and take of interactive exchanges seem much more likely to develop such personal relationships than programs that rely on a one-way flow of information.

Noteworthy among findings is the lack of trustworthiness citizens attribute to Internet web pages and public meetings. While the Internet may be useful to citizens for conducting personal business (e.g., reserving campsites or assessing an area's amenities) or for providing information about specific events (e.g., fire activity updates), findings here may suggest it has limitations as a source of detailed information about the high risk problems or politicized issues often involved in natural resource management, including fire and fuel management. This topic deserves future exploration as agency websites become more sophisticated.

Lastly, public meetings were the most poorly rated of all outreach methods. Much has been written elsewhere about the. The most often cited shortcomings of traditional public meetings revolve around the quality of the interaction that occurs in these settings (Blahna and Yonts-Shepard 1989, Lawrence et al. 1997, Yaffee and Wondolleck 1997). Specifically, public participants have characterized these meetings as consisting largely of a one-way flow of information where they were simply "talked at." Many believe that the public's role in these settings is to comment on decisions previously made by agency personnel (Shindler and Neburka 1997, Cortner et al. 1998). In other words, public meetings are only nominally interactive and until these problems are addressed on a broad scale may actually fit better with the unidirectional methods in this evaluation. In light of the principles of learning theory presented here, such meetings are likely to frustrate individuals seeking to discuss and contribute to the development of management activities. Such meetings can also further erode trust, as participants will not view agency efforts to engage citizens as genuine.

A guiding principle for improving the effectiveness of public meetings is ensuring that they are genuinely *interactive*. A review of prior research suggests this can be accomplished by ensuring meetings are open and representative of all stakeholders, initiating them early in the planning process to give participants the opportunity to contribute meaningfully to plan development, clearly defining the role of participants at the outset, and showing participants how their comments, ideas, and concerns are reflected in management plans (Blahna and Yonts-Shepard 1989; Shindler et al. 1999; Walesh 1999).

Conclusion

Findings presented here suggest that interactive methods are more likely to effectively target real-world problems and incorporate participant experiences. One implication is that specific outreach activities (e.g., conversations with agency personnel, guided field trips, interpretive activities) may prove effective in multiple locations. However, we need to be very clear on this point: Results do not argue for the adoption of one-size-fits-all communication programs. Rather, they suggest that certain approaches are likely to be effective in multiple locations and give substantial credence to the benefits of several interactive methods. The specific program implementation and content will depend on local conditions and needs and the ability of resource professionals to incorporate them into communication strategies. An interactive approach provides greater flexibility to address participant questions and concerns and tailor activities to the local context. For example, demonstration sites can be used across locations to highlight treatment activities across locations (e.g., thinning versus prescribed fire, combination treatments, or different thinning intensity levels). Highlighted management activities can be developed based on expressed concerns at the local level.

While it may be more efficient to use standardized, agency-wide communication devices, such approaches are unlikely to be as effective as messages that target local priorities and specific environmental context (Brunson and Shindler 2004). Ultimately, programs that are able to establish a high degree of relevancy through both thoughtful processes that engage stakeholders and credible content will be more successful at increasing citizen understanding and acceptance (Bright and Manfredi 1997). Such situations involving open discussion and deliberation are consistent with principles of adult learning and can be helpful in eliminating some of the uncertainty—or even serve to deflate some of the contentiousness—surrounding the use of fuel reduction treatments.

CHAPTER 2

EVALUATION OF OUTREACH PARTICIPATION: OUTCOMES AND CONTRIBUTORY FACTORS

Introduction

Research presented here builds upon findings from stage 1 and is an assessment of outreach activities at Sequoia and King's Canyon National Parks (SEKI) in California, the High Desert Museum (HDM) in Bend, Oregon, and the World Forestry Center (WFC) in Portland, Oregon. Data was collected in two phases. First, visitors were contacted and completed a brief questionnaire on-site before exposure to communication activities. In the second phase, participants received a more extensive follow-up questionnaire in the mail. Data collection was completed between July and October 2003.

In recent years, resource agencies have experimented with a variety of methods to communicate the rationale behind fuel reduction techniques; approaches have ranged from traditional text and graphic displays (brochures and exhibits) to more recently emerging demonstration areas and interpretive activities. Federal agencies have many outreach options, but limited resources dedicated to providing information to their publics. Accordingly, agency professionals have to make difficult, but informed, choices about the most effective use of their resources in communicating with citizens. The purpose of this study is to improve understanding of the communication process to help focus the development of effective outreach activities. Specifically, we were interested in how participation in these outreach activities influenced 1) participant awareness and understanding, 2) attitudes and support for fuel management practices, and 3) citizen confidence in resource agencies responsible for fire management.

Site selection was primarily driven by outreach activities; sites were selected to enable a comparative evaluation between a range of outreach methods currently employed by resource agencies. The method of site selection was similar to that presented above for stage 1. Locations are described below:

- ***Sequoia and Kings Canyon National Parks:*** SEKI is comprised of adjacent national parks located in the Sierra Nevada Mountains in central California. Fire plays a crucial role in the sequoia regeneration. Accordingly, the parks have an active fuel management program that emphasizes management-ignited prescribed fires and managing naturally ignited fires to achieve resource objectives. Thinning, though less prevalent, is also used near structures to reduce fuel levels. A broad range of outreach activities are represented at SEKI, including visitor centers, interpreter and self-guided walks, and evening "naturalist talks" at the primary park campgrounds. Each of the five visitor centers within the parks contains various interpretive activities including brochures, film strips, and static displays. One interpretive center, the Giant Forest Museum, was recently renovated and offers additional interactive opportunities, many of which emphasize the role of fire in the Sequoia lifecycle. At SEKI, fire makes up one component of a suite of interpretive information on natural processes and management activities; interpretive messages presented the rationale for management use of fire, natural and prescribed, to maintain the health of sequoia ecosystems.

- ***High Desert Museum Interpretative Center Trail:*** A cooperative project, , located just south of Bend, Oregon, funded by the National Fire Plan between the Deschutes National Forest, Prineville District of the Bureau of Land Management, Bureau of Indian Affairs, Oregon Department of Forestry, and The Nature Conservancy. Prescribed burns were conducted and an interpretive trail constructed on museum grounds. The trail was self-guided and included interpretive signs highlighting: natural forest conditions, post-fire revegetation, ladder fuels, slash piles, and an historic fire line. This community is central Oregon's largest city and serves thousands of recreation visitors each year. Most of the landscape is in a ponderosa pine or juniper dominated forest type. Bend and outlying communities have experienced rapid population growth over the last ten years with much of the expansion taking place in the wildland-urban interface.
- ***The World Forestry Center:*** Located in Portland, Oregon, from May through December 2003 the WFC presented "Fire: Forces of Nature" a cooperative project between the USDA Forest Service and Oregon Department of Forestry. The exhibit primarily consisted of static displays with graphics and text in a walk-through format. There were also displays of fire suppression equipment and video presentations on home protection and Smokey Bear as well as an abridged version of the Nova film "Fire Wars" in the center's theater. The exhibit emphasizes the management of fuels to reduce fire risk, emphasizing the use of thinning and prescribed fire. This was the only of the study sites to be located in an urban area and not within a forested, or natural, landscape. Overall, the exhibit represented a series of traditional formats that resource agency personnel could use to provide interpretive information at visitor kiosks, information centers, or state and county fairs. Although these formats are still largely unidirectional, recent technological advances have substantially increased the ability of outreach personnel to create high quality, visually appealing displays.

Methods

Questionnaire design was informed by semi-structured interviews with agency personnel and project partners as well as findings from the first stage of research. Two questionnaires were developed, one for the on-site survey and another for the follow-up phase. The on-site survey contained questions regarding awareness of fuel reduction practices, attitudes toward and understanding of fuel activities, and confidence in resource agencies to effectively implement fuel management techniques. These questions were replicated in the follow-up survey with additional items targeting participant evaluations of outreach activities.

A member of the research team contacted potential respondents on-site, provided a brief overview of the research project, and solicited their participation. Follow-up mailings were conducted following a modified version of the "total design method" (Dillman 1978). Surveys were sent in three waves beginning approximately two weeks following on-site contact. The delayed test was conducted to assess the enduring effects of the outreach activity and help control for biased findings as a result of experimenter expectancy effects (Leeming et al. 1993).

Sample sizes and response rates are presented in Table 5. Overall, 654 completed the on-site questionnaire while 459 returned the follow-up surveys for a 70% response rate. The difference in sample sizes was expected as a result of the variation in visitation levels between locations; a substantially greater number of people visit SEKI than the HDM or WFC each year.

Table 5: Sample sizes and response rates

	On-site sample size*	Post-surveys received	Post-survey response rate
Sequoia and King's Canyon National Parks (SEKI)	395	269	68%
High Desert Museum (HDM)	167	122	73%
World Forestry Center (WFC)	92	68	74%
Total	654	459	70%

* Represents number who completed the on-site questionnaire and provided valid mailing addresses

Findings

Demographic characteristics

Descriptive statistics are presented in Table 6. Responses were tested for variation among locations and no significant differences were found. Slightly more men than women participated in the survey. Participants came from a variety of community types; while rural areas and small town were represented, overall, a greater number came from urban or suburban areas. Lastly, participants in each location were well educated. In each case greater than 60% had graduated from college with fully one-third or more having at least some experience with graduate school.

Table 6: Respondent characteristics

	SEKI	HDM	WFC
Mean age (years)	49	50	44
Gender (%)			
Male	57	53	50
Female	43	47	50
Type of community (%)			
Rural area	15	18	14
Small town	20	19	18
Suburban	38	35	36
Urban	27	28	32
Education (%)			
High school only	9	6	3
Some college	27	22	24
College graduate	25	36	38
At least some graduate school	39	37	35

Awareness of fuel treatments

In the on-site questionnaire, participants were asked to indicate whether they had heard or read about prescribed fire or mechanized thinning. In each location, a large majority of respondents at least had this level of awareness with each treatment. In general, SEKI respondents were less likely to be familiar with both prescribed fire and mechanized thinning.

Table 7: Awareness of fuel treatments

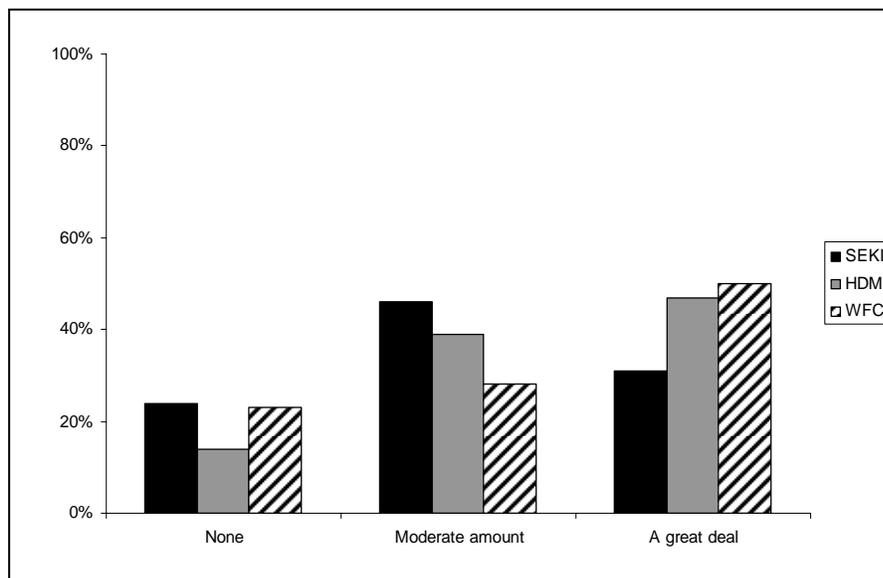
Have you read or heard about...		Percent of respondents		
		HDM	SEKI	WFC
...the use of prescribed fire or controlled burning *	Yes	100	87	99
	No	0	12	2
	Not sure	0	1	0
...forest thinning to reduce the threat of fire*	Yes	98	85	96
	No	2	14	3
	Not sure	0	1	2

*Differences between locations are significant at $p < .05$

Prior thought about wildfires

Participants indicated how much prior thought they had given to wildfires; responses were given on a 5-point scale from “none” to “a great deal” (Figure 1). While a majority of respondents had thought at least a moderate amount about wildfire at each location, participants at SEKI were less likely to have given it consideration.

Figure 1: Amount of prior thought given to wildfires.*

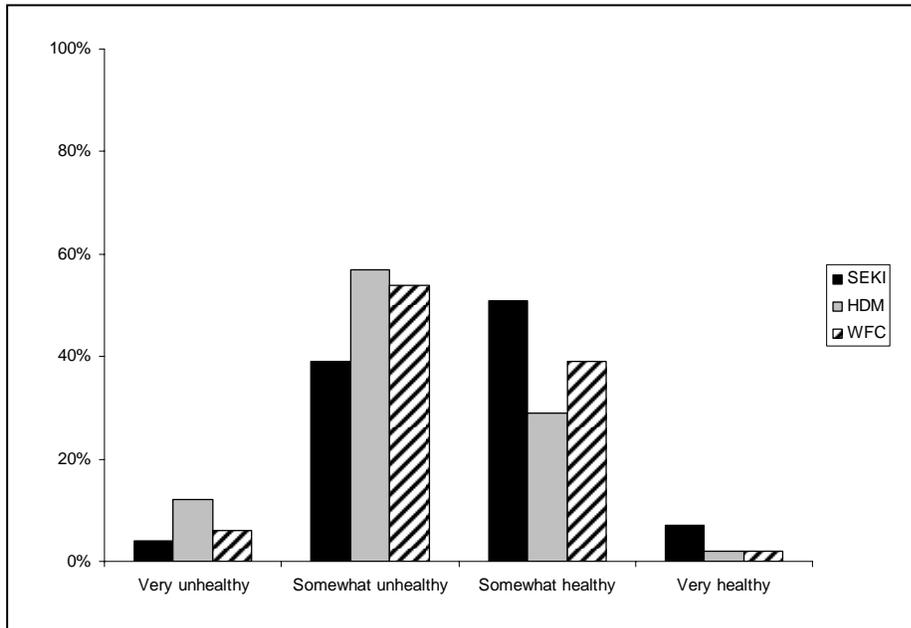


*Differences between locations are significant at $p < .05$

Forest health conditions

One of the stated goals for the use of prescribed fire and thinning practices is the restoration of forest health conditions. Respondents were asked to rate the current condition of forests in the western U.S. using a 4-point scale (Figure 2). A majority of respondents at the HDM and WFC indicated forests were somewhat or very unhealthy, while a majority of SEKI respondents viewed forests as somewhat or very healthy.

Figure 2: Condition of forests in western U.S.??*



*Differences between locations are significant at $p < .05$

Knowledge about fire management

By replicating questions across the study period, we were able to evaluate changes in citizen responses due to exposure to outreach information and activities. In the on-site and follow-up questionnaires, participants responded to a 5-item true/false quiz regarding fire and fuel management issues. Quiz statements and responses are shown in Table 8; significant differences in responses across the study period are noted.

Overall, respondents were generally knowledgeable; two-thirds or more answered each question correctly. Only SEKI responses regarding the effectiveness of prescribed fires in reducing fuel loads changed significantly between the on-site and follow-up questionnaires (from 70% to 90%). While not registering a significant increase across the study period, participant responses to most other questions either stayed consistent or showed improvement. Indeed, our inability to detect significance may have more to do with the generally high performance to the on-site questions. Specifically, responses show participants were relatively knowledgeable prior to their participation in outreach activities; thus, making it difficult to identify change.

Participants here performed better on three of the five questions than those in prior studies. More recognized the impact of wildfires on wildlife than in previous surveys (Cortner et al. 1984, McCool and Stankey 1986, Loomis et al 2001). A higher percentage also indicated that prescribed fire reduces the risk of high-intensity fire (Cortner et al. 1984). Finally, there was a greater recognition that long-term fire suppression has resulted in increased fire risk (Stankey 1976, McCool and Stankey 1986). These findings may suggest a general increase in citizen awareness and understanding regarding fire management. It is likely that the long-term commitment to public outreach among management agencies, coupled with media coverage of fire events over the last several years has contributed to this growing awareness.

Table 8: Differences in on-site and follow-up responses to knowledge questions

		Percent of respondents		
		Generally true	Generally false	Not sure
Wildfires have played a significant role in shaping natural forests in the western United States				
SEKI	On-site	<i>87¹</i>	3	10
	Follow-up	93	2	6
HDM	On-site	96	0	4
	Follow-up	95	1	4
WFC	On-site	99	2	0
	Follow-up	97	2	2
Wildfires usually result in the death of the majority of animals in the area				
SEKI	On-site	12	<i>66</i>	22
	Follow-up	9	<i>71</i>	20
HDM	On-site	4	<i>74</i>	22
	Follow-up	3	<i>79</i>	18
WFC	On-site	3	<i>79</i>	18
	Follow-up	7	<i>79</i>	13
Prescribed fire or controlled burns effectively reduce amounts of fuel in most forests				
SEKI*	On-site	<i>70</i>	9	21
	Follow-up	<i>90</i>	2	8
HDM	On-site	<i>74</i>	7	19
	Follow-up	<i>90</i>	3	7
WFC	On-site	<i>77</i>	4	19
	Follow-up	<i>78</i>	6	16
Prescribed fires or controlled burns reduce the chance of high-intensity wildfire				
SEKI	On-site	<i>89</i>	3	9
	Follow-up	<i>91</i>	3	6
HDM	On-site	<i>88</i>	3	9
	Follow-up	<i>94</i>	2	4
WFC	On-site	<i>91</i>	6	3
	Follow-up	<i>90</i>	3	7
A history of suppressing wildfires has increased the risk of a destructive fire in the western United States				
SEKI	On-site	<i>68</i>	10	23
	Follow-up	<i>75</i>	8	18
HDM	On-site	<i>82</i>	7	11
	Follow-up	<i>87</i>	3	10
WFC	On-site	<i>69</i>	12	19
	Follow-up	<i>84</i>	4	12

¹The most correct responses are indicated by italics.

*On-site and follow-up responses significantly different at p<.05

Lastly, responses demonstrated a relatively high level of uncertainty on the impact of wildfires on animals, the effectiveness of prescribed fires in reducing fuel loads, and the impact of long-term fire suppression on current fire risks. These findings suggest areas where misperceptions still exist about some core objectives or influencing variables on the use of fuel treatments. This information can be used by managers to help focus the discussion on important ecological concepts where gaps in public understanding exist.

Attitudes toward fire management

Participants also responded to a series of five statements regarding their attitudes toward important fire management issues (Table 9). The first four items were developed based on prior research (Stankey 1976, Loomis et al. 2001, Shindler and Toman 2003). The final item about thinning was included because previous studies suggest citizens may be concerned that thinning for fuel reduction is simply an attempt to increase timber harvests on public lands (Shindler et al. 2002, Shindler and Toman 2003).

Overall, on-site responses were positive toward fire management, indicating a generally high initial level of support for treatments. As with knowledge scores, participants' positive initial attitudes made it less likely that outreach activities would encourage change on these items. However, SEKI responses to two items changed significantly across the study period. The number who agreed that all fires should be extinguished dropped from 16% to 3% after visiting the park. Additionally, the number disagreeing that prescribed fires were too dangerous to be used rose from 83% to 93%.

Responses to three items were more positive than identified in previous studies. A substantially greater number felt the immediate suppression of all fires may not be appropriate (Stankey 1976, Cortner et al. 1984, Loomis et al. 2001, Shindler and Toman 2001). Responses also indicated greater support of periodic manager underburning than in other studies prior to information exposure (Cortner et al. 1984, Loomis et al. 2001). While substantially fewer thought prescribed burns should be limited because of potential problems from smoke than in previous research (Loomis et al. 2001, Shindler and Toman 2001), an important finding given that smoke is often an obstacle to treatment implementation.

Despite these positive findings, responses did indicate considerable uncertainty (don't know responses) regarding thinning activities even following exposure to outreach activities. This may suggest the need for greater discussion of such treatments before moving ahead with treatments.

Table 9: Differences in on-site and follow-up responses to attitude questions

		Percent of respondents		
		Agree	Disagree	Don't know
All fires, regardless of origin, should be put out as soon as possible.				
SEKI*	On-site	16	78	6
	Follow-up	3	93	4
HDM	On-site	6	88	7
	Follow-up	3	85	13
WFC	On-site	9	85	6
	Follow-up	6	90	4
Managers should periodically burn underbrush and forest debris.				
SEKI	On-site	84	3	13
	Follow-up	86	2	13
HDM	On-site	82	5	13
	Follow-up	83	6	12
WFC	On-site	82	6	12
	Follow-up	82	8	10
Prescribed fires or controlled burns are too dangerous to be used.				
SEKI*	On-site	5	83	12
	Follow-up	2	93	5
HDM	On-site	1	89	10
	Follow-up	2	92	7
WFC	On-site	6	88	6
	Follow-up	6	85	9
Prescribed fire or controlled burns should not be used because of potential health problems from smoke.				
SEKI	On-site	6	81	14
	Follow-up	3	86	12
HDM	On-site	5	87	8
	Follow-up	7	84	9
WFC	On-site	4	82	13
	Follow-up	5	82	13
Thinning for fuel reduction will lead to unnecessary harvesting.				
SEKI	On-site	15	51	34
	Follow-up	18	55	27
HDM	On-site	12	68	21
	Follow-up	15	68	18
WFC	On-site	19	57	24
	Follow-up	21	59	21

*On-site and follow-up responses significantly different at $p < .05$

Citizen confidence in fuel managers

Participants were asked to indicate their confidence in managers to implement a responsible and effective fuel treatment program. Responses are based on a 4-point scale (full, moderate, limited, none plus a no opinion category), but are collapsed in Table 10 for presentation purposes. Overall, participants had a high level of confidence in agency personnel; 70% or more indicated moderate or full confidence for both treatments. Interestingly, SEKI respondents

expressed significantly less confidence in the follow-up than they when first questioned. While not significant, WFC responses appeared to be trending in the same direction.

Table 10: Confidence in fuel managers

			Percent of respondents		
			Full/ Moderate	None/ Limited	No opinion
Prescribed fire	SEKI	On-site	92	7	2
		Follow-up	90	8	3
	HDM	On-site	84	13	4
		Follow-up	78	18	4
	WFC	On-site	80	21	0
		Follow-up	70	29	0
Thinning	SEKI*	On-site	81	13	7
		Follow-up	77	19	5
	HDM	On-site	73	21	7
		Follow-up	72	23	6
	WFC	On-site	75	20	4
		Follow-up	70	25	4

*On-site and follow-up responses significantly different at $p < .05$

Evaluations of outreach activities

Agency outreach methods-compare to findings in Chapter 1

Participants rated thirteen outreach methods commonly used to communicate regarding fire and fuel management issues. For presentation purposes, the outreach programs have been divided into interactive and unidirectional formats (in Table 11). The percentages are presented in aggregate across all three study areas; significant differences in helpfulness ratings between locations are noted in the table. The first column represents the percentage of respondents who were unfamiliar with the particular information program and, consequently, had no basis for opinion to answer the questions in subsequent columns. Thus, the columns to the right present responses from those familiar with each program and were able to rate them. The middle two columns show the percentages who agreed the program is **easy to understand** and is a **trustworthy** source of information. The final three indicate respondent ratings of the program's overall **degree of helpfulness** (very, slightly, not).

Respondents indicating they had “no basis for opinion” ranged from a low of 13% (visitor centers and Smokey Bear’s message) to a high of 61% who had no experience with agency public meetings. Differences in familiarity between programs were expected given the different lengths of time the programs have existed and the potential for citizens to access them. For example, Smokey Bear has been around for over 50 years, while internet web pages came into existence within the past decade and may be more difficult for some people to access. Overall, there are no recognizable trends in the level of familiarity (no basis for opinion responses) between interactive and unidirectional programs.

All programs, both interactive and one-way messages, were rated as **easy to understand** by a majority of the respondents familiar with them. Indeed, all but one method, agency public meetings, received scores over 90%.

While most programs were also rated as **trustworthy** by a majority of respondents, it is likely that scores in this column carry a different value than ratings of other categories. Central to the success of forest agencies is establishing trust in the information, the information provider, and the formats used to convey it. Thus, a simple majority rating of its programs may not represent a strong vote of confidence overall. Overall, interpretative centers (including video messages), guided field trips, and brochures were the most highly regarded. Agency public meetings again received the lowest ratings, rated as trustworthy by approximately half of the participants, suggesting that a substantial number of people do not place a good deal of faith in the information they receive in these settings. After public meetings, web pages and newspaper inserts were the least trustworthy. As a group, interactive programs seem to be more trustworthy than unidirectional ones; all but public meetings received positive ratings by at least 88% of the respondents.

The next three columns report the helpfulness rating for each method. The five most highly rated programs were all interactive—guided field trips, interpretative centers, conversations with agency personnel, video messages at interpretive centers, and elementary school programs—indicating greater dividends may be achieved from this form of outreach. Of the interactive programs only Forest Service public meetings failed to resonate with a majority of the respondents. Indeed, a greater percentage indicated meetings were not helpful (40%) than very helpful (23%). Of the unidirectional programs, only one—informational brochures—was judged helpful by a majority of respondents. Web pages, newsletters, newspaper inserts, and Smokey Bear were moderately helpful to (41-45%) to participants.

Four programs received significantly different helpfulness scores across locations. First, while 84% of SEKI respondents rated guided field trips as very helpful, somewhat lower percentages of HDM (71%) and WFC (74%) participants gave them similar ratings. This may reflect participants' experience at a national park, where interpreter guided walks are commonly offered and are an integral component of the overall interpretation program. Three other programs—brochures, newsletters, newspaper inserts, and Smokey Bear—also received higher ratings from SEKI participants, than those at the HDM or WFC.

Table 11: Assessment of communication and outreach methods

Information Program	Percent of respondents					
	No Opinion	Easy to Understand ^a	Trustworthy ^a	Helpfulness ^a		
				Very	Slightly	Not
Interactive Methods						
a. Guided field trip to forests*	49	99	98	78	19	4
b. Visitor centers and interpretative information	13	98	99	67	30	3
c. Conversations with agency personnel	43	91	88	64	28	8
d. Video messages at interpretive centers	29	98	98	60	33	8
e. Elementary school educational programs	58	98	91	59	26	15
f. Educational workshop	60	92	96	57	30	13
g. Agency public meetings	61	51	49	23	37	40
Unidirectional Methods						
h. Informational brochures*	23	97	97	57	39	4
i. Internet web pages	57	91	71	45	41	14
j. Regular newsletters*	52	90	86	42	45	12
k. Newspaper inserts*	54	89	72	42	44	15
l. Smokey Bear message*	13	99	93	41	46	13
m. Television messages	28	97	81	39	49	13

^a Percentages reflect responses from individuals who had an opinion about the specific program.

*Helpfulness responses significantly different across locations at $p < .05$

Scores reported for *easy to understand*, *convenience*, and *trustworthy* are “yes” responses from a yes/no scale.

Outcomes of outreach activities

Respondents were asked a series of questions to assess how their participation in outreach activities influenced their understanding and attitudes toward fuel treatments. Responses are presented in Table 12. It is important to note these questions did not measure absolute knowledge or attitudes but the *change* that occurred as a result of exposure to outreach information and methods. Responses indicate outreach activities were particularly effective. Indeed, 40% to 73% of participants indicated increased understanding and support following outreach participation. In addition, at least one-third of respondents in each location had greater confidence in agency managers to implement fuel programs. These findings are even more striking when viewed in light of the results presented above (Tables 8, 9, and 10) illustrating the high initial understanding and supportive attitudes toward treatments. Ultimately, the outreach

activities had a positive influence even though participants were already generally knowledgeable about and supportive of fuel treatments.

As indicated in Table 12, there were a number of differences between locations. Responses to the first three statements followed a similar pattern; fewer SEKI participants indicated increased understanding than at the other locations. Lastly, the number of respondents indicating greater support for fuel treatments varied from 56% of HDM respondents to 40% at SEKI.

Table 12: Influence of outreach activities

	Percent of respondents		
	Yes	No	Unchanged
As a result of your participation in the outreach activities, do you feel...			
...more knowledgeable about the risk of wildfire?*			
SEKI	44	6	50
HDM	59	3	39
WFC	70	5	26
...more knowledgeable about the role of fire in forest and range ecosystems?*			
SEKI	51	3	46
HDM	60	2	39
WFC	73	3	34
...more knowledgeable about fuel reduction treatments (prescribed fire or thinning)?*			
SEKI	40	10	51
HDM	68	3	29
WFC	68	9	23
...more supportive of agency fuel reduction programs?*			
SEKI	40	8	53
HDM	56	6	38
WFC	46	12	42
...more confident in the ability of managers in agencies like the Forest Service or BLM to implement responsible and effective fuel reduction treatments?			
SEKI	39	8	53
HDM	37	12	51
WFC	32	18	50

*Responses significantly different across locations at $p < .05$

In another question, participants were asked if the outreach activities influenced the acceptability of treatments (Table 13). One-third of SEKI participants and a higher number of HDM (45%) and WFC (42%) indicated prescribed fire was more acceptable as a result of their experience. While thinning was more acceptable to a similar number of HDM and WFC participants, fewer SEKI respondents (29%) indicated increased acceptability. This may reflect the relatively minor role that thinning plays in SEKI outreach activities.

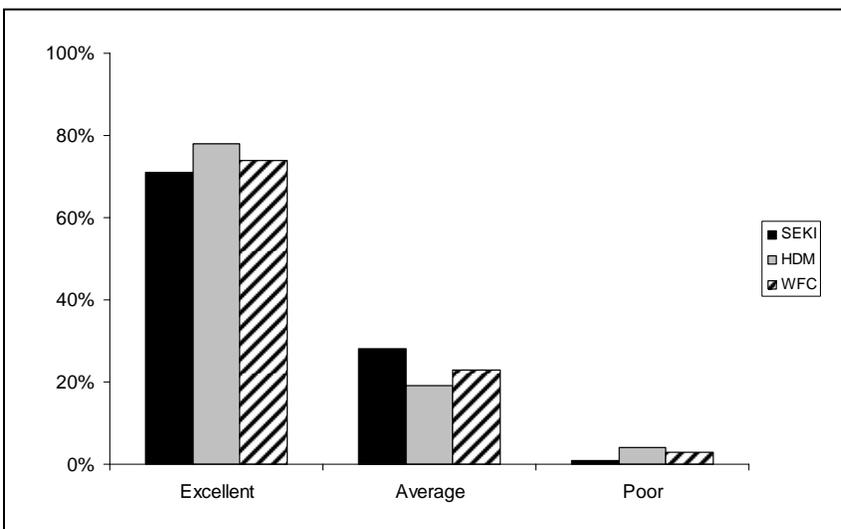
Table 13: Outreach influence on treatment acceptability

		Percent of respondents		
		More acceptable	Less acceptable	Unchanged
Did your experience influence treatment acceptability?				
Prescribed fire				
	SEKI	34	2	64
	HDM	45	2	53
	WFC	42	2	57
Thinning*				
	SEKI	29	3	68
	HDM	45	2	54
	WFC	42	2	57

*Responses significantly different across locations at $p < .05$

Finally, participants were asked to assess the overall quality of the outreach activities at each location. At the HDM and WFC, respondents rated the effectiveness of the interpretive fire trail and complete exhibit respectively, while SEKI participants assessed the Giant Forest Museum (recently renovated prior to the study). Each activity received high scores; in each case a strong majority rated the programs as excellent while very few (4% or less) gave them poor marks.

Figure 3: Ratings of outreach activity.



SEKI ratings reflect assessment of the Giant Forest Museum

Discussion

Data presented here provide information about participant understanding and attitudes toward fuel management activities as well as subsequent changes following exposure to outreach activities. Key findings are summarized below:

Awareness and understanding of fuel treatments

The research design incorporated a survey protocol to collect data from the same individuals before and after participation in an outreach activity. Overall, findings suggest a relatively high awareness of fuel treatments and forest conditions prior to participation in the outreach activities.

- Most participants had given a moderate or great deal of thought to wildfires prior to the survey suggesting fire management is a salient issue. Similarly, nearly all the participants had heard of prescribed fire and forest thinning to reduce the risk of fires. These are both good signs as people are more likely to pay attention to information and support actions related to issues that resonate with them (Bright and Manfredro 1997). Participants were also aware of the condition of forests. In each location a large number, including majorities at the HDM and WFC, believed western forests are somewhat unhealthy. This suggests participants understand a key rationale behind agency use of fuel treatments—restoration of healthy forest conditions.
- On-site scores on knowledge questions about prescribed fire and mechanical thinning indicate a high initial level of understanding among project participants. Indeed, participants performed better on many questions than had been reported in other studies. While the research approach targeted individuals who generally may be more experienced with natural resource issues than the public at large (e.g., they chose to spend their leisure time at a natural resource site), the increase in scores over prior studies were substantial, even when compared with research that targeted wilderness visitors (Stankey 1976, McCool and Stankey 1986). Responses here show a greater appreciation for the role of fire, as well as an increasing recognition of the consequences of fire suppression and the beneficial outcomes of the use of prescribed fire.

Likely contributors include recent agency emphasis on programs promoting fire and fuel management as well as media coverage that has increased in both volume and depth. In particular, while media reports still highlight dramatic fire events, there has been increased attention paid to the factors contributing to fire activity (e.g., long-term fire suppression resulting in increased fuel loads) as well as potential responses by management agencies. Results here suggest this increased exposure has resulted in higher initial awareness of fire and a basic acceptance of some fire management practices among the general public. The management opportunity is that outreach messages could become more sophisticated to encourage citizens to take greater responsibility for fuel reduction activities around their homes.

- Despite this high performance, responses suggested some degree of uncertainty regarding the impacts of fires on wildlife and, to a lesser degree, the role of fire suppression in increasing current fire risks. Managers can use this type of information to help focus the discussion on important ecological concepts where gaps in public understanding exist. Citizen support for these practices often rests on their understanding of the rationale behind agency actions and the likelihood that desired outcomes will occur.
- Overall, findings indicate participants are aware of, interested in, and feel they know something about forest conditions. Such individuals are likely to seek opportunities to contribute to decisions regarding management alternatives. Thus, good leadership is required to structure conversations so that communities and management agencies can work toward a

common understanding of environmental complexities—one that includes the causes of forest conditions, the effects of management alternatives, and methods for reaching agreement on forest plans. On the other hand, this also suggests fire management may receive increased scrutiny from community members who are interested and attentive to what fire managers may be doing. Resource professionals should be aware of this and provide opportunities for meaningful discussions with these individuals regarding fire management objectives.

Attitudes and confidence in agency personnel

Overall support was strong for both prescribed fire and mechanized thinning. Even prior to participating in outreach activities, large majorities expressed positive attitudes toward treatments. Participants also expressed high levels of confidence in the ability of agency professionals to implement fuel treatment programs.

- Responses to three items were more positive than identified in previous studies. Participants were initially more supportive of manager-ignited underburns. Moreover, strong majorities disagreed all fires should be immediately suppressed or that the use of prescribed fires should be limited because of smoke. This last finding is particularly important given that in many locations, the most vocal opposition to the use of fire has been over increased smoke levels. However, this does not signify that agencies have carte blanche to implement treatments. The sensitive nature of these risks suggest that any increases in perceived threats—for example, a particularly damaging escape of a local prescribed fire or the presence of smoke for lengthy periods—will result in substantially decreased support for the use of fire. Ultimately, it does not take many people who are either uncomfortable with smoke levels or who suffer from respiratory ailments to marshal a vocal response. Community discussions about the tradeoffs of (low level) smoke from prescribed fire versus more substantial levels from large-scale wildfire may be useful. In any case, we are just beginning to learn about the public’s tolerance for smoke and further investigation into this problem is necessary.
- On balance, people expressed more reservations about thinning treatments; while supportive of their use, there was some uncertainty about whether thinning for fuel reduction would lead to unnecessary harvesting. While previous research has found substantial support for thinning in some forest communities (Shindler and Toman 2003, Brunson and Shindler 2004), citizens have also expressed reservations with thinning treatments as a new means to conduct “business as usual” and increase timber harvests on public lands (Brunson 1993, Shindler et al. 2002). Findings here suggest greater discussion within communities will likely be necessary before proceeding with large-scale thinning projects. Outreach activities can play an important role here, particularly interactive programs, as research has shown that personal contact can reduce the controversy surrounding thinning decisions (McCaffrey 2004).
- Even with several of the caveats mentioned here, support for the use of fire and thinning practices remains high. In each case, at least 70% of participants indicated acceptance of some use of each treatment.

Information sources and the effectiveness of delivery systems

Given the association between knowledge of fire management practices and public support for management programs (e.g., Stankey 1976, Carpenter et al. 1986, Loomis et al. 2001), it is

important to understand which outreach activities best connect with citizens. The public has turned largely to agency professionals for information about fuel conditions and fire management in the past (Shelby and Speaker 1990). To remain a primary source of information, agencies have to not only provide current and credible information, but use effective methods of communication.

- For each method of delivery listed in Table 11 there is a substantial number of citizens who simply are unfamiliar with, and thus have no basis for opinion about, these messages from resource agencies. Different reasons apply depending on the method used, but these data provide a starting point as agencies decide how and where to invest scarce resources for communicating with the public. For example, some of the same skills (if not funding levels) are required to produce interpretive information, video messages, and internet web sites; however, public awareness of each form is uneven and helpfulness ratings among people who are familiar with them are dramatically different. On the other hand, nearly half of the individuals surveyed had no opinion about guided field trips but this format had the highest ratings among individuals who knew about them. Usefulness can only begin to be measured when someone is exposed to a message; essential criteria include how easy the message is to understand and how trustworthy the provider is. Specific conversations within communities or among user groups about preferred forms of information exchange can help identify the most cost effective and influential communication programs.
- Given the climate in which forestry decisions are made, a reliance on traditional, one-way methods for transmitting information (e.g., brochures, written reports, and large meetings for “information sharing”) is not an effective strategy. More interactive forms of communication—for example, field trips to treatment sites, interpretive programs, and open discussion with respected agency personnel—offer more effective learning experiences and generally are considered more useful tools for influencing attitudes about natural resources (Wondolleck and Yaffee 1994, Veverka 1996). Most often, programs that simply provide information are not very effective at improving peoples’ understanding or changing their behavior (Jamieson 1994). Learning about, and ultimately public acceptance of forest practices, is more likely to occur in the context of personal relationships than in one-way, anonymous communication. Participation in interactive programs requires greater initiative on the part of the public (as well as managers), but these forms of communication hold considerable promise for a more informed constituency.
- More than three-fourths agreed that guided field trips provide messages that are easy to understand and come from a trustworthy source; such reactions are reiterated in our research throughout the pacific northwest (Shindler and Toman 2003; Shindler et al. 2002). Although these activities require greater initiative on the part of citizens and land managers, experiences in many management units 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 are the groups that are greatly concerned about conditions and have a real stake in the outcomes. The benefits of meeting with the public on-site are often substantial; people are able to witness the effects of treatment alternatives and engage agency personnel—often resource specialists—in informal, meaningful discussion.
- Visitor centers and interpretive information were highly rated across all criteria. Most people have been exposed to such sites where information is typically crafted for clarity and

convenience. People typically visit during their free time when they are usually more receptive to these softer, more easily accessible messages. It is likely that ratings of trustworthiness for this method were high because information is delivered by naturalists or interpreters who are seen as friendly, competent and approachable. Fire and fuel management has just recently begun to appear as interpretive topics in visitor facilities; these venues seem to be a good place for increasing outreach efforts.

- Conversations with agency personnel, perhaps one of the most informal and earliest forms of outreach, continue to be relevant for most people. Most residents reported experience with this form of communication, indicating that agency personnel have a strong presence in local communities. In more rural settings citizens often recognize Forest Service employees and value their opinions, even when agency members are not acting in an official capacity (i.e., in their role as ordinary citizens). These personal interactions can provide a basis for more formal planning activities.
- School educational programs were highly rated. No doubt this view stems from citizens who have seen positive programs in action, but it is also likely that many responded positively because educational programs seem like a good idea and it is easy to “vote” for them. Nevertheless, environmental education research generally reports positive results from classroom exposure to information about natural resources and the ratings here suggest that participants feel this would be a good long-term investment. As with any educational program, however, the delivery system is essential. We have noted in other regions (Shindler and Collson 1998), that classroom tools such as workbooks, video, and interactive computer applications seem particularly well suited to students learning about topics like fuel management and forest health problems.
- Public meetings were the one interactive program to receive a low rating as a useful source of information. In recent years, and in virtually every region throughout the U.S., citizens have been critical of how federal agencies conduct this form of outreach, often because people feel they are being “talked at” rather than included in a meaningful way. Research has clearly shown that structure and leadership are critical components of successful public meetings (See Shindler et al. 1999 for a comprehensive summary). Citizens expect to have a useful role when they attend, respond well to clearly defined meeting objectives, prefer interactive settings as opposed to simple information sharing, and appreciate leaders that they see as genuine and trustworthy. Depending on the attention given to the design and process elements of public meetings, these settings can be either detrimental or highly useful forms of outreach. Willingness to expand and experiment with meeting formats will result in more effective communication with citizens.
- Of the unidirectional methods, informational brochures received the highest ratings. Most people are familiar and comfortable with this traditional form of outreach which has long been a staple of resource agencies. This type of outreach is relatively inexpensive and convenient for resource users, as they can take the brochures with them and read the material at their own pace. However, there are limitations to the types and amount of information that can be effectively communicated through brochures. To be effective, information must be concise and focused; the dilemma is that people are less likely to trust an overly simplistic message that presents only one point of view.

- Three uni-directional programs that received mid-level usefulness ratings were Internet web pages, newsletters, and newspaper inserts. Just under half of participants had been exposed to each of these methods and a high percentage found them easy to understand; however, they received some of the lower trustworthy ratings among all programs. Credibility often depends on who is behind the message (e.g., an interest group, government agency, or university researchers) as well as message content. As discussed with brochures above, information presented through these methods must be simplified and targeted. Considerable care and expertise is required in the design of these informational products. Although each of these formats is useful in selected situations, they probably should not be relied on as primary forms of outreach.
- Smokey Bear was one of the most recognizable programs. However, responses seemed to acknowledge that due to the scope of Smokey's message, the benefits of this information source are likely limited to education about fire prevention.

Changes following outreach participation

Comparisons between initial and follow-up responses on knowledge and attitude questions revealed few significant changes. Our inability to identify potential effects here may be a consequence of the measures used in this study. We replicated measures used by others, but the high initial performance of participants may indicate it is time to increase the level of sophistication in our tests. Specifically, respondents performed so well in the on-site questionnaire that it limited our ability to identify changes following exposure to outreach activities. A different set of knowledge and attitude measures may be necessary to identify change and assess contributory factors among an increasingly informed public.

However, this does not mean that outreach activities were ineffective. On the contrary, responses indicated important changes occurred including:

- A number of participants were more knowledgeable about fire risk.
- Majorities in each location indicated increased understanding about the ecological role of fire.
- Just over two-thirds of participants at the HDM and WFC and another 40% of those at SEKI had a greater understanding of fuel treatments.
- Many participants (SEKI-40%, HDM-56%, WFC-46%) expressed greater support for agency fuel reduction programs.
- More than one-third in each location indicated they had greater confidence in resource managers to implement an effective fuel reduction program.
- In each location, a substantial number expressed increased support for prescribed fire and thinning treatments.

Conclusion

Effective communication is essential to building the understanding and support necessary for sustainable resource management. Findings here suggest two basic levels of communication are useful. One is general information dispersal; this usually involves broad messages that can be conveyed by unidirectional, mass communication formats such as newspapers, brochures and public service announcements. Messages delivered through this format are typically created for general public consumption and, as such, provide few opportunities to target specific audiences.

Because it is difficult to ensure that information is received and understood, their effectiveness as an educational tool is limited. Indeed, as Atkin writes, “campaign messages that have the broadest reach can deliver only a superficial amount of information and persuasive content that is seldom customized to the individual recipient” (2001, p. 56). However, these programs can still be beneficial; they are typically inexpensive and can contribute to building awareness for important issues or projects (Atkin 2001, Jacobson 1999). Moreover, unidirectional activities, as demonstrated here, can positively influence citizens who possess low initial knowledge and lack formal opinions about these programs.

The second level of communication is more focused in scope and usually includes opportunities for interaction at the community or individual level. Because such outreach activities target local priorities and specific environmental contexts, they will likely be more effective at influencing citizen understanding and acceptance (Brunson and Shindler 2004; McCaffrey 2004). Indeed, as citizen understanding of fire management becomes increasingly sophisticated, the flexibility of interactive activities to provide context-relevant information will become even more important.

The central message from these findings is that effective outreach goes beyond simply using standardized tools to provide information. Every resource office has a filing cabinet full of brochures and newsletters on a range of resource issues. However, “the availability of information does not necessarily mean that it will reach its audience or be effective once it gets there” (McCaffrey 2004, p. 12). Successful communication requires effective planning including consideration of the communication objective, the nature of the topic, and audience characteristics including prior knowledge and attitudes (Jacobson 1999). Fire and fuel management are resource issues that offer a real opportunity for achieving success through communication and outreach. The public has long looked to management professionals to provide sound information and leadership regarding fire issues (Shelby and Speaker 1990). As findings from these outreach programs suggest, managers can use this leadership role to influence public understanding and generate positive attitudes for management activities.

CHAPTER 3

MASS COMMUNICATION: THE INFLUENCE OF PUBLIC SERVICE ANNOUNCEMENTS

Introduction

This stage of research assessed a public service announcement (PSA) campaign targeting fire and fuel management in Coeur d'Alene, Idaho (CDA) using a National Fire Plan grant and in cooperation with the Coeur d'Alene Press. From March to October 2004, the CDA Press ran a series of PSA's (consisting of a small daily ad on the front page with larger, internal page ads on Saturdays) as well as occasional articles about fire and fuel management. These PSA's were designed to increase awareness of fire risk and promote homeowner adoption of defensible space and other home protection activities. Multiple partners were involved in this project including the Local Emergency Planning Committee, Bureau of Land Management, USDA Forest Service, Idaho Bureau of Disaster Services, Office of Emergency Management, Idaho Department of Lands, Idaho Department of Commerce, and the Coeur d'Alene Press.

The PSA campaign relied on mass, unidirectional methods to increase homeowner awareness of local fire risk and awareness of a county program (funded by the National Fire Plan) to offset the costs of defensible space. This program provided an opportunity to evaluate a different approach to community outreach than that explored in the prior chapters. In particular, the study was designed to assess 1) the PSA's effectiveness at capturing attention of subscribers, 2) their influence on citizen awareness and opinions, and 3) whether they prompted participants to take action.

Study Site

Coeur d'Alene is located in Kootenai County in the Idaho panhandle (northern Idaho). Between 1990 and 2003 the city's population grew at more than twice the national rate expanding from 24,561 to 37,262 residents (8% growth). During this same time period the population of greater Kootenai County increased by 8.1% to 117,481. Much of this growth has occurred in the wildland interface. Located on the Columbia Plateau between the Cascade and Bitterroot Mountain Ranges, approximately 80% of the Idaho panhandle is forested, with land in private (including industrial lands) and public ownership (USDA Forest Service, and Bureau of Land Management). Forest types include ponderosa pine, Douglas fir, western red cedar, and white pine.

Methods

Findings reported here come from responses to a telephone survey conducted from October to November 2004. Questionnaire design was based upon prior research and informed by interviews within the study area. The research team developed a protocol for telephone contacts that included a short project introduction and solicitation for project participation. The CDA Press provided a random list of 514 subscribers, of these a total of 186 subscribers were

contacted and 108 (58%) recalled seeing the ads and/or articles. Everyone in this latter group participated in the survey; data displayed here come from these participants.

Findings

Demographic characteristics

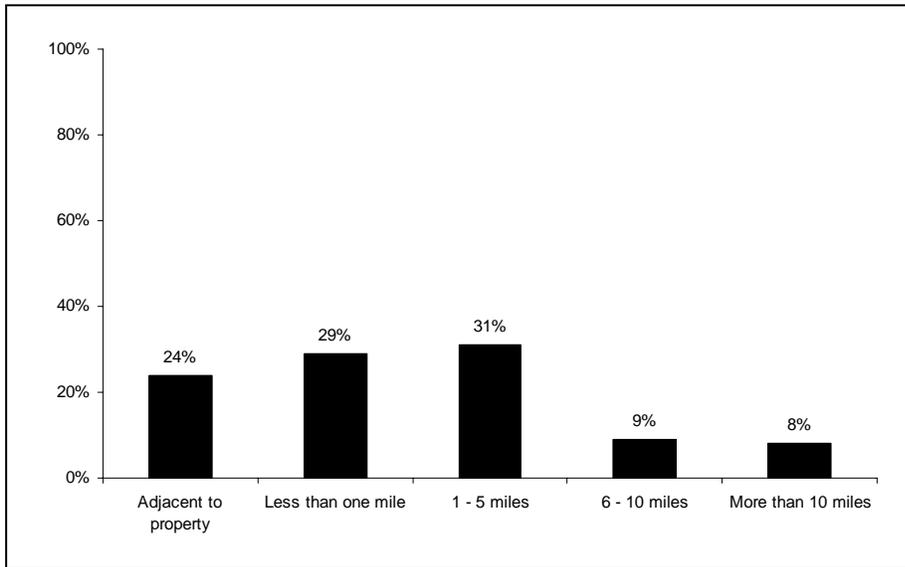
Participants had a mean age of 60 and a majority were female. Most live either in the outskirts of the city or in surrounding rural areas with only 19% residing in interior CDA. As homeownership may influence the adoption of defensible space and other home protection activities, we inquired whether participants owned or rented their residence; nearly all (95%) were homeowners. One fourth of respondents had graduated from college, while another 10% had completed at least some work towards a graduate degree. Lastly, participants were asked about how frequently they receive the CDA Press; most (97%) received it on a daily basis.

Table 13: Respondent characteristics

	Coeur d'Alene
Mean age (years)	60
Gender (%)	
Male	44
Female	56
Which best describes your community (%)	
In the country	29
Outskirts of Coeur d'Alene	52
Interior Coeur d'Alene	19
Do you... (%)	
...own your home?	95
...rent your home?	5
Education (%)	
High school only	34
Some college	33
College graduate	24
At least some graduate school	10
How often do you receive the CDA press? (%)	
Every day	97
Sundays only	3

Participants also indicated the proximity of their home to an area where a wildfire might burn. As shown in Figure 4, one-fourth of participants lived adjacent to a natural area while another 29% are within one mile. Overall, a large majority (84%) lived within 5 miles of a natural area. Thus, most participants live in the wildland interface and are a key target audience for home protection activities.

Figure 4: Proximity to natural area where a wildfire may burn.



Evaluation of PSA campaign

Participants responded to a series of questions regarding the PSA’s (Table 14); percentages displayed here come from the 108 who recalled the articles or advertisements. Approximately half indicated they had seen the small front page ads (see example in Figure 5). Of these, nearly all indicated the information provided was easy to understand and trustworthy. A majority (70%) also agreed the information was at least moderately useful. Slightly more participants (56%) recalled the larger, interior page ads (see example in Figure 6) and most agreed the information was easy to understand and trustworthy. Two-thirds indicated the information in the larger ads was moderately or very useful.

Figure 5: Examples of front page advertisements



Figure 6: Example of interior page advertisements

LOCAL EMERGENCY PLANNING

Does Your Home Have DEFENSIBLE SPACE?

Protect Your Home And Your Investment With Some Simple Planning For The Very Real Threat Of Urban Wildfire.

The pre-fire activities implemented by this homeowner included a green and well-maintained landscape, reduction of wildland vegetation around the perimeter of the property, a fire-resistant roof, and a good access road with a turnaround area. As seen in the photo, these pre-fire activities were effective.

For More Information Contact:



FireSmart™
Kootenai County

larryissi@imbris.net
772-6704



A majority (61%) also recalled feature articles related to fire. When asked to compare the usefulness of the ads and articles, two-thirds indicated the articles were more useful while just over one-fourth (28%) felt they were about the same. Very few (5%) felt the ads were more useful. Lastly, participants were asked if they could recall any specific topics the ads or articles had covered. Forty-one percent were able to provide specific topics; most recalled information about defensible space.

Table 14: Assessment of PSA campaign

		Percent of respondents
Do you recall the small, front page ads?	Yes	49
	No	51
If yes, was the information: Easy to understand?	Yes	100
	No	0
Trustworthy?	Yes	97
	No	3
How useful was the information?	Very/Moderately	70
	Not/Slightly	31
Do you recall the large, interior page ads?	Yes	56
	No	44
If yes, was the information: Easy to understand?	Yes	100
	No	0
Trustworthy?	Yes	94
	No	7
How useful was the information?	Very/Moderately	66
	Not/Slightly	34
Do you recall seeing any feature articles related to fire?	Yes	61
	No	39
Between the ads and articles, which was most useful?	Ads	5
	Articles	67
	About the same	28
Do you recall any specific topics covered?	Yes	41%
	No	59%

Outcomes of PSA's

Participants responded to a series of questions regarding the influence of the PSA's; in general, responses suggest they were effective (Table 15). A majority indicated they were now more aware of the local fire risk (55%), while slightly fewer were more knowledgeable about how to protect their home (48%) and available assistance for home protection activities (47%). Only one-fourth indicated they were interested in learning more about fire protection. Lastly, a slight majority (52%) indicated they had greater confidence in fire management agencies to protect communities from wildfire.

Table 15: Influence of PSA's

	Percent of respondents		
	More	Less	No change
Based on your exposure to the ads and articles, are you more or less...			
...aware of fire risk in the Coeur d'Alene area?	55	1	44
...knowledgeable about how to protect your home from wildfires?	48	0	52
...knowledgeable about available resources or assistance for home protection activities?	47	1	52
...interested in learning more about fire protection?	26	5	70
...confident in the ability of fire management agencies to protect communities from wildfire?	52	2	46

Participants were also asked if the ads or articles had prompted them to take action (Table 16). Just under one-third (31%) indicated they had; of these, the largest percentage, 75%, had implemented defensible space activities on their property, while another 25% had contacted the local fire safe organization for more information. Equal numbers had improved visibility of home addresses or street signs and acquired more information. Very few (2%) participants had planned on but not yet taken action. Of these, equal numbers planned on implementing defensible space activities, improving visibility of addresses, and acquiring more information.

The largest percentage, just over two-thirds, indicated they did not plan to take action. When probed for the reasons behind this decision, nearly half (47%) replied that they did not think any actions were necessary. Most commonly cited reasons were that their personal property (25%) and safety were not at risk (17%) or because they live in an interior area away from the wildland interface. More than one-third (35%) had previously taken steps to protect their homes.

Table 16: PSA influence on participant actions

	Percent of respondents
Did the ads or articles motivate you to take action?	
Yes, I have already done something	31
What actions did you take?	
Implemented defensible on property	75
Contacted Fire Smart Kootenai County	25
Widened driveway	14
Improved visibility of home address or street signs	4
Acquired more information	4
Not yet, but I plan to do something soon	2
What do you plan to do?	
Implement defensible on property	50
Improve visibility of home address or street signs	50
Acquire more information	50
I don't plan to do anything	67
If you are not planning to take action, why not?	
Don't think its necessary	42
Already took prevention activities prior to PSA's	35
Personal property not at risk	25
Personal safety not at risk	17
Don't live in wildland interface	17

Discussion

This study presents findings from a telephone survey evaluating the effectiveness of a PSA campaign targeting home protection from wildfire. Overall, responses suggest the PSA's were effective at increasing the awareness of a substantial proportion of participants. Key findings are presented below:

- Throughout the campaign, over 50 ads or articles were run in the CDA Press; however, a majority of participants recalled seeing 5 or fewer. This suggests the importance of repetition and using different presentation formats for a successful PSA campaign. In most cases, mass communication methods require multiple contact attempts to capture people's attention. Indeed, a majority of our participants recognized one ad or article for every ten presented.
- Responses indicate the information provided was at the right level. It was easy to understand, trustworthy, and useful. Given the limited space, PSA's must be crafted to provide an appropriate amount of information most likely to connect with members of the target audience. These ads contained concise language and illustrated easy-to-follow steps of action. In addition, many highlighted the financial assistance that was available to help offset

the costs of implementing fuel treatments. In each case, the ads also included the contact information of the local fire planning group so readers could acquire more information.

- Not surprisingly, articles were rated as providing more useful information than the ads. Given their greater overall length, articles can provide more information and can provide more supporting evidence to make their case. A surprisingly large number of people recalled seeing the articles, considered they were much less frequent than the ads. Taken together, these findings suggest articles may be an effective means to provide fire information. By developing relationships with members of the press, resource professionals can suggest topics of importance and contribute to providing useful information to a broad audience.
- Given the limited amount of information contained in PSA's, they seem best suited for increasing the awareness of participants and encouraging them to seek more information. Results here indicate that approximately half of those who recalled the ads or articles increased in awareness. However, a surprising number of participants, nearly one-third of those who recalled the PSA's, also took action to protect their homes from wildfire. This is quite encouraging and suggests PSA's may be targeted to prompt action in some situations. In this case, highlighting the available financial assistance likely increased their effectiveness. Moreover, all program participants discussed treatment implementation on their property with the program manager and project contractors prior to implementation.
- It is important to note that while a majority of participants (58%) recalled seeing ads or articles, a substantial number (42%) were unaware of the PSA campaign. This suggests that while PSA's can provide contact with a large audience, they should not be relied on as the sole method of public outreach. Ultimately, they are likely to be most successful as part of a broader communication strategy.

Conclusion

Overall, responses suggest that PSA campaigns can be developed to increase participant awareness and, in some case, even prompt action particularly when they showcase a topic of near-universal interest (e.g., financial assistance) and are coupled with personal interaction. The active participation of the CDA Press maintained costs at a relatively low level and greatly contributed to program success. PSA's using mass communication methods can reach a large number of people; however, there are limited in the amount of information that can be provided. Thus, these approaches are most likely to be successful as part of a comprehensive communication strategy that includes opportunities for people to acquire more specific information and explore outcomes in a meaningful context.

CHAPTER 4

COMMUNICATING IN POST-FIRE ENVIRONMENTS: LESSONS FROM A GUIDED TOUR

Introduction

Wildfire impacts have increased in extent and severity in recent years (National Interagency Fire Center 2005). There has been an increase in the number of acres burned nationwide throughout the last decade. Current forest conditions suggest these problems are likely to continue in the near term. As a result, many resource professionals are faced with the dual challenge of recovering from fire impacts and reducing the risk of future wildfire events.

Several unique factors make management decisions particularly challenging in the post-fire environment. First, as large fires are a relatively recent phenomenon, management personnel have little direct experience to draw upon to direct their response. Despite this uncertainty, there is high pressure for prompt action as many restoration activities have time limits for their effective implementation on the ground. Moreover, while resource agencies have developed a systematic approach to managing fire events, only limited organizational direction has been provided for post-fire situations. Burned Area Emergency Rehabilitation (BAER) teams may be on-site immediately following a fire to implement erosion control, flood mitigation, or other resource stabilization activities. While such activities meet important short-term needs, they leave many restoration questions unanswered.

Adding to the complexity, effective post-fire response will not only account for ecologic restoration but also social recovery (Sisk et al. 2005). In a synthesis of findings from related literature, Kumagai et al. (2004a) found that disasters, including fire events, can have substantial impacts on a community's way of life including financial losses, damage to private property, and disruption of local social networks. In one example, the most often cited local impact of the Hayman Fire in Colorado was the "loss of the forest resources and physical beauty of the area" (Kent et al. 2003, p. 359) suggesting the strong connections residents have with the surrounding landscape. Accordingly, post-fire decisions have high stakes for local citizens who often view restoration of the burned landscape as an important part of their own recovery. They will look to agency personnel for leadership to navigate through the uncertainty of potential management actions. In this section, we review one method used by forest managers to create meaningful discussion with community members regarding post-fire management decisions—a guided field tour to the burned area.

In August and September, 2003, the B&B Complex fires burned in the Cascade Mountains of central Oregon. By the time of their containment on September 26th, the fires had burned 90,769 acres of land in the Deschutes and Willamette national forests and on state, private, and tribally-owned lands. In late October, the Forest Service's Sisters Ranger District organized two local community bus tours of affected lands that remained closed to public access. Notification of the tour was posted on a bulletin in a local community store and in the local community paper, The Nugget Newspaper.

Over two days, 68 area residents participated in a six-hour bus tour conducted and led by the Forest Service District Ranger and key agency resource specialists. The purpose of the tours was

to allow citizens to see first-hand the effects of the fire and to discuss their concerns and questions with agency personnel. Discussions included future management activities with an emphasis on restoration work and future fuel reduction treatments.

These tours provided a valuable opportunity to explore citizen-agency communication in the aftermath of a large fire event. We followed-up with tour participants to learn about their experiences and impressions. Questions probed citizen opinions of potential restoration actions, the role of the public in post-fire decision-making, and their evaluations of the tour and interactions with agency personnel. Findings provide insight into citizen needs and expectation in post-fire environments.

Study site

Located on the eastside of the Cascades in central Oregon, the study area is comprised of three main communities, Sisters, Camp Sherman, and Black Butte Ranch; all respondents were residents of this study area. These communities contain substantial wildland urban interface (WUI), although this is a misnomer in the predominantly rural area. The Forest Service is the primary landholder in the area; the Deschutes National Forest covers 1.6 million acres. There has been considerable local fire activity in recent years. In addition to the B&B fire, two homes were destroyed in Black Butte Ranch during the Cache Mountain Fire in 2002.

Methods and Findings

Approximately five weeks after the tour, our research team conducted a telephone survey of participants. Of the 68 tour participants, 50 were contacted and agreed to participate in the survey. Survey measures included participant assessments of the tour, changes in understanding and opinions regarding fuel treatments, confidence in agency personnel, and demographic information. The surveys included closed-choice questions where participants selected among existing response categories and open-ended measures that encouraged respondents to describe their experiences in their own words.

Demographic characteristics

Overall, respondents had a mean age of fifty-eight years and nearly half (46%) were women (Table 17). They were well educated; nearly all (92%) had at least some college experience, 44% had received a bachelor’s degree while another 29% had pursued post-graduate studies.

Table 17: Respondent characteristics

	B&B Bus Tour
Mean age (years)	58
Gender (%)	
Male	54
Female	46
Education (%)	
High school only	8
Some college	25
College graduate	44
At least some graduate school	29

Participant evaluation

Responses in Table 18 show that participants were very positive about their experiences with the guided tours. Nearly all rated the tour as moderately or very useful (98%) and agreed the information was fair and well balanced (98%) that was easy to understand (98%). All participants felt the information was credible and trustworthy. Open-ended questions prompted participants to provide a more in-depth explanation of these ratings.

Participants were first asked to indicate any positive or negative aspects of the tour. Only two provided any negative aspects of the tour (one wanted to hear more from firefighters and biologists while another indicated that the Forest Service was unable to accommodate all who wanted to attend the tour).

Table 18: Assessment of guided field tour

		Percent of respondents
How would you rate the usefulness of the tour?	Very/Moderately	98
	Not/ Slightly	2
Was the information...		
...fair and well balanced or one-sided?	Well-balanced	98
	One-sided	2
...easy to understand?	Yes	98
	No	2
...trustworthy?	Yes	100
	No	0

In contrast, when asked about the best aspect of the bus tour, 48 responded. Two primary themes emerged from their responses. First, 63% of the respondents mentioned the importance of being able to see the burned region first-hand and of viewing the impact the fire had on the landscape. These participants appreciated seeing the “severity” of fire impacts with one-fourth indicating they were interested in “observing the mosaic pattern”—how the fire affected areas and species differently, with some areas “scorched” and “others untouched.” Some of these participants suggested the tour confirmed the value of fuel treatments as areas that had been thinned prior to the fire appeared to have burned at a lower intensity. Other participants noted the substantial “regrowth” of grass and ferns that was already occurring despite only three weeks had passed since the fire. Both the observation of untouched areas and re-growth were cited as reducing participants’ apprehension regarding the extent of the fire’s impact.

Second, the personal interaction with Forest Service employees was cited as one of the best aspects of the tour. Nearly one-fourth of participants (22%) appreciated having “knowledgeable people”—scientific experts and people actually involved in fire suppression—on hand to discuss the fires “face-to-face” and having them available to answer specific questions. One remarked, “It was great hearing from the guys who had been on the fire.” Another indicated that the

interaction prompted by the tours contributed to a “great community feeling” while others cited the “cooperative” nature and “lack of hostility” among participants.

Tour outcomes

Respondents were also asked to indicate how the tour had influenced their opinions of fuel reduction strategies (Table 19). Most indicated they now felt more knowledgeable about fuel reduction practices (62%) as well as post-fire restoration strategies (78%). Likewise, 68% of the tour participants stated that they were more supportive of fuel reduction programs while 60% were more confident in the Forest Service’s ability to implement an effective fuels reduction program. Lastly, 84% of respondents had greater confidence that the Forest Service would incorporate citizen concerns in future plans.

The tours also influenced citizen evaluations of three fuel reduction strategies. More than half of participants (56%) indicated increased acceptability for thinning. While results were less dramatic for prescribed fire and thinning, a substantial proportion of participants still indicated increased acceptability as a result of the tour (34% for prescribed fire and 26% for understory mowing). Moreover, many participants indicated they were already supportive of fuel treatments prior to the tour; in such cases a response of “no change” was most likely.

Table 19. Changes in participants’ opinions as a result of the B&B tour.

Are you more of less...	More (%)	No change (%)	Less (%)
Knowledgeable about fuel reduction practices?	62	38	0
Knowledgeable of forest restoration strategies?	78	20	2
Supportive of fuel reduction programs?	68	32	0
Confident in the ability of the Forest Service to implement an effective fuel reduction program?	60	40	0
Confident that the Forest Service will incorporate citizen concerns into future plans?	84	16	0
Are fuel treatments more or less acceptable...			
Forest thinning?	56	44	0
Prescribed fire?	34	64	2
Understory mowing?	26	70	4

Restoration activities

Participants were also presented with a list of potential post-fire management actions and asked which should be carried out on non-wilderness Forest Service lands (Table 20). At least 90% were supportive of erosion control efforts and replanting burned areas. Interestingly, three-

fourths were also willing to support some harvesting of burned trees, essentially timber salvage. Two-thirds disagreed that trees should only be removed if they posed a threat to safety. These findings suggest four participants are supportive of active management in burned areas. Indeed, very few (6%) agreed there should be no manager intervention in recovery efforts.

Table 20: Participant opinion on potential restoration activities

Proposed management activity	Agree (%)	Neutral (%)	Disagree (%)
Erosion control	96	4	0
Replanting	90	4	6
Harvest and sell what they can	78	10	12
Only remove trees that are a safety concern	28	6	66
No intervention, let nature take its course	6	10	84

Post-fire priorities

Participants were also asked to indicate their priorities for post-fire management. Specifically, whether the Forest Service should concentrate their resources on reducing fuels in unburned areas or restoring forest land previously burned (Table 21). A slight majority (54%) favored emphasizing fuel treatments while slightly fewer (44%) indicated they preferred balancing the two types of activities. Ultimately, only 2% preferred managers emphasize restoration-oriented activities.

Table 21: Post-fire management response

Preference on whether the Forest Service should concentrate on reducing fuel in unburned areas or restoring forest land that has already burned.		
56%	44%	2%
Reduce fuels only	Balanced approach	Restore only

Post-fire decision-making

In an open-ended question, participants were asked to comment on the appropriate role for the public in deciding what should happen to burned areas. Several themes emerged from participant responses. Over half (56%) of the respondents indicated that the public should be allowed to provide input into the planning process. As one participant indicated, “it is our forest [we] should be involved in planning.” Many participants suggested specific methods to facilitate public involvement. Their suggestions included traditional approaches, such as meetings and public hearings, as well as more innovative methods, including workshops, bus tours, and personal interactions with Forest Service staff.

Interestingly, over one-fourth (27%) of the participants commented that the general public needs to become better informed before participating in decision-making. These respondents perceived that the public is “largely uninformed,” holds opinions that are “too skewed,” and should become

“knowledgeable” about the issues so they are not making up their minds “with sound bites,” particularly considering the complexities associated with post-fire management.

Moreover, while recognizing the value of public involvement many participants (19%) also indicated the Forest Service should have the final say over decisions for the burned areas. There were two main drivers behind these comments. First, many expressed concern that implementation of post-fire management practices are often delayed by lengthy planning and appeal processes. Indeed, while many felt that “local” and “informed” citizens should participate in planning, 17% felt there should be “limits” on the involvement of the general public and special interest groups so natural resource professionals “can carry out plans in a timely manner...and not get bogged down in litigation.”

Second, an equal number of participants (17%) recognized that high levels of citizen trust are necessary for the Forest Service to be given such authority. In particular, participants noted they need confidence that the agency is truly considering citizen input and making decisions “with an open mind.” Participants also indicated the local public, of which all respondents were members, tend to have more trust and a better relationship with the Forest Service than do non-local publics. As one stated, while there is a “question of trust region-wide locally it is good.” Another indicated, he “trusts the local group” and particularly recognized the local district ranger. Participants attributed these strong local relationships to the efforts of local Forest Service personnel with comments such as, “Sisters group is very good, cooperative, and involved with the public.”

Discussion

This study was intended to provide useful information to resource professionals working in the post-fire environment. Findings presented here suggest guided field trips can be a useful tool to respond to management challenges. Several important points emerge.

- First, findings support the usefulness of guided field tours. In particular, the tours provided an opportunity for managers and participants to discuss fuel management and post-fire restoration decisions in a meaningful environment. Responses suggest the tour was effective in increasing participant understanding of fuel reduction and post-fire management activities. Ultimately, citizens are more likely to support management activities when they understand the rationale and potential outcomes.
- Perhaps even more importantly was the influence of the tour on participant attitudes toward Forest Service personnel. Substantial research has found that citizen trust is in short supply these days (e.g., Shindler et al. 2002). While it may appear particularly challenging to build credibility in the post-fire environment, responses here suggest guided field tours may provide a relatively straightforward method to do so. Indeed, one of the strongest points to emerge from this research is the substantial good will generated by these tours. Multiple participants expressed appreciation for being invited to participate and findings suggest this appreciation translated into increased confidence in Forest Service personnel. Ultimately, trust is more likely to develop in the context of personal relationships than in anonymous information provision (Jamieson 1994). The give and take of interactive exchanges offered by guided field tours seem much more likely to develop such personal relationships than programs that rely on a one-way flow of information.

- These results are particularly noteworthy considering the survey was conducted more than a month following the tours. Short-term, transient effects often occur directly after participation in an outreach activity (Leeming et al. 1993). However, as practitioners we are more interested in effects that persist over time and have a lasting impact on citizen attitudes and understanding. In this case, the five-week interval between participation and assessment of the tour suggests the measured shifts represent durable effects. Overall, these findings provide substantial evidence that guided tours can have substantial and long-lasting influence on participants.
- Lastly, we want to explore participant opinions toward post-fire management actions. While agreement among responses was quite high here, post-fire conflict has been high in other locations. While the results presented here suggest post-fire guided tours offer an effective method to reduce the uncertainty surrounding restoration decisions, it is important to note that the responses in this study are influenced by a long history of substantive interaction between local agency personnel and citizens. In the years leading up to the B&B fires, the Sisters Ranger District has placed an emphasis on working with local communities, often going above and beyond the legal minimum requirements for public involvement. While such an approach may be viewed as time consuming and unnecessary, results here suggest a substantial payoff from these efforts. In particular, participants noted that although citizen trust may be low elsewhere, they are confident in the local Forest Service staff. Ultimately, such support is necessary for the successful implementation of agency activities on the ground.

Conclusion

To be successful, natural resource management needs to be both ecologically sound and socially acceptable, particularly among local publics who are often moved to voice their concerns with management decisions in areas they are familiar with and care deeply about. Given the high degree of uncertainty and pressures for prompt action, the post-fire environment is particularly challenging. Guided field tours offer an effective method to engage local residents in a meaningful context and build agreement on management priorities. Such an approach will likely prove successful for other management issues as well.

CHAPTER 5

CONCLUDING SUMMARY OF RESEARCH STUDIES

Meeting today's fire management needs can be a difficult proposition. Current challenges are too great to be managed by resource professionals; citizen support is required. Findings here suggest building public support for fire and fuels management is greatly enhanced through effective public communication and outreach programs. Many management units are well along in their own communication programs and are finding success through multiple methods and support of outreach personnel. We conclude by illustrating a set of guiding principles to build successful fire and fuel management outreach programs in forest communities. A long-term commitment to outreach and education is a requirement, and will, over time, yield positive outcomes for managers and citizen stakeholders. Not all outcomes will be achieved immediately, nor will each one be achieved everywhere. When implemented, outcomes include:

Internal

- Management units will have an internal planning process for public outreach.
- Personnel will reach agreement on how to proceed and avoid “surprises” later on.
- There will be a refinement of public information materials and programs; financial resources can be directed at the most productive and useful methods.
- The best personnel for leading the outreach effort will emerge and resources for doing the job will be identified.
- The agency will appear better organized and ready to respond to citizens' concerns.
- Units will focus on methods that result in achieving local solutions and be less concerned with national or regional agendas.

External

- A more supportive, more action-oriented constituency will emerge within the community.
- Other citizen groups (homeowner associations, watershed councils) will help carry the fuel reduction message and take the agency out of the perpetual “hot seat.”
- Community capacity will be built for responding to fire and fuel reduction problems.
- Citizens will help identify trouble spots in need of active management.
- Community residents will take greater responsibility for defensible space and fuel reduction activities on their own property.
- Citizens will demonstrate greater support for agency fuel reduction programs on adjacent public lands.

Principles for effective communication

To conclude we draw upon findings presented here as well as additional research to develop four principles that contribute to the success of agency outreach and communication activities. These organizing principles are:

- Effective communication is a product of effective planning.
- Both unidirectional (one-way) and interactive approaches to communication have a role in public outreach. Utilize the strengths of each to build a program.

- Communication activities that focus on local conditions and concerns can decrease the uncertainty that citizens associate with fire management and build their capacity to participate in solutions.
- A comprehensive communication strategy will emphasize meaningful interaction among participants and build trust along the way.

Principle 1: Effective communication is a product of effective planning.

Fuel managers would never implement a prescribed burn without a comprehensive plan detailing treatment objectives and appropriate conditions. Yet, it is not uncommon for outreach activities to be implemented with nothing more than a vague goal of “educating the public.” Not surprisingly, such a simplistic approach is unlikely to be successful. Effective planning depends on the ability of resource professionals to determine communication objectives and organize an appropriate approach to outreach prior to opening the door and inviting the public into the process (Jacobson 1999). Two researchers, Delli Priscoli and Homenuck (1990), refer to this as “up-front thinking” and argue that thoughtfully planning outreach activities in advance can help avoid costly problems later on such as confrontations, delays, appeals, and lawsuits.

First and foremost, agency personnel should identify what they want to achieve by communicating with the public. For example, objectives may be classified as 1) building awareness or 2) influencing attitude or behavior change (Rogers 2003, Atkin 2001). Is the primary purpose to call attention to basic wildfire prevention (Smokey Bear-type messages) or to encourage property owners to take action in creating defensible space? Perhaps it is to enlist public support for agency fuel reduction activities. Each is a worthy objective, and each requires a different outreach approach.

Planning for outreach should consider specific audiences—their information needs, the role they will play, previous interactions with agency personnel, and the local conditions they are familiar with. Key questions to help organize this approach are presented in Table 22. Depending on the communication objectives, the audience may vary from homeowners in a particular neighborhood to residents of an entire community or region. Agency personnel will need an understanding of stakeholder awareness of fuel problems as well as their attitudes about severity levels and potential management actions (Jacobson 1999). In some cases, this information may already be available, while in others it may be necessary to conduct an assessment of community characteristics through formal methods (stakeholder surveys or interviews) or informal means (“coffee-shop” meetings or discussions with community leaders).

Outreach planning also includes consideration of internal resources and constraints, particularly identifying staff with the necessary skills to be in the lead in communication activities. Shindler et al. argue that “most effective public processes historically have involved one or two agency members with genuine interpersonal skills” (2002, p. 46). Outreach programs will be more effective when such individuals are enabled to play a lead role and supported in their efforts by their management unit.

Once these questions have been addressed internally by relevant personnel, outreach activities can be developed and implementation can begin. Ultimately, these planning efforts will result in communications that focus more on contextual conditions within the community while also meeting objectives of the management unit. Working through this planning process also forces personnel to wrestle with difficult questions before being confronted by citizens. This serves to generate a consensus among staff about appropriate actions, allows time for everyone to “get on

Table 22: Planning the communication approach

<p>Organizing questions¹</p> <p>1. Determine objectives</p> <p>What do we hope to accomplish with this outreach program?</p> <p>What should the public know, or be able to do, as a result of this communication process?</p> <p>What does the public need to know to participate effectively?</p> <p>What do we need from the public?</p> <p>2. Assess the target audience(s) and contextual influences</p> <p>Who is “the public” for this issue?</p> <p>Are there specific groups or stakeholders for this problem or issue?</p> <p>What are their initial attitudes or understanding of the issue?</p> <p>How might the history of agency-citizen relationships affect reactions to the issue?</p> <p>What past management actions might contribute to citizen reactions to the issue?</p> <p>What is the public’s role in this process and how will it be communicated?</p> <p>What other contextual circumstances should be considered?</p> <p>3. Evaluate internal resources</p> <p>How will decisions be made and who will make them?</p> <p>What resources can we dedicate to this process?</p> <p>Who are the appropriate individuals to be in the lead on outreach activities?</p> <p>What internal constraints will influence the types or scope of activities that can be implemented?</p>
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¹Adapted from Priscolli & Homenuck (1990), Shindler et al. (1999), Jacobson (1999)

the same page” regarding the need for communicating with the public, identifies the best individuals in the unit for working on the front-lines of the outreach effort, and helps in organizing the necessary resources to carry out the job.

Principle 2: Both unidirectional (one-way) and interactive approaches to communication have a role in public outreach. Utilize the strengths of each to build a program.

Public agencies often feel it is their responsibility to develop information and deliver it to the public. But the facts do not speak for themselves. They must be interpreted and appreciated. Generally programs that just provide information are not very successful in improving understanding or changing behavior (Jamieson 1994). Individuals progress through various stages in a decision process. They first develop basic awareness of the issue or topic (such as defensible space or agency-implemented fuel treatments), then form opinions about its appropriateness, and, finally, decide whether or not to support or adopt the new behavior. Research suggests individuals rely upon particular communication channels during these different decision stages (Rogers 2003). Mass, unidirectional outreach methods (e.g., public service announcements, brochures) are particularly useful in the first stage when individuals seek

basic information about new practices while interactive communication approaches (e.g., personal contacts, guided field trips) are more likely to increase citizen support or encourage behavior change.

The primary advantage of mass communication is the ability to reach a large number of people relatively easily. However, as Atkin writes, messages with the “broadest reach can deliver only a superficial amount of information” (2001, p. 56). At best, these message formats are useful for instilling a central idea or to communicate a general theme (e.g., forest health conditions, the need for defensible space around homes, or the role of fire in forest systems). Simply, these formats are not for delivering details; people will not be able to recall specifics from PSA’s, brochures, or signs at kiosks. Accordingly, mass or unidirectional messages can be effective at generating recognition of an issue, sensitizing participants to later messages, and encouraging people to seek additional information (Rogers 2003, Atkin 2001). In limited cases, mass communication methods can be effective at influencing attitudes among already supportive audiences, or individuals with low understanding about an issue (Toman and Shindler 2005). In sum, outreach activities that rely only on unidirectional means appear to have a limited influence on public attitudes or behavior change (e.g., Rogers 2003, Toman et al. 2006).

Research has found that people turn most to interpersonal communication methods when deciding whether to adopt new ideas or change behavior (Rogers 2003). At this stage, individuals want more specific information about likely outcomes of a practice—or alternatively, of doing nothing—either to them or to places they know and care about (such as the impacts of thinning or prescribed fire around a homesite or favorite recreation area). More specifically, they want to know how *serious* and *certain* the outcomes are, and *how soon* they will occur in the context of these places (Shindler et al. 2002).

Public preference for more interactive forms of information exchange is particularly high for activities such as fuel treatments that may hold a degree of risk or uncertainty for citizens (Jamieson 1994). The ability to engage in discussion, visit a site where treatments have been implemented, or actually view a demonstration of fuel reduction practices can reduce the uncertainty regarding treatment outcomes. It is the give-and-take of interactive exchanges that allow citizens to become more comfortable with the available options and decide how they feel about managers’ ability to carry out the fuel reduction job.

Recent studies have evaluated interactive forms of outreach including small workshops, field trips, demonstration sites, and interpretive programs. McCaffrey (2004) evaluated a multi-faceted wildfire information program that used both unidirectional (brochures, mass media) and interactive methods (personal contact, group presentations, neighborhood meetings) and determined that personal contact contributed substantially to communication success. Indeed, educational materials, including unidirectional items, were more effective if delivered via personal contact. Similarly, in two recent comparisons of wildfire outreach programs conducted by the research team, interactive methods were preferred over unidirectional approaches and also were more effective at influencing public attitudes (Toman and Shindler 2005, Toman et al. 2006).

Ultimately, both unidirectional and interactive methods play an important role in a comprehensive communication strategy. At any given point, citizens are likely to be at different stages of the communication process and, thus, have different information needs. For example, residents in a wildland urban interface community are likely to range from some who have not

heard of defensible space practices, others interested in seeing a demonstration of treatment outcomes, and others looking to confirm the value of treatments following implementation. A comprehensive strategy will target each of these audiences with activities and information designed to meet their specific needs. Unidirectional and interactive approaches can play complementary roles in these efforts. Mass messages are relatively inexpensive and can be used to build awareness as well as to motivate participants to seek more information. Interactive opportunities, although more time-consuming and requiring a certain skill-set, can reduce the uncertainties associated with new activities and enhance trust in resource agencies.

Principle 3: Communication activities that focus on local conditions and concerns can decrease the uncertainty that citizens associate with fire management and build their capacity to participate in solutions.

At the local level, citizen decisions about the adoption of defensible space or support for fuel treatments on nearby federal lands often boils down to the risk and uncertainty people associate with perceived outcomes (Winter et al. 2002, Shindler and Toman 2003). Of particular importance are concerns about the perceived compatibility of treatments with other values specific to the location (aesthetics, recreation use, privacy, etc.), perceptions of the local planning process employed by the agency (scientifically sound, fair, and inclusive), as well as citizen trust in personnel to do what they say they will do (Winter and Fried 2000, Nelson et al. 2003, Shindler and Toman 2003). Evaluations of these factors are place-dependent and can vary over time and across locations. Accordingly, activities acceptable in one situation may be unacceptable elsewhere (Brunson and Shindler 2004). Gaining acceptance among local residents for specific treatments will require more than general interpretive messages. The implementation of specific projects will require effective communication tailored to ecological and social issues at the local, and perhaps the neighborhood, level (Brunson and Shindler 2004).

Communication activities that target local conditions and public concerns about the rationale behind specific practices, potential outcomes, and implementation scenarios are more likely to resonate with participants. Although this can be accomplished in varying degrees with many forms of outreach, programs that allow for interactive exchanges, such as guided field trips to project sites and conversations with agency personnel, are better suited to relating information to the local context. One limitation of many unidirectional methods (e.g., brochures, newspaper sections, television messages, or newsletters) is that they rely on fixed messages, whereas interactive formats include citizens in the discussion and can be adapted to the concerns and interests of the parties involved. Such an interactive approach provides greater flexibility to address participant needs and tailor activities to the local context.

Strong evidence for keeping a local focus comes from citizen reactions to an agency-led field tour to see the aftermath of a 90,000 acre fire on the Deschutes National Forest (Shindler et al. 2005). Following the tour, a majority of participants had a greater understanding of and support for proposed management activities. In particular, responses indicated the ability to see fire impacts first-hand and discuss proposed restoration activities helped them understand the rationale behind and likely outcomes of treatments. By offering an opportunity for meaningful interaction in a place that is familiar and important to participants, these tours were able to address their concerns and improve their ability to participate in crafting solutions.

Principle 4: A comprehensive communication strategy will emphasize meaningful interaction among participants and build trust along the way.

Fire managers and outreach personnel must recognize that citizens do not come with a ready-made ability to engage in constructive, deliberative discussions of fuel management. The use of prescribed fire may seem risky and thinning (often viewed as harvesting) may be something they are initially opposed to. In any case, the topic may just recently have become relevant to them, and will likely involve a degree of emotion that other issues do not. Thus, agency managers will need to consider how they can contribute to the competence of residents and communities to engage in meaningful discussions (Jacobson et al. 2001, Jamieson 1994).

Initially, public judgments of conditions are likely to be based on visual references from personal exposure to forests and interpreted through their previous experiences. As citizens begin to receive additional technical information about the landscape, the nature of the communications is likely to be just as important. Accordingly, a comprehensive communication strategy will not only focus on the types and content of the information disseminated, but also the process of how it is communicated. The ability of fire professionals to specify conditions and engage citizens in discussion about the nature of the options is just as essential as providing objective, unbiased information. Thus, personnel must be forthcoming about the difficult decisions, including the uncertainty of outcomes associated with the use of fire and thinning treatments.

While outreach programs typically focus on improving awareness, additional, equally-important objectives are often overlooked, including relationship and trust-building outcomes. Indeed, for some projects, it may be that changes in the level of trust among stakeholders—because of a well-planned and articulated outreach program—are the *only* measurable benefits that accrue (Shindler and Neburka 1997). The value of relationship-building can have long-term impacts on management success and should not be underestimated (Lawrence et al. 1997). For example, following the Deschutes bus tours described above, nearly all participants expressed increased appreciation for and confidence in agency personnel. This confidence translated into support for proposed management activities as participants were vocally supportive of a proposed 13,000 acre thinning project on adjacent forestlands.

Ultimately, public trust is central to an agency's ability to act (Kramer 1999) and significantly influences citizen support for fire management activities (Winter et al. 2002, Shindler and Toman 2003). Trust is more likely to develop in the context of personal relationships than through mass information provision (Jamieson 1994). The give-and-take of interactive exchanges is much more favorable to developing these relationships than programs that rely on an impersonal, one-way flow of information.

CHAPTER 6

WILDLAND FIRE AND FUEL MANAGEMENT: A FRAMEWORK FOR EFFECTIVE COMMUNICATION

Introduction

Recent years have seen a substantial increase in the number of wildland fires across the U.S. Resulting impacts have included record numbers of burned acres (more than 9 million acres in 2006) as well as an increasing number of destroyed homes in forest communities. Demonstrating the existing potential for property losses, 2,400 structures were lost during the Cedar Fire in southern California in October 2003. While this may be an extreme example, a substantial number of homes are at risk to future wildland fires. Population growth in the wildland-urban interface (WUI), defined as the area “where humans and their development meet or intermix with wildland fuel” (Federal Register 2001), has exceeded that of urban areas over the past several years (Long and Nucci 1998). Indeed, 60% of new housing starts between 1990 and 2000 were in the WUI (Stewart et al. 2005).

Federal initiatives to reduce the losses of homes in the WUI, including the National Fire Plan and Healthy Forests Restoration Act, promote the use of fuel treatments such as prescribed fire or mechanized thinning on nearby public lands as well as encouraging property owners to take action to protect their own homes by modifying the surrounding vegetation to prevent a fire from spreading to structures. Although specific recommendations vary depending on geographic location and ecosystem type, research has demonstrated the vegetative characteristics within 40 meters of residential units are the most likely determinants of combustion (Cohen 2000). Accordingly, defensible space guidelines target the type, spacing, and structure of vegetation adjacent to homes.

These initiatives also recognize the wildland fire challenge is too extensive to be managed by resource agencies alone and call for an unprecedented degree of collaboration with citizens in forest communities. Successful public outreach will play a key role in building awareness of the fire situation and enlisting the support of local residents in fire management. However, currently there are few tools available to guide fire professionals as they organize their communication approach. The purpose of this paper is to provide a conceptual framework for designing and implementing outreach programs to achieve fire management objectives. The intent is to help managers develop messages and select from the array of delivery methods to craft an efficient and effective communication approach for their community of participants. We do this first by examining theoretical and experimental literature on communication as well as experiences with outreach activities in forest communities. There are numerous examples within these sources; thus, we draw on the most relevant for purposes of planning for fire and fuel management. We then consider implications of these findings to effective public outreach and present a step-wise approach to organize, implement, and monitor a comprehensive communication program.

Related Literature

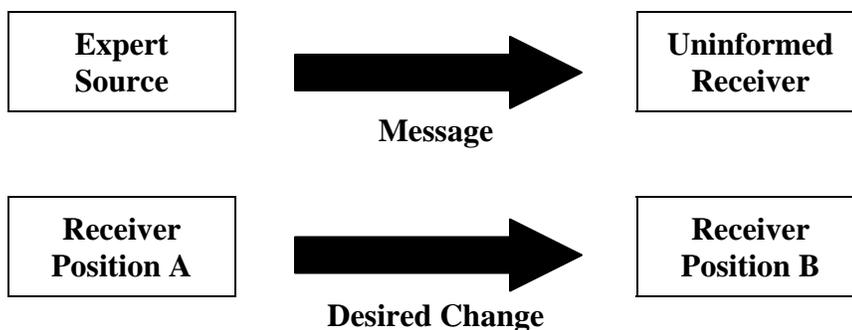
The study of communication has a long history, dating back to Aristotle's *Rhetoric* written in the fourth century. Our review of this substantial body of literature is organized around four main topic areas, 1) mass communication, 2) persuasive communication, 3) learning theory, and 4) diffusion of innovations. We conclude by summarizing findings and illustrating examples for outreach activities.

Mass communication

Mass communication research examines messages transmitted from a central source to a large and dispersed population. Early researchers viewed communication as a linear flow of information from a source to receivers (see Figure 1). Communication effects were assumed to

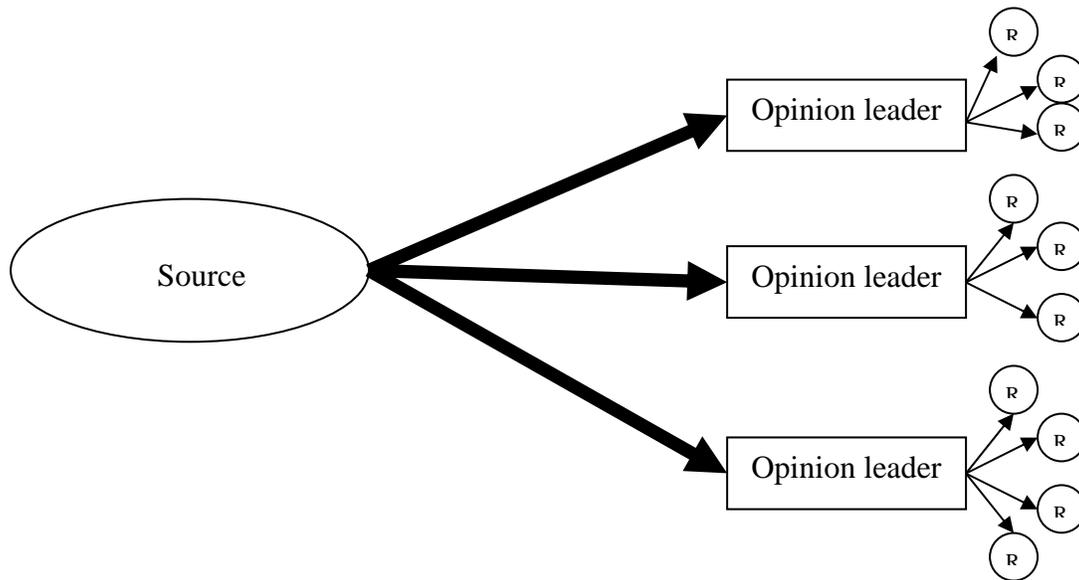
be straightforward; the provided information prompted the desired response among compliant receivers (McQuail and Windahl 1981, Reardon 1991). This view of communication assumes: 1) sources have substantial direct influence over receivers, 2) the target audience is homogeneous and all receivers interpret the message exactly as intended, and 3) sources need only transmit the appropriate content to trigger the desired response (Heath and Bryant 1992, Greenberg and Salwen 1996). While this perspective is overly simplistic, this early research did identify three key components of the communication process—the source, message, and receiver.

Figure 1: Linear model of communication and expected outcome



Following World War II communication models became increasingly complex. Particularly influential the Two-Step flow model depicts information flowing from a mass media source to opinion leaders and then from opinion leaders to other members of the population (see Figure 2) (Katz and Lazarsfeld 1955). While still relatively linear, this model recognized communication effect may be influenced by factors other than message content. Specifically, communication response may be mediated by social interactions among receivers.

Figure 2: Two-Step flow model of communication exchange

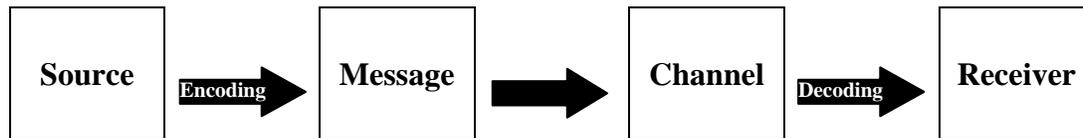


Further advances were made by Berlo whose work began to provide a more complete picture of communication (1960). The resulting model not only included source, message, and receiver variables but also recognized information is translated and interpreted as it passes from source to receivers as well as the influence of the channel or method of communication (Figure 3). We examine each of these components and their influence on the communication process below.

Berlo also characterized communication as a dynamic, ongoing process rather than a discrete event. This was significant because it acknowledged communication response could be influenced by the prior experiences, knowledge, and attitudes of the receiver (McQuail and Windahl 1981). For example, an individual's interpretation of an agency-sponsored message on defensible space will likely be influenced by prior beliefs or understanding of fire behavior as well as previous experiences with the sponsoring agency (such as the Forest Service or Bureau of Land Management). As a result, the same message may be interpreted differently and create

dissimilar effects among receivers (e.g., some may be prompted to action while others are largely inattentive to the message arguments).

Figure 3: Berlo's SMCR model of communication



Components of the communication process

Source variables

Source characteristics can have substantial influence on outreach success. Receivers may “accept or reject an advocacy...on the basis of source cues rather than...the content of the message” (Petty and Cacioppo 1996, p. 63). In *Rhetoric*, Aristotle identified three variables that influence communication effectiveness, ethos (source credibility), pathos (ability to appeal to and motivate receivers), and logos (logical argumentation). Of these, he wrote that an individual’s character, or ethos, may be “the most effective means of persuasion he possesses” (Aristotle, 1954, p. 25). Credibility derives from perceived expertise, trustworthiness, and attractiveness or similarities with the audience (McGuire 1999).

Perceived expertise is influenced by the source’s education level, knowledge of the subject matter, and confidence and is particularly influential when messages advocate positions substantially different from the recipient’s original attitude (McGuire 1999, Petty and Cacioppo 1996). Trustworthiness is based on factors including reputation, affiliation with an honorable profession, and absence of a vested interest in message outcomes (e.g., the source will not gain personally by convincing the audience) (McGuire 1999). Attractiveness is influenced by familiarity and similarities between the source and receivers and can be surprisingly influential (McGuire 1999, Erwin 2001). Indeed, research has found individuals were more likely to

believe statements from familiar sources, even after being told they were lying (Begg et al. 1992). Specific to natural resource issues, Steel et al. (1992-93) found people had greater confidence in information from friends or neighbors even if these individuals had no expertise in the topic area.

Credibility appears exceptionally important to environmental communication (Jacobson 1999) and has been shown to influence attitudes toward fire management issues (Winter et al. 2002, Shindler and Toman 2003). Ultimately, outreach programs will be more effective when the source is trustworthy, viewed as an expert, and is perceived as similar to receivers.

Message variables

Not all messages are created equal; some are more effective at delivering information and encouraging attitude or behavior change. Here we examine factors that influence message success including comprehensibility, number of arguments, the use of incentives or fear appeals, message dissonance, and relevance (Petty and Cacioppo 1996, McGuire 1999, Erwin 2001). Findings on the first two factors are largely intuitive; messages which are understandable and provide a greater amount of high quality supporting information are more likely to result in persuasion (Eagly 1974, Calder et al. 1974). However, developing such messages can be difficult to achieve in practice. Of particular importance, messages should avoid the use of agency jargon, acronyms, or undefined technical terms which can cause confusion among receivers (Brunson 1992). Regarding fire management, studies have found high levels of citizen uncertainty with terms including prescribed fire, wildland fire, and ladder fuel (Shindler et al. 2001, Toman and Shindler 2004). While such language may seem straightforward to managers, these terms need to be defined for common usage to play an effective role in any outreach message.

As for incentives or fear appeals, messages encourage persuasion by highlighting benefits of the desired behavior or consequences of inaction (Atkin 2001). In some cases, actual

incentives such as monetary compensation may be offered to encourage the desired outcome; similar approaches have been used to promote adoption of defensible space in forest communities (Toman and Shindler 2004). Although this approach is likely to increase adoption initially, commitment to the new attitudes or behavior may be weak, resulting in discontinuance when the incentive is no longer available (Rogers 2003). On the other hand, fear appeals are designed to persuade by highlighting negative consequences of undesired behavior or not taking the appropriate action as Smokey Bear has long proclaimed the negative effects of careless fire use. Fear appeals can be effective when the message provides strong evidence of a significant threat, illustrates likely, and unfavorable, consequences, and provides recommendations to avoid consequences (Petty and Cacioppo 1996, Erwin 2001). However, this approach can also result in a “boomerang effect” as listeners react defensively to control or rationalize their concerns (Atkin 2001). For increased success, campaigns should not only concentrate on negative consequences, but also emphasize positive outcomes to behavior change (Atkin 2001, Erwin 2001).

Persuasive impact is also influenced by message dissonance (the distance between the message and participants initial attitudes) and relevance of the message topic. In the case of dissonance, participants appear more likely to be influenced by messages that are a moderate distance from their initial attitudes, while those extremely dissimilar from initial attitudes are likely to be rejected (Sherif and Hovland 1961, Siero and Doosje 1993). Thus, messages should target incremental changes in individual beliefs and attitudes rather than radical shifts.

Relevance of the message topic is positively associated with persuasive effects. That is, participants are more likely to thoughtfully consider message arguments and evidence on topics that are personally important (Petty and Cacioppo 1996). Similar outcomes were demonstrated in research on natural resource issues, including fire management communications (Bright and Manfreda 1997, Toman and Shindler 2005). To increase their relevance, messages should be

crafted to relate information to local conditions and places and demonstrate their direct application to receivers.

Channel variables

Although the communication channel often receives less attention during the planning process, it can have substantial influence on outreach effectiveness. Outreach activities can be classified based on the type of outreach experience; unidirectional methods consist of a one-way flow of information while interactive approaches enable two-way communication among participants. Each approach has specific strengths and can be effective in certain situations (Petty and Cacioppo 1996). Unidirectional approaches can reach a broader audience and have proven effective at building awareness, while more-targeted interactive communications are more likely to create attitude or behavior change (Jacobson 1999, Erwin 2001). As suggested by the Two-step model of communication exchange, in some cases unidirectional activities may prompt interactive exchanges (Katz and Lazarsfeld 1955).

Specific to fire and fuel management, research has examined a number of outreach approaches. Informational brochures have long been a staple in the resource professionals' communication toolkit; in an early study, Taylor and Daniel (1984) found participants expressed increased understanding following exposure to brochures. A more recent study confirmed these results and also recorded a positive influence on participant attitudes (Loomis et al., 2001). Nielsen and Buchanan (1986) found that both a slide show and interpreter guided walk resulted in higher knowledge and attitude scores among participants. Two more recent studies have also found success with recent, innovative outreach approaches. Hands-on workshops influenced participant understanding and attitudes (Parkinson et al. 2003), while site visits to treated sites increased the acceptability of prescribed fire (Toman et al. 2004).

The best method in any situation is the medium that effectively reaches the greatest proportion of the target audience (Jacobson 1999). In a recent review of a multifaceted

information program, McCaffrey (2004) found differential results depending on the approach employed. Specifically, different methods appeared more effective depending on the particular topics or objectives. Similarly, in a study of eleven outreach methods commonly used by fire managers, participants rated interactive activities as significantly more useful despite being more familiar with unidirectional approaches (Toman et al. 2006). These findings suggest an outreach program can be organized to take advantage of the strengths of multiple methods.

Receiver variables

While substantial research has assessed the influence of receiver variables including gender, intelligence, self-esteem, knowledge, and attitudes these variables, there is still substantial uncertainty regarding their effects (Petty and Cacioppo 1996, Erwin 2001). Although influential in some cases, other studies, including reviews of fire outreach programs, have identified limited effects (McGuire 1969, Toman et al. 2004, 2006).

Initial knowledge and attitudes toward the message topic appear to play a more consistent role in persuasive impact. Specifically, messages are more likely to be influential when participant knowledge or attitudes are not well developed (Petty and Cacioppo 1996, Dillard and Peck 2000, Erwin 2001). Similar results emerged in a recent assessment of two fire communication programs; in both cases, participants with low initial understanding or less supportive attitudes were more likely to experience positive change following exposure to outreach programs (Toman and Shindler 2005).

The apparent inconsistencies in the influence of demographic variables can cause consternation among resource professionals looking for guidance in developing communication messages. While receiver characteristics can greatly influence communication success, research does not suggest a list of universal rules to guide program development. However, findings do confirm the importance of knowing your target audience to enable managers to tailor the outreach approach to their particular needs.

Persuasive communication

Persuasion is defined as strategic communication to influence the actions, beliefs, or behavior of receivers (Reardon 1991). This appears to be an apt description of public outreach activities typically designed to promote knowledge gain or influence attitude or behavior change among participants.

Erwin (2001) proposes five primary steps in the persuasion process (Table 1). An individual is first exposed to a message and pays attention to the presented information. Next, receivers develop understanding by exploring the arguments and supporting evidence. Following this evaluation, individuals decide whether to accept the information and yield to the advocated position. While participants may agree with the message at this point, two additional steps are necessary for persuasion to occur. They must retain the information in order to draw upon it for future decisions. Lastly, the individual takes action in accordance with the newly acquire information. We present these steps to emphasize that persuasion is a process. Individuals exposed to new information do not automatically adopt the advocated viewpoint or behavior. There is no guarantee all communication will result in persuasion; even after hearing and understanding a message an individual may disagree or disregard the presented information.

Table 1: Erwin's steps in the persuasion process

1. Attention
2. Comprehension
3. Acceptance/Yielding
4. Retention of the message
5. Acting as a result

Over time substantial effort has been dedicated to integrating the above findings in a general theory of persuasion. Two particularly influential theories are Ajzen and Fishbein's

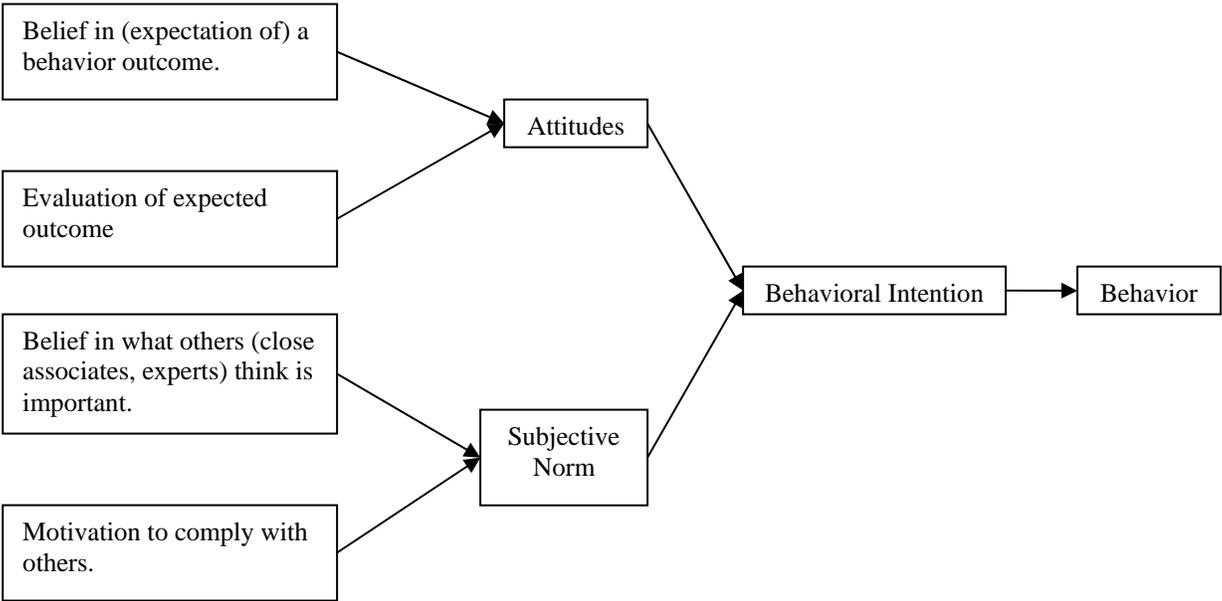
Theory of Reasoned Action (TRA) and Petty and Cacioppo's Elaboration Likelihood Model (ELM). Both models have practical application and have been used successfully to organize and evaluate outreach messages (e.g., Bright et al. 1993, Bright and Manfreda 1997). We briefly review each model below.

Theory of Reasoned Action

The TRA was developed by Ajzen and Fishbein to explain behaviors under the voluntary control of individuals. Primary model components include attitudes (influenced by beliefs and evaluation of behavior outcomes), subjective norms (influenced by beliefs in what others think and motivation to comply), behavioral intentions, and behavior (see Figure 4) (Fishbein and Ajzen 1975). The influence of additional factors such as source credibility or communication channel is assumed to be mediated through attitudes and subjective norms (Erwin 2001).

Model components directly influence adjacent variables (e.g., attitudes and norms influence behavioral intention) and only indirectly effect non-adjacent components (e.g., attitudes indirectly influence behavior) (Ajzen and Fishbein 1980). According to the TRA, messages are most likely to influence behaviors by encouraging participants to alter their attitudes (beliefs in, and evaluation of, likely outcomes of behavior) or subjective norms (either altering normative beliefs or motivations to comply) (Ajzen and Fishbein 1980). In practice, changes in behavioral intention have been highly correlated with changes in actual behavioral (Fishbein and Middlestadt 1995). A meta-analysis provides strong support for the TRA when the appropriate predictors are used (Kim and Hunter 1993). Bright et al. (1993) identified support for the model in a study of fire-related messages.

Figure 4: The Theory of Reasoned Action



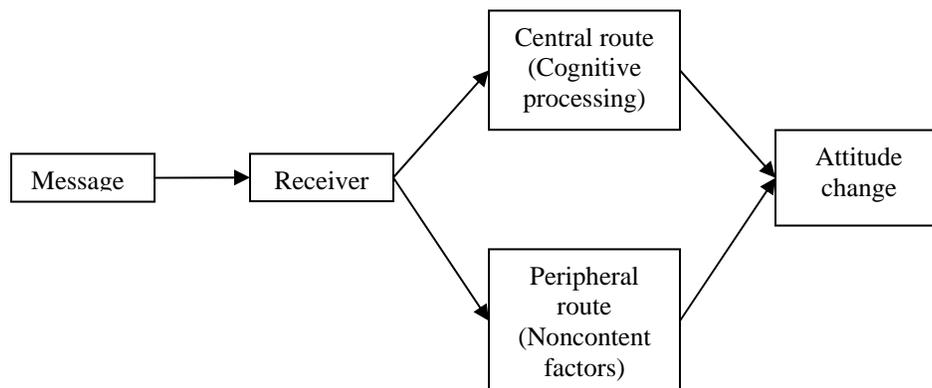
Elaboration Likelihood Model

The ELM identifies two potential routes to persuasion differentiated by the amount of active thinking directed towards message content and the targeted issue (Figure 5). Similar to the TRA, the central route involves rational consideration of message content in relation to previously held attitudes and beliefs. In addition, the model also includes a peripheral route to persuasion where cognitive processing is limited and attitude change is influenced by non-content factors, such as source characteristics or potential for benefits and consequences (Petty and Cacioppo 1996). Parallel processing may also occur, that is, an individual may simultaneously use both central and peripheral routes to evaluate the message (Petty et al. 1987).

While persuasion is possible through either route, attitude change is stronger and more resistant to further change when resulting from central processing (Petty and Cacioppo 1996). For central processing to occur, individuals must be motivated (such as when the message topic has high personal relevance) and have the ability to consider the issue (influenced by

distractions, message complexity, repetition, and dissonance from initial attitudes) (Petty and Cacioppo 1996, Bright and Manfredi 1997). While persuasive messages often attempt to influence participant change by associating the advocated position with desirable traits (success, money) or spokespeople viewed positively by the target audience (celebrities), such techniques rely solely on peripheral processing and are unlikely to be effective on issues already viewed as relevant or when receivers have some initial understanding about the topic (Petty and Cacioppo 1996).

Figure 5: The Elaboration Likelihood Model



Learning theory

As nearly every outreach exchange aims to increase participant understanding, we draw upon literature from adult learning to examine how people learn, interpret, and internalize new information. Based on concept of *andragogy* (Knowles' et al. 1998), we highlight four key principles about adults as learners. First, adults approach learning situations from a problem-based perspective, essentially looking for information that provides insight into a currently perceived problem (Knowles et al. 1998, Merriam and Caffarella 1999). Accordingly, outreach messages which demonstrate their relevance to local concerns and contextual conditions are more likely to resonate with participants.

Second, adults bring a variety of prior experiences (e.g., with the source, general topic area, or specific issue) to the outreach situation. New information will be interpreted based on how it relates to this prior knowledge (Knowles et al 1998). Citizens in forest communities are likely to assess outreach messages in light of their previous experiences with the information provider, e.g., the Forest Service or the Bureau of Land Management. Prior experiences can provide a rich resource for learning activities or can lead to biases and assumptions regarding new ideas. At the very least, communication activities should take participants' experiences into account; failure to do so may result in a lack of interest among the intended audience, serve to discourage participants, or even lead to feelings of distrust and resentment (Knowles et al. 1998).

Third, because they feel they have relevant experiences and interest, adults often seek to actively participate in the information exchange process (Merriam and Caffarella 1999). Adults are more likely to be effectively engaged when they can participate in educational activities that allow them to learn from peers as well as technical experts. This seems particularly important for fire and fuel outreach programs; individuals want to express their particular problem or experience in order to feel that the "solution" is right for them.

The final principle is the importance of source credibility to facilitate effective information exchange (Knowles et al. 1998). Simply, adults are not likely to believe information from a source they do not view as credible. This situation is especially complicated in natural resource management, where the perceived credibility of the information provider (the resource agency) is linked to citizen beliefs about the appropriateness of agency management activities (Jacobson 1999). This can be particularly important in situations where citizens may have interests or concerns about a proposed activity, but know little about its application. In such cases, Wright and Shindler (2001) noted that citizens and organizations believed information about an upcoming project was more useful when they had trust in the agency that provided it.

Diffusion of Innovations

Diffusion of innovations research explores the adoption of new ideas and practices in real-world settings. This work indicates that individuals progress through five stages in a decision process, 1) knowledge, 2) persuasion, 3) decision, 4) implementation, 5) confirmation. The first begins when they become aware of the issue or topic. During this stage they develop two types of understanding, *how-to* (information necessary about how to correctly use a new idea) and *principles* (information about how and why the innovation works).

During the second stage, individuals form favorable or unfavorable attitudes. Interpersonal communication channels become increasingly important as they seek specific information regarding the likely benefits and consequences of implementation and normative beliefs of their peers. For example, regarding defensible space an individual will likely explore how implementation would influence the values they hold for their property (aesthetics, species mix, privacy, etc.). They may also look for normative information at this point, such as whether neighbors perceive treatments as an eyesore or as contributing to community safety.

The next two stages are closely linked. Individuals decide whether to adopt or reject the innovation and then take action. Uncertainty may still exist and decisions are likely to be provisional with the innovation implemented on a trial basis. At this stage, individuals are likely to look for technical, how-to, knowledge. For example, as a homeowner begins to create defensible space zones they may seek information to allow adaptation of guidelines based on the specific characteristics of their property. Demonstration sites or incentives (such as free samples or funding support) can increase adoptions; both have been successful at encouraging property owner implementation of defensible space (Toman and Shindler 2004).

Lastly, adopters evaluate whether the innovation has provided expected benefits and if they are worth the investment. They seek information, including opinions of peers, to support their decision. For example, confirmation of defensible space can occur through examples of

treatments successfully altering fire behavior (either experienced first-hand or indirectly through educational materials, news coverage, etc.) or when others, such as adjacent property owners, also implement home protection activities. New behaviors may be discontinued if a more beneficial practice becomes available or the innovation is perceived as performing poorly.

Summary of related literature

This review of related literature illustrates key elements of the communication process and examines how public outreach can influence participant attitudes and behavior. In this section, we briefly summarize findings and examine implications for the development of agency outreach programs.

While federal agencies have shifted to an increasingly holistic approach to management, natural resource communication is still largely dominated by a linear model of information provision (as described in Figure 1). From this perspective, outreach is viewed as a “spare wheel, to be used when programs break down” (Piotrow and Kincaid 2001, p. 250) and seen as a means to educate an uninformed public who would support agency decisions if they understood the “facts” (Brunson and Kennedy 1995, Jacobson 1999). Ultimately, such an approach places unrealistic expectations on agency communication programs, and public affairs personnel, to provide a quick-fix when conflict arises.

Findings reviewed above suggest a number of shortcomings with this linear approach to public communication. Resulting outreach activities are largely content-driven and fail to account for other factors that influence outreach success. Prior research identified four key components of the communication process—source, message, receiver, and channel. Each merits consideration during development of a communication strategy. Regarding the source, credibility has a particularly strong influence on message effectiveness and may trump the influence of other variables. Messages may be dismissed without consideration of their content or method of delivery if the source is not seen as credible (Petty and Cacioppo 1996). Findings

reviewed here suggest sources are more likely to be regarded as credible when they are seen as unbiased experts who are familiar to participants. Similarly, research has indicated that while citizens trust local agency personnel, they have less confidence in the larger federal bureaucracy suggesting the importance of localizing the source of outreach messages (Shindler and Toman 2003).

As for the message, two specific characteristics that influence communication effectiveness are message dissonance and the relevance of message topic; moderately dissonant messages and those that target issues of high importance are more likely to lead to attitude change. With the linear approach, there is an assumption that every receiver needs the same information for persuasion to occur. Thus, messages are not likely to be designed or targeted at individual attitudes or normative beliefs.

The channel or method of communication can also influence success. Findings from both persuasion research and diffusion of innovations indicate individuals pass through various stages in a decision process. They are likely to look for different communication methods depending on which stage they are in (Rogers 2003). Particular methods are more appropriate to achieve different communication objectives. Broad, awareness-building messages are important in early stages, while participants seek more specific, interactive communication activities when deciding whether to adopt a new behavior. Comprehensive outreach programs can include multiple outreach methods to meet a range of participant needs and communication objectives.

Lastly, this review reinforces the importance of knowing the target audience. Each model examined here emphasizes the importance of developing an understanding of receivers. Only then can outreach approaches be tailored to address the specific attitudes and normative beliefs, targeted to demonstrate their relevance, and account for participants' prior experiences and understanding. Through this approach, message content is no longer simply decided on by agency experts, but is based upon receiver needs and expectations.

Conceptual Framework

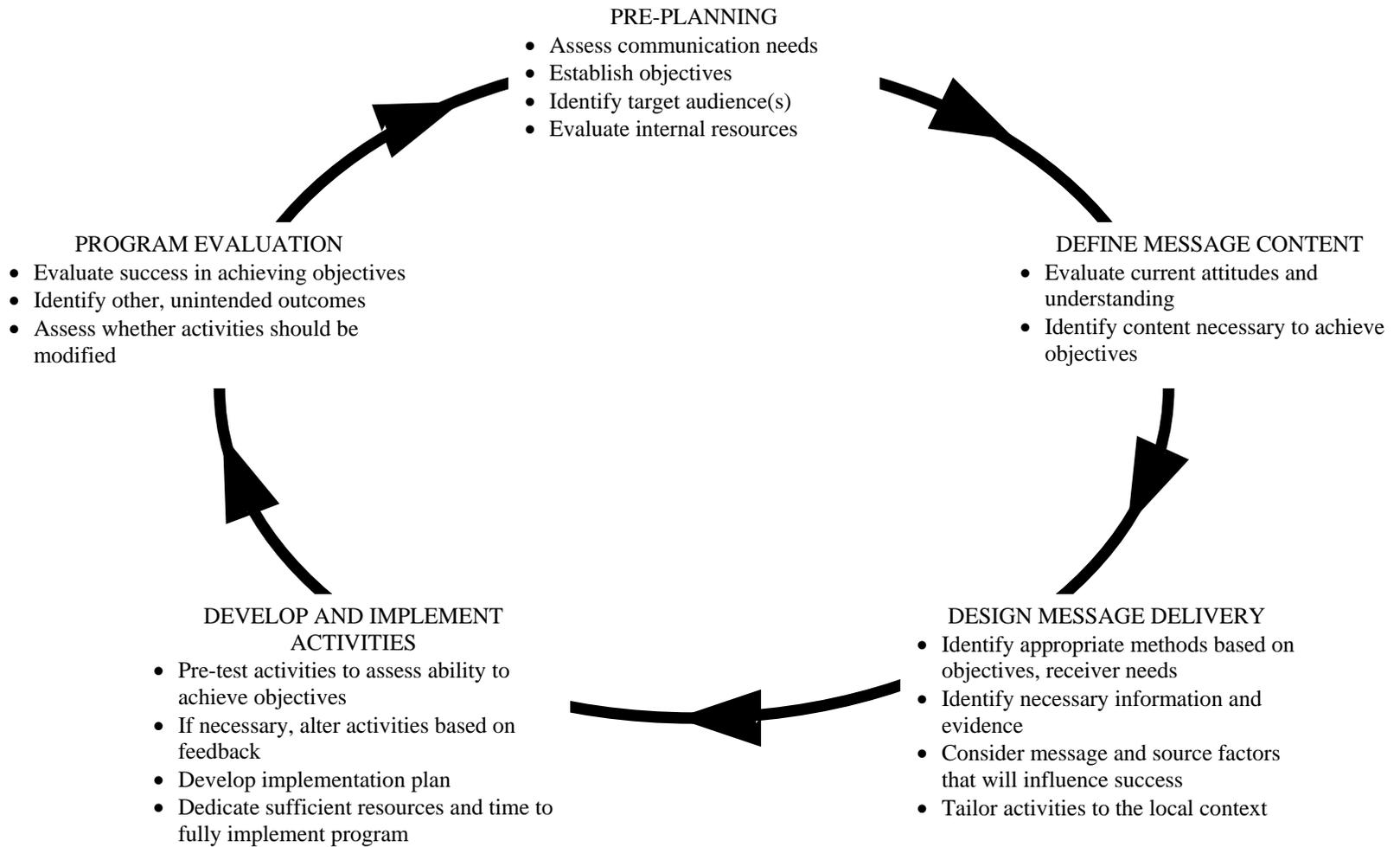
In this section we draw upon the literature to outline a framework for organizing and implementing a comprehensive outreach program. Framework steps are designed to overcome the following common shortcomings of public communication campaigns identified in a recent review (Piotrow and Kincaid 2001). First, outreach programs typically lack specific objectives and expressed methods to achieve them. Second, messages are typically created for general consumption and not tailored to specific audiences. Third, messages and delivery formats that are not pre-tested to examine their effectiveness with intended audiences. Fourth, most programs are not developed following “well-articulated models of behavior change” such as TRA or ELM. Lastly, little or no monitoring and evaluation is completed to evaluate the program’s success in meeting objectives.

Figure 6 presents the framework organized around five main steps,

- Pre-planning,
- Designing message content,
- Designing message delivery,
- Developing and pre-testing activities, and
- Implementation and evaluation.

The framework incorporates a circular design to illustrate the ongoing nature of the communication process and underscore the interaction among framework components.

Figure 6: Framework for implementing and monitoring outreach programs for fire and fuel management



This framework is designed to provide guiding principles to resource managers as they plan, implement, and monitor outreach activities. The remainder of this section discusses each framework component in greater detail. Tables are included to highlight discussion points and organizing questions. These are designed to encourage thoughtful deliberation among resource personnel and provide guidance for outreach development. The framework is based upon theoretical perspectives and applied research from forest communities. Ultimately, while no simple formula for success exists, outreach activities are more likely to be effective when based on sound communication principles tailored to address local needs.

Step One: Pre-Planning

Fuel managers would never conduct a prescribed burn without a comprehensive plan detailing treatment objectives and appropriate conditions. Yet, it is not uncommon for outreach activities to be implemented with nothing more than a vague goal of “educating the public.” Not surprisingly, such a simplistic approach is unlikely to succeed. Effective planning depends on the ability of resource professionals to determine communication objectives and organize an appropriate approach to outreach before inviting the public into the process (Jacobson 1999). Two researchers, Delli Priscoli and Homenuck (1990), refer to this as “up-front thinking” and argue that thoughtfully planning outreach activities can help avoid costly problems later on such as confrontations, delays, appeals, and lawsuits.

Key questions to help organize this approach are presented in table 2. Questions are designed to encourage discussion among the management team to develop shared expectations and ownership in the communication process. In many cases, agencies will have resources in place they can draw on for direction, such as overarching plans, prior interactions with the community, and public responses to similar projects (Jacobson 1999, Shindler et al. 1999).

First and foremost, agency personnel should identify what they want to achieve by communicating with the public. Objectives may be classified as building awareness or

influencing attitude or behavior change (Atkin 2001, Rogers 2003). Other important, but often unrecognized, objectives may include relationship and trust-building outcomes; these should also be specified. Is the primary purpose to call attention to basic wildfire prevention (Smokey Bear-type messages) or to encourage property owners to take action in creating defensible space? Perhaps it is to enlist public support for agency fuel reduction activities. Each is a worthy objective and each requires a different outreach approach.

Planning for outreach should consider specific audiences—their information needs, the role they will play, their previous interactions with agency personnel, and the local conditions they are familiar with. Depending on the communication objectives, the audience may vary from homeowners in a particular neighborhood to residents of an entire community or region. Agency personnel will need to understand stakeholders' awareness of fuel problems as well as their attitudes about severity levels and potential management actions (Jacobson 1999). In some cases, this information may already be available, but in others it may be necessary to assess community characteristics through formal methods (stakeholder surveys or interviews) or informal means (“coffee-shop” meetings or discussions with community leaders). The appropriate scope depends upon the particular issue and communication objective and may vary from discussions with select homeowners to a formal survey of community members or visitors to a specific recreation area. Results can improve communication activities by aligning them with community needs.

During this stage, management discussions should also identify any organized groups, such as homeowners' associations or local Friends' organizations, who may be effective allies in the outreach process. These groups can contribute to outreach success through their knowledge of local communication networks and credibility among peers in the community. Building communication partnerships has proven effective at increasing citizen support for agency fuel

treatments and encouraging homeowners to implement defensible space activities (Toman and Shindler 2004).

Planning also includes consideration of internal resources and constraints that may influence outreach effectiveness. In particular, it is important to identify staff with the appropriate skills and temperament to lead communication activities. Shindler et al. (2002) argue that “most effective public processes historically have involved one or two agency members with genuine interpersonal skills” (p. 46). Outreach programs will be more effective when such individuals are given a lead role and supported in their efforts by their management unit. This seems particularly true in fire and fuel management where trust and credibility with residents are essential attributes.

Table 2: Planning the communication approach

Organizing questions¹
<p>1. Determine objectives</p> <p>What do we hope to accomplish with this outreach program?</p> <p>What should the public know, or be able to do, as a result of this communication process?</p> <p>What does the public need to know to participate effectively?</p> <p>What does the agency want from the public (e.g., understanding, feedback, acceptance, action)?</p> <p>2. Assess the target audience(s) and contextual influences</p> <p>Who is “the public” for this issue?</p> <p>Are there specific groups or stakeholders for this problem or issue?</p> <p>What are their initial attitudes or understanding of the issue?</p> <p>How might the history of local agency-citizen relationships affect reactions to issue?</p> <p>Are there specific groups or organizations who have an established relationship with agency personnel and can become part of the outreach effort?</p> <p>What past management actions might contribute to citizen reactions to issue?</p> <p>What is the public’s role in this process and how will it be communicated?</p> <p>What other contextual circumstances should be considered?</p> <p>3. Evaluate internal resources</p> <p>How will decisions be made and who will make it?</p> <p>What resources can we dedicate to this process?</p> <p>Who are the best individuals to be in the lead (public contact) on outreach activities?</p> <p>What internal constraints will influence the types or scope of activities that can be implemented?</p>

¹Adapted from Priscooli and Homenuck (1990) and Jacobson (1999)

Step Two: Defining Message Content

The next step is to identify the information necessary to achieve outreach objectives. Key organizing questions are presented in Table 3. In the traditional communication approach, message content was paramount (Jamieson 1994). Specifically, resource professionals selected the information they believed participants lacked and developed messages to deliver it. While information is central to communication success, this content-centered focus largely failed to account for other factors essential to the process of how people come to understand forest conditions and support agency activities (Shindler et al. 2002). The approach advocated here

differs in two important ways. First, content selection is based upon communication objectives, receiver needs, and contextual influences previously identified in Step 1. Second, message content and delivery (specific communication methods) are each considered as equally important components of outreach activities. We explore message content according to communication objective (awareness-building, instructive, and persuasion) below while message delivery is discussed in Step 3.

Common to all message types is the importance of crafting messages that are understandable to the target audience. In natural resource communication this applies most often to avoiding the use of jargon; agency personnel should pay particular attention to the use of acronyms and technical or operational terms that may be unfamiliar to the audience (e.g., hazardous fuels, invasive species, and ladder fuel) (Brunson 1992).

Message content for awareness-building

Awareness-building messages are generally created for mass consumption. As Atkin (2001) writes, messages with the “broadest reach can deliver only a superficial amount of information” (2001, p. 56). Content is generally limited to providing basic information about a topic including a select number of arguments and supporting evidence. Accordingly, these methods are best suited to instilling a central idea or communicating a general theme (e.g., forest health conditions, need for defensible space around homes, or role of fire in forest systems). The primary purpose is to generate increased recognition of the issue, sensitize participants to later messages, and encourage additional information seeking (Rogers 2003, Atkin 2001). In limited cases, these basic messages can contribute to attitude change among individuals with low initial understanding or prompt action among already supportive audiences, but they should not be counted on to achieve persuasive objectives (Dillard and Peck 2000, Toman and Shindler 2005).

Successful awareness-building messages demonstrate their relevance to receivers by localizing information and highlighting the most compelling arguments. In many cases, these

messages represent one component of a larger communication program that also includes instructive and possibly persuasive messages. Coupling outreach activities in this way can improve program success. For example, a management unit preparing for a large-scale thinning project may begin their outreach efforts with activities to increase resident awareness of the project through advertisements in the local newspaper and notices in community centers. These advertisements could highlight the purpose and scope of the project and indicate project websites, scheduled public workshops, or guided field tours where additional information can be obtained.

Table 3: Defining message content

Organizing questions
<p>1. Review communication objectives and citizen information needs</p> <p>What is the communication objective (build-awareness, provide instruction, or influence attitude or behavior change)?</p> <p>What do stakeholders need to know to achieve the communication objectives?</p> <p>2. Awareness-building¹</p> <p>What is current awareness level?</p> <p>How relevant is the issue for this audience?</p> <p>What are the main arguments and evidence that will demonstrate issue relevance to audience?</p> <p>What appeals will be most effective at motivating individuals to first pay attention to the message and then seek more information?</p> <p>Where can individuals be directed to receive more information?</p> <p>3. Instructive messages¹</p> <p>What is current understanding and skill-level of audience?</p> <p>What skills does the audience need to implement the proposed activity?</p> <p>What is primary rationale behind proposed activity?</p> <p>What examples and evidence will best explain proposed activity?</p> <p>How can audience members contribute to outreach effectiveness? Can some members participate in peer-instruction?</p> <p>4. Persuasive messages¹</p> <p>What are current attitudes and normative beliefs of audience?</p> <p>What beliefs influence these attitudes?</p> <p>What normative expectations influence normative beliefs (e.g., expectations of neighbors' attitudes toward vegetation removal)?</p> <p>What evidence and arguments can be targeted to alter current audience beliefs?</p> <p>Can a message be created that is a moderate distance from initial beliefs?</p> <p>How can audience beliefs and experiences be included in the message? To what extent can audience members participate actively in message development and delivery?</p> <p>Is message delivered by a respected, credible source? Is message content current, accurate, credible?</p> <p>What counter-arguments are likely? Are they credible? Should they be refuted?</p>

¹Most effective if based on needs of specific audience generated from evaluations in Step 1.

Message content for instructive messages

Instructive messages are designed to provide the necessary understanding (“principles knowledge”) and skills (“how-to knowledge”) to support or undertake advocated activities. Messages communicating “principles knowledge” generally explain the rationale behind a

specific management approach (Rogers 2003). In the case of a prescribed fire program, these messages may highlight the ecological benefits achieved by restoring fire to the landscape, citing such things as the area's historical fire regime and ecological adaptations of local species to fire. While principles knowledge is not always necessary, without it there is a higher probability of misunderstanding and discontinuing support over time (Rogers 2003).

“How-to” messages provide information necessary to implement a new activity (Atkin 2001). Such messages are not required in all situations, but are particularly important when outreach is designed to encourage a specific behavior among receivers. To illustrate, instructive defensible space messages include specific guidelines for vegetation management and appropriate species in a series of zones around the house.

Message content for persuasive messages

Persuasive messages are intended to create attitude or behavior change. These messages will likely contain a greater number of arguments and evidence than awareness-building or instructive messages (Atkin 2001). Essentially, the burden of proof is greater for persuasive messages; as more is asked of the receiver, more is required of the message provider. While all message types will be more effective when targeted at specific audiences, it is particularly crucial that persuasive messages establish their relevance by tailoring information to receivers' initial attitudes and beliefs (Bright et al. 1993, Siero and Doosje 1993).

The models of behavior change discussed above, particularly the TRA, indicate how to target message content for greatest effect. Substantial research supports the effectiveness of messages developed according to these guidelines (e.g., Bright et al. 1993, Fishbein and Middlestadt 1995, Atkin 2001). The TRA specifies that attitudes and behaviors can be changed by influencing antecedent variables (see Figure 4). Specifically, messages aimed at influencing behaviors would encourage participants to alter their attitudes or subjective norms toward the behavior (Ajzen and Fishbein 1980). Message content should be tailored to the attitudes and

normative beliefs of the specific audience based on assessments conducted for Step 1 outlined here. For example, if residents resist implementing defensible space because of perceived impacts to wildlife or upsetting neighbors by altering aesthetics, messages can target these concerns directly by highlighting benefits to wildlife habitat and demonstrating aesthetic outcomes.

Step Three: Designing Message Delivery

After identifying target audiences, establishing objectives, and defining content, outreach personnel must determine the appropriate method to deliver the information. In any given situation the best method is the one that will “*effectively* reach the greatest percentage of the target audience” (Jacobson, 1999, p.8, italics in original). While method selection may appear relatively straightforward (e.g., those with greater coverage are better), communication approaches have different strengths and weaknesses and differ in their ability to achieve objectives (Jacobson 1999, Rogers 2003). Ultimately, method selection should be driven by outreach objectives—awareness-building, instruction, or persuasion. This approach to method selection is summarized in Table 4.

Unidirectional methods offer the ability to reach a large number of people relatively easily but are generally limited in the amount of information they can effectively transmit. Accordingly, these methods are particularly well-suited to building awareness of an issue and are most effective during the early, knowledge gaining stage of the decision process (Jacobson 1999, Rogers 2003).

Instructive messages designed to provide “how-to” or “principles” information can be effectively transmitted through either unidirectional or interactive means. Reviews have found both approaches to be effective at increasing participant understanding of fire-related information (e.g., Nielsen and Buchanan 1986, Loomis et al. 2001, Toman and Shindler 2005).

Criteria to decide which approach is best include size of target audience, need for participants to adapt information to fit needs, and complexity of the messages.

With increasing audience sizes unidirectional methods are likely to be more appropriate. On the other hand, information that is less universal and more likely to require adaptation by the user is better suited to delivery through interactive means. For example, while defensible space guidelines can be delivered in prepared messages, homeowners are likely to develop questions during implementation on their property regarding specific landscape features. To be most effective, messages should also include contact information of a local FireWise council or extension office where answers to such questions can be found. As for message complexity, research suggests complex messages are better interpreted if they can be read at one's own pace and re-read if necessary (Chaiken and Eagly 1976). Returning to the example of defensible space, it is likely that a plan outlining treatment zones and vegetative options will be more effective when presented in a format that can be consulted throughout the implementation process, such as a brochure or newsletter. As these last examples illustrate, instructive messages may be most effective when using a combined approach that includes hard copies of information for review and consultation as well as a "feedback loop" to enable interaction with peers or resource professionals and options to adapt to changing conditions. A recent review of fire outreach activities supports such an approach (McCaffrey 2004).

As for persuasive messages, interactive methods are most appropriate. As noted in the review of prior research, individuals progress through various stages in a decision process. They first develop basic awareness of the issue or topic (such as defensible space or agency-implemented fuels treatments), then form opinions about its appropriateness, and, finally, decide whether or not to support or adopt the new behavior. People generally turn to interpersonal communication methods when deciding whether to adopt new ideas or change behavior (Rogers 2003). At this stage, individuals want more specific information about likely outcomes of a

practice—or alternatively, of doing nothing—either to them or to places they know and care about (such as the impacts of thinning or prescribed fire around a homesite or favorite recreation area). More specifically, they want to know how *serious* and *certain* the outcomes are and *how soon* they will occur in the context of these places (Shindler *et al.* 2002). Public preference for more interactive forms of information exchange is particularly high for activities such as fuels treatments that hold a degree of risk or uncertainty for citizens (Jamieson 1994). The ability to engage in discussion, visit a site where treatments have been implemented, or actually view a demonstration of fuel reduction practices can reduce the uncertainty about treatment outcomes. The give-and-take of interactive exchanges allows citizens to become more comfortable with the available options and decide how they feel about managers' ability to carry out treatment implementation or the acceptability of defensible space.

In some cases, management units may focus on a single communication objective, such as building awareness among forest users of the need for personal responsibility with fire. In other situations, a comprehensive communication strategy is likely to include elements of all three objectives. An example of such a combined approach is an outreach program designed to encourage homeowners to implement defensible space in Coeur d'Alene, Idaho. The program began with a series of public service announcements to build awareness of the need for defensible space in the WUI. These PSA's were printed in the local newspaper and included guidelines for implementation, information about available funding to offset treatment costs, and contact points for additional information. In addition to the PSA's the campaign also included print material with detailed implementation guidelines, demonstration areas, and on-site meetings with project personnel to discuss treatment lay-out and implementation on their personal property or neighborhoods. For some residents who were already committed to the need for defensible space, the PSA's were sufficient to prompt action. However, most participated in additional outreach activities before implementing defensible space on their

property. This combined approach has proven successful; as of July 2006, over 4,000 buildings had been protected.

Table 4: Designing message delivery

Organizing steps
<p>Review communication objectives and citizen information needs</p> <p>What is the communication objective (build-awareness, provide instruction, or influence attitude or behavior change)?</p> <p>Awareness-building messages</p> <p>Mass, unidirectional communication methods are more appropriate.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Brochures • Public Service Announcements • Newsletters • Environmental impact statements • News releases • Internet websites • Exhibits at State/County fairs <p>Instructive messages</p> <p>Either a unidirectional or interactive approach may be successful. A combined approach appears particularly effective.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Small-group workshops or demonstrations on defensible space with take-home implementation guidelines • Brochures or newsletters delivered to participants by fire personnel • Brochures, newsletters, or public service announcements include contact information where answers to specific questions can be found <p>Persuasive messages</p> <p>Interactive approaches are more appropriate.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Guided field trips • Demonstration sites • Conversations with agency personnel • Interpretive centers • Small-group workshops

Step Four: Pretest and Implementation

In most cases, following development messages are simply put into practice without assessing their ability to achieve communication objectives. Returning to our prescribed burn comparison, even after the myriad of pre-burn measurements and evaluations are completed, the fire team ignites small test burns to confirm the treatment fire will behave as expected. Similarly, outreach messages should be pre-tested prior to their wholesale implementation. To

conduct a pre-test, a small portion of the target audience participants in the planned activities and is engaged in discussions regarding their experience. Methods similar to those discussed in Step 1, such as focus groups and interviews can be used. Questions presented in Table 6 can help organize these discussions and generate feedback to fine-tune activities.

Following necessary adjustments, outreach activities are ready for implementation; completion of prior steps will result in a well-developed and targeted communication program. As with other agency actions, personnel should develop an operational plan and identify the actions necessary for implementation. Organizing steps are presented in Table 6. Topics include developing tasks required for implementation, budgetary considerations, project timeline, and assignment of responsibilities.

Table 6: Pre-testing and Implementing outreach activities

Pre-test: Organizing questions
To what extent do activities meet participant needs and expectations?
Do activities achieve outreach objectives?
Are there other, unintended outcomes from communication program?
If alternate versions of the activities were tested, which are most effective?
How could activities be modified to better serve participants?
Should program be fully developed and implemented?
Implementation: Organizing steps
1. Create a detailed list of required tasks
2. Determine a final budget
3. Determine timeline of task completion
4. Identify personnel responsibilities for each task

Pancer and Westhues 1989, Jacobson 1999

Step Five: Program Evaluation

Implementation has generally been viewed as the final step of outreach development. However, without monitoring activities are simply assumed (perhaps incorrectly) to be resulting in the desired outcomes. Evaluation is crucial to the long-term success of any communications program as it allows the management team to gather feedback and make necessary course corrections (Jacobson 1999). Questions presented in Table 7 are intended to provide discussion points for agency personnel. Evaluation techniques are similar to those for pre-testing, and may include interviews, focus groups, or participant surveys.

Table 7: Program Evaluation

Organizing questions
<ul style="list-style-type: none">• To what extent does the outreach program meet participant needs and expectations? Is it effective at achieving outreach objectives? Do activities result in unintended outcomes?• Is the message content appropriate to achieve objectives? Specifically, is the message clear and terms are defined for common use? Is sufficient evidence and information provided? Should content be updated to reflect more current information?• Are outreach methods aligned with the objective (unidirectional for awareness-building and interactive for persuasion)? Would other methods be more effective? Have methods been fully and appropriately implemented? In the case of interactive methods, are the most qualified personnel involved?• In what ways have outreach activities influenced relationships with stakeholders? Describe any changes in communication style, trust, and credibility among participants.• How have contextual factors influenced outcomes? What obstacles still exist? How can they be addressed?• Could activities be modified to improve their effectiveness? How? In what ways can experiences with this outreach program contribute to communication about other topics? Can activities be adapted to address other topics?• Should program be continued or are resources better directed at other topics? Are communication outcomes worth the resources necessary for implementation? Have outcomes been achieved to a sufficient level to justify shifting focus?

Shindler et al. 1999

Conclusion

Until recently, agency fire messages were dominated by a singular purpose, to support fire exclusion efforts by discouraging carelessness with fire. The straightforward nature of this message was well-suited to unidirectional communication methods typical of natural resource communication throughout much of the last century. Over the last several years the communication job has become substantially more complex. While the message of personal responsibility is still valid, today's messages are also designed to support agency fuel reduction efforts and encourage property owners to play an active role in protecting their homes from wildfire.

The framework presented in this paper is designed to provide planning guidelines to organize a comprehensive public communication strategy to meet resource objectives. We recognize its use will require a substantial commitment of time and effort beyond that normally involved in outreach planning. There are no short cuts to developing the trust and understanding necessary to manage today's fire management challenges. Effective outreach and education requires long-term dedication by resource professionals. Over time such an approach will play an important role in encouraging property owners to share the responsibility of fire and fuel management.

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VI. Appendices: Summary Reports

Wildland Fire Study: An Evaluation of Communication Strategies

This study is part of a comprehensive project to evaluate agency communication strategies with citizens and local communities to gain acceptance for fire management activities and fuel reduction programs. This preliminary report summarizes responses to a questionnaire completed by visitors to Sequoia and King’s Canyon National Parks in central California, the High Desert Museum in central Oregon, and the World Forestry Center in Portland, Oregon. Overall, 654 visitors completed a survey on-site in Summer 2003. Of these, 459 received and completed a more extensive follow-up for a 70% response rate. One objective for surveying visitors after their visit was to compare responses to determine if exposure to the exhibit influenced their thinking about fuel management. The mail survey replicated questions from the on-site questionnaire and included additional items for further analysis. This report provides a summary of frequency distributions of those who completed both questionnaires. For additional information contact:

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Support for this research provided by the USDA Forest Service North Central Research Station and the Joint Fire Science Program.

1. GEOGRAPHIC DIFFERENCES

1.1. Prior experience with forest management

1. Have you read or heard about:

	Percent of respondents			X ²	Significance	
	On-site	HDM	SEKI			WFC
the use of prescribed fire or controlled burning	Yes	100	87	99	23.4	<.01
	No	0	12	2		
	Not sure	0	1	0		
	Mail					
	Yes	100	98	100	3.6	NS
	No	0	2	0		
Not sure	0	0	0			
forest thinning to reduce the threat of fire	On-site					
	Yes	98	85	96	21.1	<.01
	No	2	14	3		
Not sure	0	1	2			
	Mail					
	Yes	94	93	100	6.4	NS
	No	2	4	0		
Not sure	4	4	0			

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

	A moderate amount					A great deal	X ²	Significance
	None	1-----2-----3-----4-----5						
HDM	1%	13%	39%	27%	20%	23.2	<.01	
SEKI	6%	18%	46%	19%	12%			
WFC	2%	21%	28%	31%	19%			

3. In general, how would you rate the overall condition of forests in the western US?

	Percent of respondents			X ²	Significance
	HDM	SEKI	WFC		
Very unhealthy	12	4	6	31.1	<.01
Somewhat unhealthy	57	39	54		
Somewhat healthy	29	51	39		
Very healthy	2	7	2		

1.2 Opinions and experience with fire management strategies

4. Please indicate your opinion regarding the use of the following fuel management practices by managers in agencies like the Forest Service or BLM. (*Please select one answer for each treatment.*)

	Post-visit mail survey	Percent of respondents			X ²	Significance
		HDM	SEKI	WFC		
Prescribed fire	Totally acceptable	41	52	42	10.6	.385
	Somewhat acceptable	43	31	37		
	Neutral	6	8	9		
	Somewhat unacceptable	6	4	8		
	Totally unacceptable	3	2	3		
	No opinion	2	4	2		
	Post-visit mail survey					
Thinning	Totally acceptable	54	42	42	6.8	.740
	Somewhat acceptable	27	30	28		
	Neutral	7	9	10		
	Somewhat unacceptable	6	9	9		
	Totally unacceptable	3	5	5		
	No opinion	3	5	6		

5. We'd like to know about your level of **confidence** in forest managers to use practices to reduce the threat of fire. How much **confidence** do you have in managers in agencies like the Forest Service, National Park Service, or BLM...

	On-site	Percent of respondents			X ²	Significance
		HDM	SEKI	WFC		
Prescribed fire	Full	29	50	27	32.2	<.001
	Moderate	55	42	53		
	Limited	12	6	18		
	None	1	1	3		
	No opinion	4	2	0		
		Mail				
Thinning	Full	25	46	29	38.3	<.001
	Moderate	53	44	41		
	Limited	18	8	29		
	None	0	0	0		
	No opinion	4	3	0		
		On-sight				
	Full	26	48	31	23.2	.003

Moderate	47	33	44		
Limited	19	11	16		
None	2	2	4		
No opinion	7	7	4		
Mail					
Full	29	42	35	8.6	.373
Moderate	43	35	35		
Limited	21	16	21		
None	2	3	4		
No opinion	6	5	4		

6. Not everyone agrees on what to do about fire management. We're interested in your opinion. Please indicate if you **agree** or **disagree** with the following statements.

	Percent of respondents			X ²	Significance
	HDM	SEKI	WFC		
Thinning for fuel reduction will lead to unnecessary harvesting.					
On-site					
Agree	12	15	19	12.1	.017
Disagree	68	51	57		
Don't Know	21	34	24		
Mail					
Agree	15	18	21	6.5	.162
Disagree	68	55	59		
Don't Know	18	27	21		
All fires, regardless of origin, should be put out as soon as possible.					
On-site					
Agree	6	16	9	9.5	.049
Disagree	88	78	85		
Don't Know	7	6	6		
Mail					
Agree	3	3	6	12.7	.012
Disagree	85	93	90		
Don't Know	13	4	4		
Managers should periodically burn underbrush and forest debris.					
On-site					
Agree	82	84	82	1.7	.785
Disagree	5	3	6		
Don't Know	13	13	12		

Mail

Agree	83	86	82	8.0	.089
Disagree	6	2	8		
Don't Know	12	13	10		

Prescribed fires or controlled burns are too dangerous to be used.

On-site

Agree	1	5	6	6.6	.157
Disagree	89	83	88		
Don't Know	10	12	6		

Mail

Agree	2	2	6	5.5	.232
Disagree	92	93	85		
Don't Know	7	5	9		

Prescribed fire or controlled burns should not be used because of potential health problems from smoke.

On-site

Agree	5	6	4	2.6	.615
Disagree	87	81	82		
Don't Know	8	14	13		

Mail

Agree	7	3	5	4.2	.375
Disagree	84	86	82		
Don't Know	9	12	13		

7. We're interested in learning more about what you **know about wildfires and fuel management**. Please answer the following questions to the best of your ability by indicating whether you believe the answer is generally true, generally false, or that you are not sure.

	Percent of respondents			X ²	Significance
	HDM	SEKI	WFC		
Wildfires have played a significant role in shaping natural forests in the western United States					
On-site					
Generally true	96	87	99	14.7	.005
Generally false	0	3	2		
Not sure	4	10	0		
Mail					
Generally true	95	93	97	2.4	.649
Generally false	1	2	2		
Not sure	4	6	2		
Wildfires usually result in the death of the majority of animals in the area					
On-site					
Generally true	4	12	3	11.6	.020
Generally false	74	66	79		

Not sure	22	22	18		
Mail					
Generally true	3	9	7	7.6	.106
Generally false	79	71	79		
Not sure	18	20	13		
Prescribed fire or controlled burns effectively reduce amounts of fuel in most forests					
On-site					
Generally true	74	70	77	1.8	.761
Generally false	7	9	4		
Not sure	19	21	19		
Mail					
Generally true	90	90	78	9.2	.056
Generally false	3	2	6		
Not sure	7	8	16		
Prescribed fires or controlled burns reduce the chance of high-intensity wildfire					
On-site					
Generally true	88	89	91	3.8	.424
Generally false	3	3	6		
Not sure	9	9	3		
Mail					
Generally true	94	91	90	1.3	.849
Generally false	2	3	3		
Not sure	4	6	7		
A history of suppressing wildfires has increased the risk of a destructive fire in the western United States					
On-site					
Generally true	82	68	69	9.9	.042
Generally false	7	10	12		
Not sure	11	23	19		
Mail					
Generally true	87	75	84	8.4	.077
Generally false	3	8	4		
Not sure	10	18	12		

8. How familiar are you with the following terms regarding forest and fire management?

	Percent of respondents			X ²	Significance
	HDM	SEKI	WFC		
Fuel reduction					
Know meaning of term	92	81	90	8.7	.067
Heard term, don't know meaning	6	11	6		
Never heard term	3	8	4		
Hazardous fuels					

Know meaning of term	65	61	72	5.2	.265
Heard term, don't know meaning	27	25	16		
Never heard term	8	14	12		
Prescribed fire					
Know meaning of term	92	92	88	2.9	.566
Heard term, don't know meaning	7	7	12		
Never heard term	2	1	0		
Controlled burn					
Know meaning of term	95	98	99	2.8	.576
Heard term, don't know meaning	4	2	2		
Never heard term	1	0	0		
Wildland fire					
Know meaning of term	70	63	79	12.9	.012
Heard term, don't know meaning	23	20	12		
Never heard term	7	17	9		
Ladder fuel					
Know meaning of term	61	21	38	66.9	<.001
Heard term, don't know meaning	19	23	21		
Never heard term	20	56	41		

1.3. Evaluations of interpretive and outreach programs

9. Resource professionals can use various ways to provide information about management actions such as **fire prevention, prescribed burning, mowing, and thinning hazardous fuels**. We want to know how useful you think these types of information are – in other words, do they provide you with information that you find easy to understand, that you trust, and is helpful. For each of the following types of information about fire management, please circle the best answer in each column. *If you are unfamiliar with an information source, or have never used that source, please mark the space on the far right (“no opinion”).*

		Percent of respondents			X ²	Significance
		HDM	SEKI	WFC		
Guided field trips to forests						
	No opinion	36	55	45	12.6	.002
	Easy to Understand	99	99	97	.798	.671
	Trustworthy	99	98	95	1.9	.373
	Very	71	84	74	13.2	.010
Helpfulness	Slightly	27	14	15		
	Not	1	3	12		
Interpretive signs on trails or at visitor centers						
	No opinion	12	14	13	.22	.893
	Easy to Understand	100	98	97	4.0	.406
	Trustworthy	98	99	98	.762	.683
	Very	62	69	65	3.1	.539
Helpfulness	Slightly	35	28	30		
	Not	3	2	6		
Video messages at visitor centers						
	No opinion	27	33	18	6.6	.036
	Easy to Understand	94	100	96	6.9	.031
	Trustworthy	96	99	95	5.4	.067
	Very	48	64	66	8.2	.083
Helpfulness	Slightly	42	30	24		
	Not	9	6	10		
Educational workshops						
	No opinion	56	67	42	14.4	.001
	Easy to Understand	86	95	93	3.5	.169
	Trustworthy	92	99	95	4.2	.117
	Very	51	59	61	1.7	.785
Helpfulness	Slightly	33	30	25		
	Not	16	11	14		
Conversations with agency employees						
	No opinion	39	45	42	1.1	.572

Easy to Understand	83	96	84	12.4	.002
Trustworthy	86	92	76	7.3	.025
Very	54	70	57	7.4	.113
Helpfulness					
Slightly	37	23	29		
Not	9	6	14		
Elementary school programs					
No opinion	54	62	52	3.4	.179
Easy to Understand	98	98	94	2.0	.361
Trustworthy	94	84	91	2.3	.306
Very	59	61	55	1.4	.828
Slightly	25	27	24		
Not	17	12	21		
Informational brochures					
No opinion	33	21	16	8.2	.016
Easy to Understand	94	99	96	4.7	.095
Trustworthy	97	99	92	6.3	.041
Very	42	63	54	16.4	.003
Slightly	49	36	38		
Not	9	2	8		
Internet web pages					
No opinion	54	60	48	2.9	.225
Easy to Understand	87	92	94	1.9	.382
Trustworthy	56	78	74	7.5	.022
Very	33	49	52	8.5	.073
Slightly	46	42	29		
Not	21	9	19		
Government public meetings					
No opinion	54	66	50	8.3	.015
Easy to Understand	47	57	42	2.9	.226
Trustworthy	39	55	48	3.4	.183
Very	21	34	47	5.7	.221
Slightly	32	44	23		
Not	47	22	30		
TV public service messages					
No opinion	27	30	16	5.0	.081
Easy to Understand	96	98	100	2.4	.296
Trustworthy	78	85	75	3.4	.175

Very	35	41	39	1.5	.823
Slightly	53	48	45		
Not	12	12	16		
Newsletters					
No opinion	53	54	45	1.5	.465
Easy to Understand	79	95	91	10.9	.004
Trustworthy	72	92	86	10.7	.005
Very	23	52	38	27.9	<.001
Slightly	46	44	50		
Not	31	4	13		
Special sections in newspapers					
No opinion	43	47	60	11.0	.004
Easy to Understand	86	92	85	2.0	.362
Trustworthy	61	63	82	10.2	.006
Very	29	54	31	13.1	.010
Slightly	50	38	50		
Not	21	9	19		
Smokey Bear message					
No opinion	9	13	20	5.1	.077
Easy to Understand	98	100	98	2.0	.359
Trustworthy	31	34	34	.849	.654
Very	35	46	29	11.2	.024
Slightly	49	44	47		
Not	16	10	24		

10. Did your experience at the fire exhibit influence your opinion of the following practices (make them more or less acceptable) or is your opinion unchanged?

	Percent of respondents			X ²	Significance
	HDM	SEKI	WFC		
Prescribed fire					
More acceptable	45	34	42	5.3	.251
Less acceptable	2	2	2		
Unchanged	53	64	57		
Thinning					
More acceptable	45	29	42	10.4	.033
Less acceptable	2	3	2		
Unchanged	54	68	57		

11. Based on your attendance of the fire exhibit do you feel...

	Percent of respondents			X ²	Significance
	HDM	SEKI	WFC		
...more knowledgeable about the risk of wildfire in the western US?					
Yes	59	44	70	17.1	.002
No	3	6	5		
Unchanged	39	50	26		
...more knowledgeable about the role of fire in forest and range ecosystems?					
Yes	60	51	73	11.5	.021
No	2	3	3		
Unchanged	39	46	24		
...more knowledgeable about fuel reduction treatments (prescribed fire, understory mowing, thinning)?					
Yes	68	40	68	36.9	<.001
No	3	10	9		
Unchanged	29	51	23		
...more supportive of agency fuel reduction programs?					
Yes	56	40	46	10.3	.034
No	6	8	12		
Unchanged	38	53	42		
...more confident in the ability of managers in agencies like the Forest Service or BLM to implement responsible and effective fuel reduction treatments?					
Yes	37	39	32	5.6	.223
No	12	8	18		
Unchanged	51	53	50		

12. Compared to other exhibits you have seen elsewhere how would you rate the...

	Excellent	Average					Poor
		1-----2-----3-----4-----5					
...prescribed fire trail at the High Desert Museum?	23%	55%	19%	4%	0%		
... fire exhibit at the World Forestry Center?	37%	37%	23%	3%	0%		
...Giant Forest Museum at SEKI?	27%	44%	28%	0%	1%		

1.4. Demographic Information

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

	Percent of respondents			X ²	Significance
	HDM	SEKI	WFC		
Urban area	28	27	32	1.4	.965
Suburban area	35	38	36		
Small town	19	20	18		
Rural area	18	15	14		

14. Gender:

	Percent of respondents			X ²	Significance
	HDM	SEKI	WFC		
Male	53	57	50	1.3	.502
Female	47	43	50		

15. Age:

HDM	50 years (mean)
WFC	44 years (mean)
SEKI	49 years (mean)

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

	Percent of respondents			X ²	Significance
	HDM	SEKI	WFC		
Some high school	1	0	0	13.1	.214
High school graduate	5	9	3		
Some college	22	27	24		
Completed bachelor's degree	36	25	38		
Some graduate school	7	13	11		
Completed graduate degree	30	26	24		

2. PRE-POST DIFFERENCES

2.1 High Desert Museum; n = 122

1. Have you read or heard about:

	Percent of respondents		t	Significance
	On-site	Mail		
the use of prescribed fire or controlled burning				
Yes	100	100	NA	
No	0	0		
Not sure	0	0		
forest thinning to reduce the threat of fire				
Yes	98	94	0	1.00
No	2	2		
Not sure	0	4		

2. Not everyone agrees on what to do about fire management. We're interested in your opinion. Please indicate if you **agree** or **disagree** with the following statements.

	Percent of respondents		t	Significance
	On-site	Mail		
All fires, regardless of origin, should be put out as soon as possible.				
Agree	6	3	-.575	.566
Disagree	88	85		
Don't know	7	13		
Managers should periodically burn underbrush and debris.				
Agree	82	83	-.705	.482
Disagree	5	6		
Don't know	13	12		
Prescribed fires or controlled burns result in an unacceptable number of blackened trees.				
Agree	3	3	.445	.657
Disagree	80	87		
Don't know	16	10		
Prescribed fires or controlled burns are too dangerous to be used.				
Agree	1	2	.000	1.00
Disagree	89	92		
Don't know	10	7		
Prescribed fire or controlled burns should not be used because of potential health problems from smoke.				
Agree	5	7	.815	.417
Disagree	87	84		
Don't know	8	9		
Thinning for fuel reduction will lead to unnecessary harvesting.				
Agree	12	15	1.929	.057
Disagree	68	68		
Don't know	21	18		

3. We're interested in learning more about what you **know about wildfires and fuel management**. Please answer the following questions to the best of your ability by indicating whether you believe the answer is generally true, generally false, or that you are not sure.

	Percent of respondents		t	Significance
	On-site	Mail		
Wildfires have played a significant role in shaping natural forests in the Western United States				
Generally true	96	95	-1.000	.320
Generally false	0	1		
Not sure	4	4		
Wildfires usually result in the death of the majority of animals in the area				
Generally true	4	3	-.575	.567
Generally false	74	79		
Not sure	22	18		
Prescribed fire or controlled burns effectively reduce amounts of fuel in most forests				
Generally true	74	90	1.648	.103
Generally false	7	3		
Not sure	19	7		
Prescribed fires or controlled burns reduce the chance of high-intensity wildfire				
Generally true	88	94	.815	.417
Generally false	3	2		
Not sure	9	4		
Prescribed fires or controlled burns typically result in the death of the majority of large trees in the burned area				
Generally true	4	2	-1.136	.259
Generally false	80	89		
Not sure	16	9		
Thinning has little overall effect on the intensity or frequency of wildfires				
Generally true	8	8	-.630	.530
Generally false	73	79		
Not sure	19	13		
A history of suppressing wildfires has increased the risk of a destructive fire in the western United States				
Generally true	82	87	1.136	.259
Generally false	7	3		
Not sure	11	10		

4. We'd like to know about your level of **confidence** in forest managers to use practices to reduce the threat of fire. How much **confidence** do you have in managers in agencies like the Forest Service or BLM...

	Percent of respondents		t	Significance
	On-site	Mail		
...to responsibly and effectively use prescribed fire?				
Full	29	25	1.645	.103
Moderate	55	53		
Limited	12	18		
None	1	0		
No opinion	4	4		
...to responsibly use thinning to reduce forest fuels?				
Full	26	29	.383	.703
Moderate	47	43		
Limited	19	21		
None	2	2		
No opinion	7	6		

5. The prescribed fire interpretive trail utilized various methods to provide information. How useful were each of the following interpretive components to you? If you cannot remember certain interpretive items please check the last column.

	-----Level of Usefulness-----				
	High	Moderate	Slight	None	Don't Remember
Text panels	35%	43%	11%	0%	12%
Photographs	37%	40%	3%	0%	19%
On-the-ground examples of prescribed fire	72%	17%	3%	0%	8%

6. Did seeing the results of prescribed fire at the High Desert Museum influence your opinion about its application on larger areas?

No 67%
Yes 33%

2.1 Sequoia and King’s Canyon National Parks; n = 269

1. Have you read or heard about:	Percent of respondents		t	Significance
	On-site	Mail		
the use of prescribed fire or controlled burning				
Yes	87	98	4.783	<.001
No	12	2		
Not sure	1	0		
National Park Service policy to let some wildfires burn				
Yes	83	92	5.866	<.001
No	16	3		
Not sure	1	4		
forest thinning to reduce the threat of fire				
Yes	85	93	4.127	<.001
No	14	4		
Not sure	1	4		

2. Not everyone agrees on what to do about fire management. We’re interested in your opinion. Please indicate if you **agree** or **disagree** with the following statements.

	Percent of respondents		t	Significance
	On-site	Mail		
All fires, regardless of origin, should be put out as soon as possible.				
Agree	16	3	-5.853	<.001
Disagree	78	93		
Don’t know	6	4		
Managers should periodically burn underbrush and debris.				
Agree	84	86	0	1.000
Disagree	3	2		
Don’t know	13	13		
Prescribed fires or controlled burns are too dangerous to be used.				
Agree	5	2	-2.127	.035
Disagree	83	93		
Don’t know	12	5		
Prescribed fire or controlled burns should not be used because of potential health problems from smoke.				
Agree	6	3	-1.00	.318
Disagree	81	86		
Don’t know	14	12		
Thinning for fuel reduction will lead to unnecessary harvesting.				
Agree	15	18	0	1.00
Disagree	51	55		
Don’t know	34	27		

It is not worth the risk to allow any wildfires to burn.

Agree	12	4	-3.220	.001
Disagree	81	88		
Don't know	7	8		

3. We're interested in learning more about what you **know about wildfires and fuel management**. Please answer the following questions to the best of your ability by indicating whether you believe the answer is generally true, generally false, or that you are not sure.

	Percent of respondents		t	Significance
	On-site	Mail		
Wildfires have played a significant role in shaping natural forests in the Western United States				
Generally true	87	93	1.901	.059
Generally false	3	2		
Not sure	10	6		
Wildfires usually result in the death of the majority of animals in the area				
Generally true	12	9	-1.069	.286
Generally false	66	71		
Not sure	22	20		
Prescribed fire or controlled burns effectively reduce amounts of fuel in most forests				
Generally true	70	90	4.569	<.001
Generally false	9	2		
Not sure	21	8		
Prescribed fires or controlled burns reduce the chance of high-intensity wildfire				
Generally true	89	91	0	1.00
Generally false	3	3		
Not sure	9	6		
A history of suppressing wildfires has increased the risk of a destructive fire in the western United States				
Generally true	68	75	1.533	.127
Generally false	10	8		
Not sure	23	18		
Many plants and trees require occasional fires so that new seeds or seedlings can sprout				
Generally true	92	94	0	1.00
Generally false	2	2		
Not sure	7	4		

4. We'd like to know about your level of **confidence** in forest managers to use practices to reduce the threat of fire. How much **confidence** do you have in managers in agencies like the Forest Service or BLM...

	Percent of respondents		t	Significance
	On-site	Mail		
...to responsibly and effectively use prescribed fire?				
Full	50	46	1.189	.235
Moderate	42	44		
Limited	6	8		
None	1	0		
No opinion	2	3		
...to safely allow some naturally ignited fires to burn?				
Full	45	43	-.266	.791
Moderate	43	47		
Limited	10	8		
None	2	0		
No opinion	2	2		
...to responsibly use thinning to reduce forest fuels?				
Full	48	42	3.088	.002
Moderate	33	35		
Limited	11	16		
None	2	3		
No opinion	7	5		

5. Please indicate below which interpretive sites you visited or programs you participated in on this trip and how useful each was for you. (See map on back of cover for location of visitor centers.)

	YES	If YES, how useful was the program?*			
		-----Level of Usefulness-----			
		High	Moderate	Slight	None
Read park guide (newspaper received at entrance)	84%	38%	40%	3%	0%
Read brochures and hand outs	78%	51%	44%	2%	0%
Had a conversation with Park personnel	68%	60%	29%	7%	2%
Visited Foothills Visitor Center (see map # 1)	65%	38%	49%	6%	0%
Took a self-guided interpretive trail	64%	52%	37%	8%	1%
Visited Grant Grove Visitor Center (see map # 4)	53%	47%	41%	5%	0%
Visited Giant Forest Museum (see map # 2)	52%	61%	32%	2%	0%
Visited Lodgepole Visitor Center (see map # 3)	43%	43%	44%	7%	0%
Visited Cedar Grove Visitor Center (see map # 5)	26%	44%	36%	9%	3%
Attended evening program	15%	59%	28%	5%	8%
Participated in interpreter guided walk	12%	82%	9%	3%	6%

**Percentages may not equal 100% because Don't Remember responses excluded. These responses were 9% or less for each program.*

Giant Forest Museum

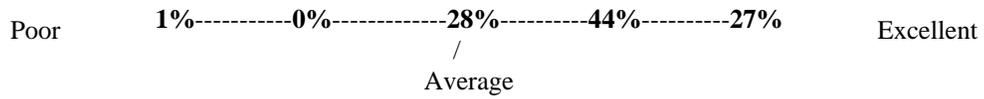
6. Did you visit the Giant Forest Museum while in Sequoia and Kings Canyon National Parks?

No 50%

Yes 50%

7. Approximately how much time did you spend in the Giant Forest Museum? **30 minutes (median)**

8. Compared to other interpretive exhibits you have seen elsewhere how would you rate the interpretive information and displays in the Giant Forest Museum?



2.3 World Forestry Center; n = 68

1. Have you read or heard about:

	Percent of respondents		t	Significance
	On-site	Mail		
the use of prescribed fire or controlled burning				
Yes	99	100	1.00	.321
No	2	0		
Not sure	0	0		
forest thinning to reduce the threat of fire				
Yes	96	100	1.425	.159
No	3	0		
Not sure	2	0		
The use of understory mowing to reduce the threat of fire				
Yes	37	66	4.316	<.001
No	62	22		
Not sure	2	12		

2. Not everyone agrees on what to do about fire management. We're interested in your opinion. Please indicate if you **agree** or **disagree** with the following statements.

	Percent of respondents		t	Significance
	On-site	Mail		
All fires, regardless of origin, should be put out as soon as possible.				
Agree	9	6	-.814	.419
Disagree	85	90		
Don't know	6	4		
Managers should periodically burn underbrush and debris.				
Agree	82	82	0	1.00
Disagree	6	8		
Don't know	12	11		
Prescribed fires or controlled burns are too dangerous to be used.				
Agree	6	6	.574	.568
Disagree	88	85		
Don't know	6	9		
Prescribed fire or controlled burns should not be used because of potential health problems from smoke.				
Agree	4	5	0	1.00
Disagree	82	82		
Don't know	13	13		
Thinning for fuel reduction will lead to unnecessary harvesting.				
Agree	19	21	-.573	.570
Disagree	57	59		
Don't know	24	21		

3. We're interested in learning more about what you **know about wildfires and fuel management**. Please answer the following questions to the best of your ability by indicating whether you believe the answer is generally true, generally false, or that you are not sure.

	Percent of respondents		t	Significance
	On-site	Mail		
Wildfires have played a significant role in shaping natural forests in the Western United States				
Generally true	99	97	.997	.322
Generally false	2	2		
Not sure	2	2		
Wildfires usually result in the death of the majority of animals in the area				
Generally true	3	7	1.00	.322
Generally false	79	79		
Not sure	18	13		
Prescribed fire or controlled burns effectively reduce amounts of fuel in most forests				
Generally true	77	78	1.00	.322
Generally false	4	6		
Not sure	19	16		
Prescribed fires or controlled burns reduce the chance of high-intensity wildfire				
Generally true	91	90	-.443	.659
Generally false	6	3		
Not sure	3	7		
Thinning has little overall effect on the intensity or frequency of wildfires				
Generally true	10	12	0	1.00
Generally false	66	71		
Not sure	24	17		
A history of suppressing wildfires has increased the risk of a destructive fire in the western United States				
Generally true	68	84	1.943	.058
Generally false	12	4		
Not sure	21	12		

4. We'd like to know about your level of **confidence** in forest managers to use practices to reduce the threat of fire. How much **confidence** do you have in managers in agencies like the Forest Service or BLM...

	Percent of respondents		t	Significance
	On-site	Mail		
...to responsibly and effectively use prescribed fire?				
Full	27	29	.331	.742
Moderate	53	41		
Limited	18	29		
None	3	0		
No opinion	0	0		
...to responsibly use thinning to reduce forest fuels?				
Full	31	35	-.178	.859
Moderate	44	35		
Limited	16	21		
None	4	4		
No opinion	4	4		
...to responsibly use mowing to reduce forest fuels?				
Full	25	39	-.902	.375
Moderate	15	25		
Limited	6	12		
None	3	0		
No opinion	52	24		

5. The Fire Exhibit utilized various methods to provide information. How useful were each of the following exhibit components to you? If you cannot remember certain parts of the exhibit please check the last column.

	-----Level of Usefulness-----				Don't remember
	High	Moderate	Slight	None	
Text panels	42%	42%	6%	0%	9%
Photographs	58%	32%	3%	0%	8%
Lightning strike radar footage	41%	23%	9%	0%	27%
Video message on types of fire (crown fire, ground fire)	52%	23%	9%	2%	15%
Video message on Smokey Bear	18%	20%	21%	6%	35%
Interactive computer display (wildland-urban interface, home protection)	21%	23%	8%	6%	42%
Display of fire tools	41%	32%	15%	2%	11%
<i>Get in the Zone</i> video (10-steps for home fire protection)	26%	23%	11%	2%	39%
Dress-up area with equipment related to fire management	27%	32%	14%	9%	18%

6. Was there a child (or children) with you when you toured the fire exhibit?

Yes 27%
No 74%

7. Approximately how much time did you spend in the fire exhibit? **34 minutes (mean)**

8. Did you view the Nova film *Fire Wars* showing in the World Forestry Center's theater?

No 47%

Yes 53%

	-----Level of Usefulness-----				Don't remember
	None	Slight	Moderate	High	
8a. If yes , how useful was the information provided in the <i>Fire Wars</i> film?	3%	0%	19%	78%	0%

Wildland Fire Study

Citizen Survey, Coeur d'Alene Idaho

This study is part of a national project to evaluate natural resource agency communication strategies with local communities to gain acceptance for fire management activities and fuel reduction programs. This preliminary report summarizes responses to a telephone survey completed by subscribers to the Coeur d'Alene Press in northern Idaho. From March to October 2004, the newspaper ran a series of advertisements (a small ad daily on the front page with larger, internal page ads on Saturdays) as well as occasional articles about fire and fuel management. These activities were designed to increase awareness of fire risk and promote home protection activities. This was a joint project involving the Local Emergency Planning Committee, Bureau of Land Management, USDA Forest Service, Idaho Bureau of Disaster Services, Office of Emergency Management, Idaho Department of Lands, Idaho Department of Commerce, and the Coeur d'Alene Press. A total of 186 subscribers were contacted, of these 106 recalled seeing the ads and/or articles and responded to the survey. This report is a summary of their responses. Reported percentages have been rounded off to the nearest whole number. For additional information contact:

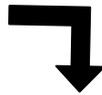
**Dr. Bruce Shindler
Dr. Eric Toman
Department of Forest Resources
Oregon State University**

Support for this research provided by the Joint Fire Science Program and the USDA Forest Service North Central and Pacific Northwest Research Stations.

I. Ad & Article Awareness

1. Over the past 6 months, approximately how many times have you noticed ads or articles about fire prevention and fire safety in the Coeur d' Alene Press?

41% 0 times
 30% 1 – 5 times
 28% more than 5 times }



- a. Do you recall seeing the small, front page ads about fire prevention and fire safety?

51% no
 49% yes



- b. Was the information provided easy to understand? **100%** yes **0%** no

- c. Do you feel the information was credible and trustworthy? **97%** yes **3%** no

- d. From the following scale, how would you rate the overall level of usefulness of the ads:

8%-----23%-----30%-----40%
 not useful slightly useful moderately useful very useful

2. a. Do you recall seeing the large, interior page ads about fire prevention and fire safety?

44% no
 56% yes



- b. Was the information provided easy to understand? **100%** yes **0%** no

- c. Do you feel the information was credible and trustworthy? **94%** yes **7%** no

- d. From the following scale, how would you rate the overall level of usefulness of the articles:

19%-----15%-----35%-----31%
 not useful slightly useful moderately useful very useful

4. Do you remember any specific topics covered?

59% no

41% yes



A majority (69%) recalled ads about defensible space while another 15% recalled the FireSmart title.

5. a. In addition to the ads, do you recall seeing any feature articles related to fire issues?

39% no

61% yes

b. Between the ads and feature articles which was most useful?

67% articles

28% about the same

5% ads

II. Influence of ads and articles

6. We want to know if these ads or articles have made a difference in your thinking about fire and fire protection. In other words, has your opinion of some things changed as a result of receiving this information. Based on your exposure to the ads and articles, are you more or less . . .

	more	less	no change
. . . aware of fire risk in the Coeur d' Alene area?	55%	1%	44%
. . . knowledgeable about how to protect your home from wildfires?	48%	0%	52%
. . . knowledgeable about available resources or assistance for home protection activities.	47%	1%	52%
. . . interested in learning more about fire protection?	26%	5%	70%
. . . confident in the ability of fire management agencies to protect communities from wildfire?	52%	2%	46%

7. Many of the ads and articles highlighted activities that you can take to protect your residence from wildfire. Did the ads motivate you to take action?

31% Yes, I have already done something

- a. What actions did you take?

- 75% implemented defensible space (green space) activities on property
- 25% contacted LEPC or Fire Smart Kootenai County
- 14% widened driveway
- 4% acquired more information
- 4% improved visibility of home address or street signs

2% Not yet, but I plan to do something soon

- b. What do you plan to do?

- 50% Acquire more information
- 50% implement defensible space (green space) activities on property
- 50% improve visibility of home address or street signs

67% I don't plan to do anything

- c. If you're not planning to take action, why not?

- 42% don't think it's necessary
- 35% Already took prevention activities, prior to ads
- 25% personal property not at risk
- 17% personal safety not at risk
- 17% don't live in Wildland Urban Interface (e.g. live in town center)

IV. Demographic Information

8. How often do you receive the Coeur d' Alene Press?

- 97%** every day
- 3%** Sundays only

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

- | | | | | | |
|------------|-----------------|------------|--------------------|------------|------------|
| 23% | right next door | 28% | less than one mile | 30% | 1-5 miles |
| 9% | 6-10 miles | 8% | more than 10 miles | 4% | don't know |

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

- 52%** outskirts of Coeur d'Alene
- 29%** in the country
- 19%** interior Coeur d' Alene

11. Do you . . .

- 95%** own your home
- 5%** rent your home

12. What is your age?

60 years old (mean)

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

- | | | | |
|------------|----------------------|------------|---------------------------|
| 6% | some high school | 24% | bachelor's degree |
| 28% | high school graduate | 3% | some graduate school |
| 33% | some college | 7% | completed graduate degree |

14. Are you?

- | | |
|------------|--------|
| 56% | female |
| 44% | male |

Appendix D: Summary report for section IV (Findings from a post-fire guided tour)

**Citizen Bus Tour of the B&B Complex Fire
Sisters Ranger District, Deschutes NF
Fall 2003**

**Survey Summary
February 2004**

Shortly after the 100,000 acre B&B Complex Fire was extinguished in October 2003 the Sisters Ranger District organized a community bus tour of affected lands. Over two days, 72 area residents participated in the six-hour tour conducted by the District Ranger and key agency resource specialists. The purpose was to allow citizens to see first-hand the affects of the fire and to discuss concerns and questions with agency personnel. Subsequently, researchers at Oregon State University's Department of Forest Resources conducted a follow up telephone survey with participants to determine their reaction to the tour as well as their perspective on agency management of the fire and future alternatives for restoration.

This preliminary report summarizes the survey responses. Of the 72 tour participants, we were able to reach 50 individuals (many others were out of the area for an extended period) and all 50 agreed to answer the survey.

This research is part of a project funded by the Joint Fire Science Program and the USDA Forest Service, North Central Research Station. For additional information about this survey, contact members of the research team:

10. What do you think the public’s role should be in deciding what happens to the burned areas. (Comments have been summarized into thematic categories based on participants’ responses)

Become informed (public meetings, forums, tours) and then be allowed to make comments and be involved in the decision-making process.	54%
Limited involvement, leave final decisions/implementation to experts (keep process from getting caught up in litigation and lawsuits).	16%
Dist. Ranger Bill Anthony and staff are doing a good job and have good working history with public—allow them to continue	12%
None/minimal, public not educated enough.	8%
Minimal, we trust the officials to do the job	6%
Other	2%
No answer	2%

11. Now that you have been to the site of the B&B fire, how would you personally rate the following concerns regarding future fires:

Level of concern...	Great	Moderate	Slight	None
Damage to private property	34%	32%	30%	4%
Loss of wildlife habitat	34%	46%	20%	0%
Economic loss of timber	16%	36%	32%	16%
Effects of recreation opportunities	27%	45%	22%	6%
Damage to visual quality of forests	34%	40%	22%	4%
Threat to human safety	32%	42%	22%	4%
Soil erosion	62%	32%	6%	0%

12. What is your age? **60 years** (mean)

13. Gender: **54% Male 46% Female**

14. Level of education completed?

High school	8%	Bachelor’s degree	44%
Some college	25%	Graduate degree	23%

15. Participant’s were asked if they had additional comments.

The overwhelming sentiment was that this tour was an excellent idea... a great form of public involvement and method for a positive ongoing relationship with the community.