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Collaborative Capacity, Problem Framing, and Mutual Trust in Addressing the Wildland Fire Social Problem

An Annotated Reading List

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Daniel R. Williams

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Abstract

We reviewed, annotated, and organized recent social science research and developed a framework for addressing the wildland fire social problem. We annotated articles related to three topic areas or factors, which are critical for understanding collective action, particularly in the wildland-urban interface. These factors are *collaborative capacity*, *problem framing*, and *mutual trust.* The integration of these is a prerequisite of *collective action* to develop Community Wildfire Protection Plans, reduce vegetative fuels, enhance public safety and preparedness, and/or create defensible space. Collective action requires *partnerships*, *common goals*, and a *common language*. Understanding the inter-relationships between the factors that enable collective action is important to collaborative partnerships, forest managers, and social science researchers as they work together to address the wildland fire social problem.

Key words: Collaboration, framework of collective action, forest communities, human dimensions of wildland fire, social science research, wildland-urban interface

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Executive Summary

This report is an annotated literature review of recently published social science articles and papers. We annotated research that examined *collaborative capacity*, *problem framing*, and *mutual trust.* We suggest that an integration of these factors is prerequisite to collective management of today's wildland fire social problem.

Understanding the relationships and interactions between these factors is important to collaborative partnerships, on-the-ground forest managers and practitioners working in the wildland-urban interface, and social science researchers who are planning new research projects to better understand the wildland fire social problem.

From an organizational perspective, **collaborative capacity** means having a clear vision and strategy to enable collective thinking, adaptive planning, and implementation beyond money, personnel, skills, and equipment—although these are important aspects of overall capacity to collaborate. A collaborative entity or partnership, with self-organization, established relationships, an attitude of confidence, and a coherent frame of reference may have the *capacity to act* in ways to improve problem situations.

Problem framing involves the different ways that stakeholders see or define, the problem—public understandings *plural*. Forest ecologists studying the wildland-urban interface would most likely frame the problem differently than residents. Likewise, this report provides a social science/human dimensions frame of reference. Given the many ways to define and approach this dynamic problem, we do not put forth a succinct definition of the wildland fire social problem in the report.

Mutual trust includes positive public relations and respect for different frames of reference. Mutual trust develops through inclusive, interactive communication and co-learning processes, *not* top-down, one-way persuasion strategies.

We organized these inter-related factors using a schematic model, or framework (fig. 1). The areas of overlap in figure 1 illustrate interactions and relationships between collaborative capacity, problem framing, and mutual trust. The central area of overlap is the goal—collective action. Collective action requires *partnerships*, *common goals*, and *a common language*. The interplay of mutual trust and collaborative capacity enables partnerships to be forged. The interplay of problem framing and collaborative capacity facilitates the development of common goals. The interplay of mutual trust and problem framing can enable a common language.

When these factors are acknowledged, developed, and sufficiently integrated, collective action (fig. 1) can occur that results in Community Wildfire Protection Plans, reduction of vegetative fuels, enhanced public safety and preparedness, and/or defensible space. In other words, the complex human dimensions of wildland fire can be managed through the creation of partnerships, common goals, and a common language—the prerequisites of collective action.

Acknowledgments

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Issues surrounding catastrophic wildfire are some of the most daunting in our field. The USDA Forest Service estimates that as many as 397 million acres need some treatment of some form, and it is clear that foresters cannot do this work alone. Aside from our colleagues in other disciplines, we will need to work with the people who live in communities that surround at-risk forests to reduce the threat of fire and to address its impacts.

Michael T. Goergen Jr. 2004
Society of American Foresters

Contents

Executive Summary ..... **ii**
Acknowledgments ..... **ii**
A Social Problem **1**
Purpose and Scope **2**
Background and Justification 2
A Framework for Understanding Collective Action 3
Approach **3**
Annotated Reading List **4**
Building Relationships and Collaborative Capacity 4
Preface 4
Recent Works 5
Problem Framing: Public Definitions of Wildland Fire/Fuels and Forest Management, Health, and Restoration 9
Preface 9
Recent Works 10
Mutual Trust: Public Relations and Inclusive, Interactive Communication 18
Preface 18
Recent Works 18
Literature Cited **24**
Additional Resources **26**
Appendix A. Author by Topic Index **27**

Collaborative Capacity, Problem Framing, and Mutual Trust in Addressing the Wildland Fire Social Problem

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A Social Problem

"The mixing of people, wildlands, and fire hazards—the wildland/urban interface—is creating a management problem that offers both challenges and opportunities to resource managers."

Cortner and Gale 1990, p. 245

The wildland-urban interface (WUI)[1] fire problem is a social problem primarily centered on people in addition to forest ecology and wildland fire behavior. This problem embodies an array of competing social values, multiple stakeholder interests, and uncertain management outcomes. Due to its social nature, wildland fire in WUI areas is considered one of the most contentious, complex, and elusive problems faced by wildland fire protection agencies (Cortner and others 1990; Davis and Marker 1987).

Defining the complex nature of the wildland fire social problem has become a problem in itself due to wickedness (Allen and Gould 1986; Rittel and Webber 1973). How numerous and diverse stakeholders understand and define wildland fire and the risks determines how the problem is addressed (Cheng and Becker 2005). A stakeholder group is a collection of people sharing a common interest, activity, way of life, or relationship relative to the outcome of an issue or management decision (Findley and others 2001). As stakeholders, social researchers view the wildland fire problem through a social science, or human dimensions frame. Forest ecologists studying the problem in the WUI would most likely frame the problem differently than both social scientists and residents. Due to the different frames, we do not formulate a succinct definition of the wildland fire social problem, which may best be defined on a case-by-case basis.

The mixing of people and wildland fire identified by Cortner and Gale (1990) in the opening passage has certainly provided ample opportunities to study the human dimensions of this challenging problem. Understanding wildland fire preparedness and reactions to vegetative fuels management on public and private lands near WUI communities has become the target of many social research studies and collaborative initiatives. For example, the journal entitled *Society and Natural Resources* published a three-part special section on the reemergence of social research on humans, fires, and forests (Cortner and Field 2004).

We are learning that knowledge of and experience with wildland fire and fuels management vary across WUI communities in different regions of the United States, and that such knowledge and experience can affect perceptions of risk and preferences for, and acceptance of, management practices (Brunson and Shindler 2004; Jacobson and others 2001; Nelson and others 2004; Vogt 2003). Experience with wildland fire, forestry, or farming and time spent living in the WUI can increase people's knowledge and awareness of wildland fire risks (McGee and Russell 2003). Interface residents within and across communities respond to fire events, fuels management, and landscape recovery programs in

[1] The wildland-urban interface (WUI) has been defined as a zone where substantial human occupancy coexists with areas of flammable forest, brush, and grassland vegetation. This zone may include primary residences, vacation homes, mobile homes, commercial buildings, and outdoor recreation facilities. The defining characteristic of the interface zone is the intermixing of people, homes, and natural vegetation, with an inherent risk to each from wildland fire (Chase 1993). Social and physical characteristics of the WUI tend to differ substantially across regions of the United States. Defining the WUI in terms of standardized and measurable boundaries presents a challenge for wildland fire managers. Disagreements about what the WUI is (and where it is) can be barriers to collective action in some places despite definitions of the WUI found in The Healthy Forests Restoration Act.

different ways depending on their worldviews, history in a place, and general perceptions of forest and wildland fire management (Rodriguez and others 2003).

Purpose and Scope

The purpose of this annotated literature review is to summarize and organize a portion of this research knowledge from the social sciences in order to develop and communicate a framework (fig. 1) that can be useful for understanding collective management of the wildland fire social problem. The intended audience is threefold: collaborative partnerships, on-the-ground managers and practitioners, and social science researchers alike as they work toward understanding and reducing the risks of wildland fire.

This report focuses on the problem situation in the WUI because this is where people and wildland fire tend to interact most often. We acknowledge that wildland fire and fuels management and related issues extend beyond the WUI to rural, roadless, and wilderness areas, and therefore this report may be of benefit to partnerships, managers, and social researchers as they address this problem across the landscape.

We focus primarily on the situation before a fire event to limit the scope, and because collaboration may be most feasible, but not necessarily more important, at the pre-fire stages of the problem (Carroll and Daniels 2003). The framework for understanding collective action developed in this report, however, should be beneficial to the work of professionals in the WUI during and after fire events, which are of equal importance and closely related to pre-fire stages.

Background and Justification

The WUI is expanding at a substantial rate as Americans leave cities and suburbs to live in once-remote rural areas adjacent to public forests with opportunities for outdoor recreation (Davis 1990; Davis and Marker 1987; Egan and Luloff 2000; Plevel 1997; Shelby and others 2004; Shumway and Otterstrom 2001; Swanson 2001). This flood of "emigrant urbanites" into rural landscapes has

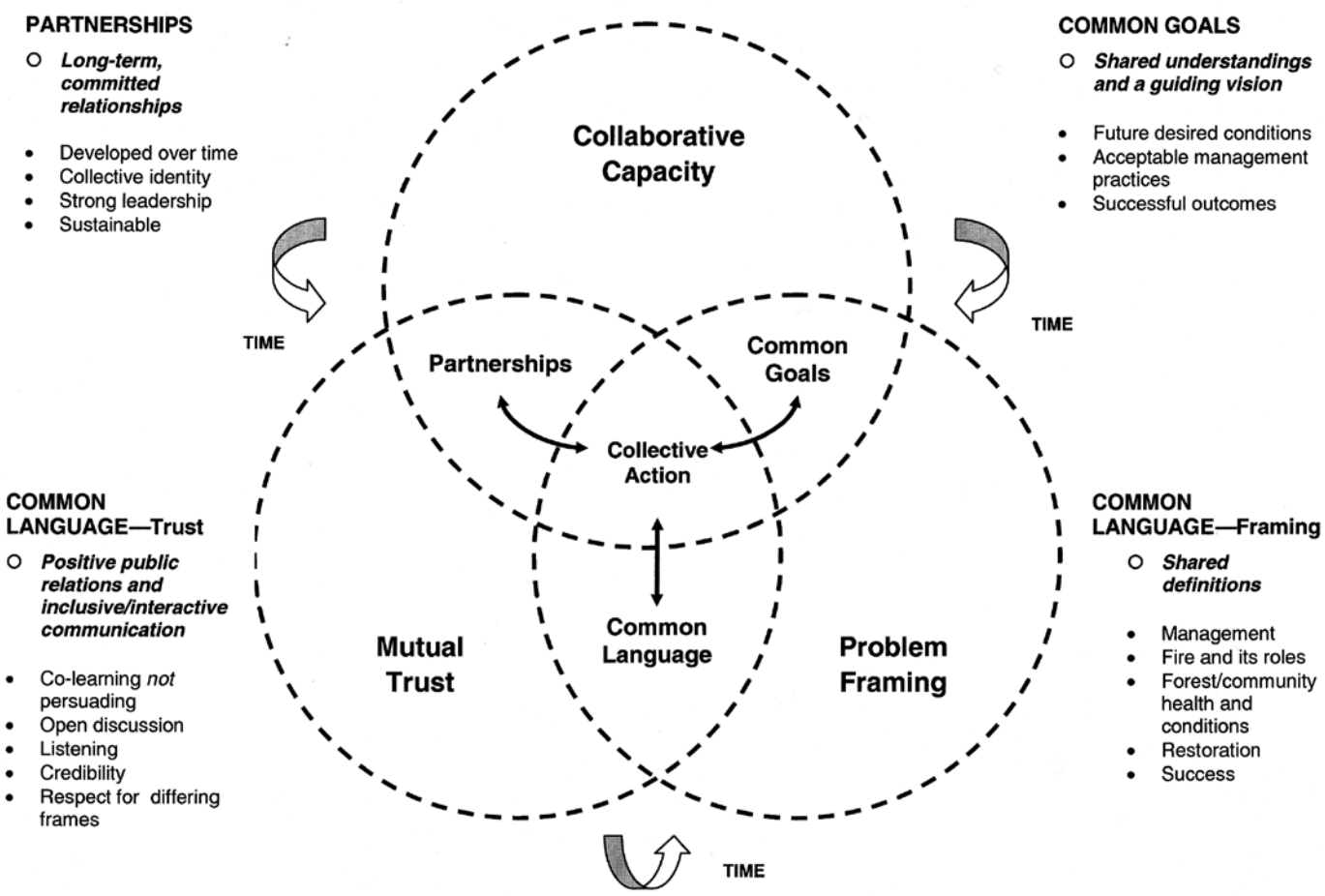

Figure 1. Simplified framework for understanding collective action.

been described by Pyne (2004) as "today's reigning fire problem." Increased human settlement in fire-prone areas presents a social dilemma because wildland fire is physically dangerous for human life and property, but people's knowledge of the problem varies and perceptions of the risks and the impacts are defined differently by residents, fire managers, policymakers, and communities (Carroll and Daniels 2003; Slovic 1999).

The situation is exacerbated by accumulations of dry vegetative fuels. For example, Colorado's largest wildfire in history, the Hayman Fire in 2002, occurred in an area with high levels of dry vegetation resulting from fire exclusion and several years of drought (Graham and others 2005). There is potential for further loss of life and property in WUI areas. The National Academy of Public Administration (2004) reported that interface communities are developing faster than they are creating defensible space and faster than their local governments' capacities to regulate fire-safe development.

A more complete understanding of the wildland fire problem is needed to guide new policies that integrate social, economic, and ecological needs across agency, public-private, and landscape boundaries (Dombeck and others 2004). We tried to answer the call, in part, by summarizing knowledge from the social sciences to provide a more complete understanding of the complex human dimensions of wildland fire management.

A Framework for Understanding Collective Action

We annotated social science articles that provide insight for acting on this problem in collective ways. The opposite of *collective action* for addressing a management problem is stalemate and paralyzing conflict (Innes and Booher 2003). This report focuses on three broad and *interrelated* social factors that are important for avoiding stalemate and collectively improving problem situations in wildland fire management (fig. 1):

- Building relationships and *collaborative capacity*
- *Problem framing*—public definitions of wildland fire/fuels and forest management, health, and restoration
- *Mutual trust*—positive public relations and inclusive, interactive communication

Community capacity has been defined as the interaction of human capital, social capital, and the physical resources existing within a given community that can be leveraged to collectively solve problems and improve or maintain community well-being (Chaskin 2001; Kaplan 2000). From an organizational perspective, **collaborative capacity** means having a clear vision and strategy to enable relationship building, collective thinking, adaptive planning, and implementation beyond the tangible elements of money, skilled personnel, and equipment—although these too are important for successful collaboration (Kaplan 2000). A collaborative entity, or *partnership*, with self-organization, an attitude of confidence, and a coherent frame of reference may have *the capacity to act* in ways that improve problem situations related to wildland fire management.

Problem framing involves the different ways that stakeholders define the problem and the terminology and concepts related to it, such as forest health. Framing accounts for public understandings, *plural*. This report, for example, provides a social science frame of reference. Different frames allow stakeholders to see what they want to see, or what they are guided to see, but stakeholders tend to have trouble seeing the same problem situation or reality from another's frame of reference (Spicer 1997). The existence of many different frames, or definitions of the problem, suggests a need to develop *common goals* and a *common language*.

Partnerships that communicate using a common language tend to have **mutual trust** between members and outside stakeholders. Mutual trust leads to positive public relations and respect and tolerance for different frames of reference. Mutual trust is developed over time through fair, inclusive, interactive communication and co-learning processes, rather than one-way persuasion strategies (Schusler and others 2003; Toman and others 2006).

Where these factors overlap, *collective action* may be achieved through long-term partnerships that have common goals and use a common language (fig. 1). The interplay of collaborative capacity and mutual trust can allow for partnerships that are characterized by long-term relationships. Partnerships with capacity are sustained by a guiding vision, strong leadership, and a sense of collective identity (Moore and Lee 1999). The interplay of collaborative capacity and problem framing can allow for common goals, which involves *shared* understandings of future desired conditions, acceptable management practices, and successful outcomes. The interplay of mutual trust and problem framing can allow for a common language, which involves *shared* definitions of management, fire and its roles, forest conditions, restoration, and success.

Approach

We present a framework for understanding collective action (fig. 1) based on annotations of studies that provided direct insights for collectively addressing

the wildland fire social problem. We used the Web of Science database and the Internet to locate recent social science articles from interdisciplinary fields of study. Articles were selected that addressed collaborative capacity, problem framing, and mutual trust, and/or the interrelationships between them. The studies were carefully summarized in greater detail than is common for annotated bibliographies of natural resource topics. Our intent was not to simply abstract many papers, but to annotate fewer papers in more depth to demonstrate how each case supports the development of such a framework, while also communicating key findings. We often paraphrased or quoted the original articles to retain the authors' intended meanings. The content for the annotations was guided by a flexible outline:

- Objectives/purpose
- Methodology
- Key findings
- Managerial/applied implications
- Specific relevance for understanding the model of collective action

It is important to note that collaborative capacity, problem framing, and mutual trust are inter-related in a process that can result in collective management (fig. 1). For the purpose of organized reporting, we have separated the annotations into individual sub-sections, beginning with a preface for each of the three factors in the framework. The purpose of each preface is to more clearly familiarize the reader with each of the topic areas and the annotations that are organized accordingly, demonstrating how each section serves to support the framework of collective action for addressing wildland fire mitigation (fig. 1).

Annotated Reading List

Building Relationships and Collaborative Capacity

Preface

The changing role of forest managers today is characterized by a need for agencies to help foster and maintain relationships with and between diverse publics. These relationships form the foundation of a community's or an organization's capacity to collectively address the problem situations that it faces regarding wildland fire. Six papers were reviewed and annotated in this section that either report on or evaluate stakeholder processes, and demonstrate evidence of relationship building and collaborative capacity for addressing complex social problems such as wildland fire.

Collaborative capacity is defined as the mobilization of skilled committed individuals, their relationships, and the physical resources within a given organization or community that can be leveraged to collectively solve problems and sustain community well-being (Kaplan 2000). As collaborative capacity and mutual trust interact over time, the social conditions surrounding a problem become increasingly favorable for the formation of partnerships (fig. 1). Partnerships and other collaborative initiatives, consist of long-term, committed relationships, have a collective identity and vision, continuous leadership, trust, shared resources, and are sustainable (Selin and others 2000). A partnership that has developed a guiding vision, the ability to think collectively, and the ability to plan adaptively will have some level of capacity to implement its wildland fire and fuels management plans. Collaborative capacity also includes common goals, as indicated by its intersection with problem framing in figure 1. Partnerships that form to address the wildland fire social problem must develop common goals and shared understandings of future desired conditions, acceptable management practices, and the outcomes that determine successes.

Building collaborative capacity involves more than increasing awareness and preparation for interface communities to respond to risks from wildland fire. Strong leaders and a network of relationships are characteristic of capable partnerships, and these allow diverse stakeholders to work together (Schusler and others 2003). For example, WUI communities must be involved in building positive relationships with the United States Forest Service at the local level (Frentz and others 2000). In addition, co-learning, also known as social learning is an important process for building collaborative capacity. Schusler and others (2003) concluded that incorporating social learning into stakeholder processes can create opportunities for participants to engage one another and develop common goals and the relationships needed for collective action. One way to facilitate social learning in collaboration is to create a common map of understandings of the wildland fire social problem (Daniels and Walker 2001). Finally, the evaluation of stakeholder processes for success and improvement can provide ways to address this social problem on a long-term, adaptive basis (Innes and Booher 1999).

Daniels, S. E.; Walker, G. B. 2001. The practice of collaborative learning: Citizens, scientists, and foresters in fire recovery planning. Chapter 9. Working through environmental conflict: The collaborative learning approach (pp. 205-221). Westport, CT: Praeger. 299 p.

Key words: Citizens, collaborative learning, fire recovery planning, foresters, scientists

Annotation: This chapter presents an application of collaborative learning in wildland fire recovery planning in two communities near the Wenatchee National Forest in central Washington. The collaborative learning approach is a public involvement framework for communicating with communities about ecosystem management processes including collectively improving problem situations related to wildland fire.

Wenatchee National Forest administrators had expressed an interest in collaborative learning. The researchers conducted ethnographic interviews with residents to gather relevant information from the broad spectrum of interests about recent wildland fires in Chelan County. The interviews were supplemented by several site visits and contacts with employees of the United States Forest Service (USFS). This investigation determined that a collaborative learning approach would be feasible. The authors conducted training sessions about collaborative learning and communication competence for USFS personnel. Workshops were designed with direct USFS input about the details and timing of USFS planning activities and the meeting locations. Publicity was designed to ensure broad, inclusive public participation. Rangers were interviewed on local radio stations about the workshop, direct phone calls were placed to interested parties, flyers were posted in public places, interest groups were given announcements to post in newsletters, and advertisements appeared in major newspapers.

The initial workshops were used to create a common starting point for collaboration. For example, presentations were given about wildland fire ecology and the effects of fire on social and ecological systems. The next collaborative learning workshop started with large-group discussions and situation mapping of interests, concerns, needs, and improvements related to wildland fire recovery. Situation mapping is similar to the identification of issues, but it is a group activity focused on creating a common map of understanding that allows a visual representation of a recovery situation after a fire. Situation mapping facilitates learning about the dynamic nature of ecosystems and communities.

Brief summaries were generated from the initial workshop and shared with all participants. Alternative projects were generated by the USFS recovery teams with the appropriate environmental assessment. Two ranger districts decided to implement the more traditional public comment period for their projects. A third district conducted a second round of collaborative learning workshops for evaluating the proposed actions. Then, wildland fire recovery projects were finalized and initiated.

The Wenatchee National Forest application illustrates how successful collaborative learning improves all participants' understandings and definitions of a wildland fire problem situation by taking a systems approach, which reveals different goals about land management and creates constructive discussions about contentious issues. Collaborative learning generates shared understandings and common goals by encouraging informal discussions between stakeholders who hold differing views. Community members are empowered with active roles in the development of improvement projects. This case study demonstrated how involving citizens in a collaborative planning process can create better decisions and build collaborative capacity.

Frentz, I. C.; Voth, D. E.; Burns, S.; Sperry, C. W. 2000. Forest Service—community relationship building: Recommendations. Society and Natural Resources. 13: 549-566.

Key words: Community capacity, ecosystem management, forest communities, forest planning, relationship building, Rural Community Assistance program

Annotation: Recommendations to promote collaborative relationship building between the United States Forest Service (USFS) and local communities were based on interviews with leaders working on community and forest planning projects adjacent to USFS lands. Most of the geographically dispersed projects that were contacted received funding from the USFS Rural Community Assistance (RCA) program. Some of the projects were administered by USFS personnel. A survey was sent to the interviewees to review the preliminary recommendations. This article described the assumptions used to construct the recommendations and presented an analysis of the survey results.

Respondents highly supported the following assumptions: (1) community involvement depends on building a positive relationship between the USFS and communities, (2) communities close to National Forests benefit from increased involvement in forest planning, and (3) an enhanced relationship between communities and the USFS is needed before community and forest planning can be successfully coordinated.

Recommendations were separated into five audiences: (1) Ranger District, (2) Forest Supervisor, (3) the National Forest System Deputy Chief, (4) the RCA leader in Washington DC, and (5) RCA coordinators on National Forests. The authors recommended that the District Ranger devote staff time to building community relationships and educating staff about the networks of social relationships that existed in the local community. The recommendations for the Forest Supervisor enabled him or her to set the stage and facilitate local relationship building by providing direction and opportunities for District Ranger offices to interact with communities. The higher level recommendations facilitated support and direction for people on-the-ground to become active in relationship building.

Communities must also be interested in building a positive collaborative relationship with the USFS. The survey data showed evidence that the responsibility of relationship building should not be entirely placed on the shoulders of community leaders or agency leaders. Respondents also noted a lack of formal organization in many local communities.

The article concluded with seven policy recommendations. Three of these apply to the wildland fire social problem: (1) cultivate working relationships with other agencies that have responsibility and expertise in working with rural communities, (2) pursue RCA projects that have high potential to benefit both the target community and strengthen community-Forest Service relationships, and (3) promote the building of community leadership and collaborative capacity for participation in agency-community planning. The USFS and its partner communities should stay better informed of current activities and future needs so that the positive relationships between the USFS and local communities can build on shared understandings and trust in order to be sustained overtime.

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Innes, J. E.; Booher, D. E. 1999. Consensus building and complex adaptive systems: A framework for evaluating collaborative planning. Journal of the American Planning Association. 66(4): 412-423.

Key words: Collaboration, complexity, open communication, relationship building

Annotation: This paper proposed a conceptual framework for evaluating consensus building. Consensus building is a collaborative practice in which stakeholders, selected to represent different interests, come together for face-to-face, long-term dialogue to address a common policy or decision problem. The purpose of the paper was to lay a foundation for understanding and improving collaborative planning that is based in open and fair communication.

As a collaborative process, consensus building must be evaluated beyond any agreement that is achieved. The authors stressed that even a process without agreement may be considered successful if the participants have learned about the problem, about each other's interests, and about alternative resolutions. In consensus building, processes and outcomes are not easily separated because the process and the outcomes are tied together. Agreement by itself falls short of genuine support and consensus if reached by a process that was not regarded as fair and accountable by all the participants. If the process is judged as fair, even stakeholders who have not met their objectives may support an agreement if they believe that their voices were heard and their interests were included to some extent. New levels of trust, shared knowledge, and working relationships depend on collaboration that is mutually respectful.

The authors identified and discussed several outcomes of successful consensus building. Criteria for evaluating the collaborative process included:

- includes representatives of all relevant and different interests;
- is driven by objectives that are practical and shared by the group;
- allows participants to organize and decide on ground rules, tasks, working groups, and discussion topics;
- engages participants, keeping them at the table, interested, and learning through in-depth conversations, humor, and informal interactions;
- encourages challenges to the status quo and rewards creative thinking;
- ensures agreement on the meaning of many types of information; and
- seeks consensus only after significant effort has been made to find creative responses to differences of opinion.

Criteria for evaluating the outcomes of consensus building included: a high-quality agreement, ending stalemate; compares favorably with other planning methods for costs and benefits; produces creative ideas; results in co-learning and learning beyond the group; creates social and political capital; and culminates in

new partnerships, new collective practices, or new institutions.

The most important consequences of consensus building may be to change the direction of a complex, changing situation (such as the wildland fire social problem), and to help move communities and partnerships toward collective action to address their social and environmental problems, capitalizing on leadership that has learned how to work together to co-develop flexible and long-term management practices.

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Kaplan, A. 2000. Capacity building: Shifting the paradigms of practice. Development in Practice. 10(3, 4): 517-526.

Key words: Capacity building, community-centered development, organizations, practitioners

Annotation: This conceptual article proposed that despite much lip-service about building capacity for organizations, the concept itself remains elusive and not well understood. The author stressed that the practice of capacity building on a situation-by-situation basis has largely failed, in part, due to current approaches that focus on material things that are tangible and easily quantified, ignoring the intangible or invisible elements. The article called for a major shift in thinking about capacity building.

A hierarchy of elements of organizational life was discussed that serves as a prerequisite for building collaborative capacity. At the top of the hierarchy are intangible or invisible things. First, an organization must develop a coherent frame of reference that allows the organization to make sense of the world around it and to make relevant decisions. An organization must also develop an attitude of confidence to take action in ways that are seen as effective. A clear guiding vision and strategy are necessary to enable collective thinking and adaptive planning and implementation. The roles and functions of the organization need to be clearly defined and differentiated. Human capital is located at the bottom of the hierarchy, and it is indicated by tangible and measurable things such as growth of individual skills, abilities, and competencies, which can be enhanced with trainings. An organization with capacity also has material resources, or physical and financial capital, such as money, office space, and equipment.

The author argued that the intangible elements at the top of the hierarchy largely determine the functioning of the organization, but traditional capacity-building efforts tend to focus on the more quantifiable elements such as human, physical, and financial capital. Although there is much talk about building collaborative capacity in organizations, administrators and practitioners concentrate on what products can be easily delivered. This disconnect provides the need for a radical shift toward the ability to work with intangibles.

The author cautioned that the needs of an organization change as it develops. It may not always be the case that capacity-building efforts should begin with the intangibles before moving to the more quantifiable—"It all depends on where a particular organization is at a particular time, and on what kind of an organization it is." For example, although training will not be effective unless the vision, culture, and structure of an organization are clearly defined, these elements are dependent on one another, so practitioners may sometimes have to work on a number of levels in the hierarchy at the same time to be effective.

The implication for addressing the wildland fire social problem is that communities, like organizations, are unique and the stage of development of capacity for interface communities varies. This uniqueness demands case-specific responses on the part of fire managers and residents as they work together to build collaborative capacity in communities. Also, processes of change in an interface community cannot be easily predicted. The author warned that it is easy for managers to rely on standardized models developed in the office rather than on accurate case assessments specific to the situation on-the-ground.

Wildland fire and forestry practitioners are normally trained to deliver interventions, packages, or programs rather than to read and interpret the developmental phase of a particular community regarding its capacity to act collectively. Practitioners need to be (re)trained to develop management practices that are appropriate to a community at a particular time in its developmental history, regarding its capacity. A new focus should be directed toward the actual practice of the community forester rather than on well-worded programs or well-designed training courses. Practitioners need to develop a resourcefulness out of which they can respond, rather than being trained in past solutions, standard models, and behaviors that replicate the status quo. Instead, practitioners need to be given the freedom to respond uniquely to unique situations. The article concluded with a list of abilities that forestry practitioners need to develop, such as the ability to listen deeply and develop mutual trust, find the right questions to help communities move forward, and capitalize on ambiguity, rather than to seek immediate solutions.

Schusler, T. M.; Decker, D. J.; Pfeffer, M. J. 2003. Social learning for collaborative natural resource management. Society and Natural Resources. 15: 309-326.

Key words: Collaborative natural resource management, community-based management, deliberation, social learning

Annotation: This study described a cooperative effort between a state conservation agency in New York and diverse stakeholders from communities involved in planning for the Lake Ontario Islands Wildlife Management Area. The authors investigated how the state agency could encourage collaborative management of these islands through a deliberative learning process. The primary issue of contention in the area was management of large populations of double-crested cormorants that use the islands as breeding habitat and compete with locals for fish stocks. There was concern over how management decisions would affect communities along the lake shore where sport fishing and related tourism are central to the local culture and economy.

In a pre-assessment of the situation, local interviewees expressed a desire for economic development that would be compatible with preserving their rural quality of life and the critical freshwater resources of the islands. To capitalize on these shared desires, the authors employed the search conference methodology to enable participants to collectively create and implement a management plan. During the two and a half day search conference and one month after the event, the authors used multiple qualitative data gathering techniques to examine whether and how social leaning had occurred among participants. Social learning was defined as learning that occurs when people engage one another and share diverse perspectives and experiences in order to develop shared understandings of a problem and a basis for collective action. The analysis focused on the extent to which social leaning contributed to identifying a common purpose and developing relationships of trust, two requisites of collaborative capacity and two characteristics of effective partnerships.

After the search conference process, the authors conducted a telephone survey with the participants. Most of the interviewees reported that they had learned about the facts surrounding the management of the islands. They also learned about areas of agreement and disagreement among participants, barriers and opportunities, and actions to address problems or take advantage of opportunities. A key finding was that all participants interviewed after the search conference said that they had learned about the concerns of other participants to a moderate or great extent. Half of the interviewees said that participating in the process had changed their own concerns about management of the island habitat, expanding their views and concerns beyond their self interests. This group had begun the process of developing the shared understandings needed for collective action.

Most participants agreed that the search conference substantially contributed to the identification of a common purpose for the group. Participants found that they shared more common ground than they had anticipated. One-third of the participants described re-establishing relationships with other participants, strengthening relationships between the public and the private sectors, or generally getting to know the others better through discussions and informal time spent together. Over one-half of the participants said that they had created new relationships. Most of the interviewees reported that they gained trust in others to a moderate or great extent. These participants described mutual respect, listening, and open-mindedness as essential for developing collaborative working relationships and enhancing trust.

The authors also sought to understand how social learning had occurred. An in-depth analysis of observations made during the conference and analyses of the interviews after the event identified eight attributes of the process that had enabled learning: open communication, diverse participation, unrestrained thinking, constructive conflict, democratic structure, multiple sources of knowledge, extended time for engagement, and professional neutral facilitation of the process. The authors suggested that these conditions had created an atmosphere in which the participants could share diverse views and opinions, respectfully question one another, and explore the complex challenges that they faced with sensitivity and humor. They concluded that incorporating these eight attributes into stakeholder processes can create opportunities for participants to engage one another in order to develop common goals and a foundation for collective action. The authors advised that social learning is necessary but not sufficient for the development of collaborative management, but social learning may be the process that develops the other necessary requisites for collaborative management: capacity, partnerships, and supportive policies.

Selin, S. W.; Schuett, M. A.; Carr, D. 2000. Modeling stakeholder perceptions of collaborative initiative effectiveness. Society and Natural Resources. 13: 735-745.

Key words: Collaboration, community development, monitoring, partnerships

Annotation: The emerging practices of collaboration, planning, and stewardship call for ways to monitor the effectiveness of these processes. The authors identified several characteristics of effective collaboration from the research literature. Some common factors included the presence and participation of open-minded, dedicated, and committed individuals; broad-based support from stakeholders, public agencies, and citizens; informal and formal structure; information sharing among partners; recognizing common goals; and the existence of adequate resources, capabilities, and support.

They examined several collaborative initiatives throughout the United States. The researchers used criteria to select the cases, including existence for two or more years as an entity, multiple scales of operation, diverse objectives, and active participation by the United States Forest Service (USFS).

A questionnaire was mailed to active individuals (41percent response) in different collaborative initiatives. The respondents provided descriptions of 30 collaborative initiatives and rated statements on their expectations of the effectiveness of the initiatives. The outcomes of effective collaboration rated highest (average scores above 3 on a 5-point scale) included: improved agency coordination, improved communication, more resource sharing, and enhanced levels of trust. Statements that were rated lower than expected included: improved quality of life, reduction in litigation, increased job opportunities, increased community awareness, and sustainable resource management.

The characteristics of effective collaboration rated highest by these respondents were strong vision, support from agencies, a sense of belonging, recognizing interdependence, broad representation of stakeholders, and clear goals and objectives. Next in order of importance were power balanced among stakeholders, mutual trust, open lines of communication, and pre-existing relationships in the community.

Results from this investigation provided evidence that supports the premise that natural resource-based collaborative initiatives can achieve beneficial outcomes when active participants are included in the process. Leadership emerged as a strong predictor of effectiveness of collaboration, suggesting a need for more leadership training efforts on the part of government agencies. Continuity in leadership also emerged as an important predictor of effectiveness. By demonstrating that their efforts are effective, an organization can justify its continued investment in building collaborative capacity.

Problem Framing: Public Definitions of Wildland Fire/Fuels and Forest Management, Health, and Restoration

Preface

The 11 articles reviewed and annotated in this section demonstrate the importance of understanding problem framing and recognizing that different stakeholders hear different things when they hear people talk about aspects of the wildland fire social problem. Framing addresses the different ways that stakeholders see or define, the wildland fire social problem and the terminology related to it such as forest health and restoration.

Different frames allow stakeholders to see what they want to see. Understanding how different groups frame the elements of a problem is important because stakeholders find it difficult to see the same problem from another's frame of reference, leading to poor communication and conflict. The existence of different frames suggests a need to develop a common language for collective management (fig. 1). A collaborative partnership that uses a common language has undergone the difficult process of developing shared definitions of concepts like forest management, the roles of wildland fire in the landscape, forest health and restoration, and successful outcomes of collaboration.

Some managers, scientists, and partnerships working to address the wildland fire social problem have moved beyond thinning vegetation in and around communities to broader scale landscape issues such as forest health and ecological restoration (Kauffman 2004). This is one way to frame the problem, but using this frame presents additional uncertainties because meanings of the concepts of forest health and restoration are debated by various stakeholders (Abrams and others 2005; Burger 2002; Hull and others 2003; Woolley and McGinnis 2000). Landscape preferences and forest conditions such as naturalness and biodiversity mean different things to different people (Findley and others 2001; Hull and others 2001; Nelson and others 2004).

Knowledge of and experience with wildland fire and fuels management vary across communities and in different geographical regions, affecting how diverse stakeholders frame the problem in terms of their preferences for, and acceptance of management practices on public and private lands such as mechanical thinning and prescribed burning (Brunson and Shindler 2004; Nelson and others 2004; Wagner and others 1998). People within and across communities respond to fire events, fuels management, and fire recovery programs in different ways depending on their frames of reference including

their environmental worldviews and orientations, history in a place, and general views on forest management (Abrams and others 2005; Rodriguez and others 2003).

Recent Works

Abrams, J.; Kelly, E.; Shindler, B.; Wilton, J. 2005. Value orientation and forest management: The forest health debate. Environmental Management. 36: 495-505.

Key words: Active management, forest health, public opinion, value orientations

Annotation: "Forest health" has become an issue of contention. The authors proposed that differing frames of reference used by people to make sense of the forest health concept may be related to what they believe are and what are not appropriate ways to manage forests. In other words, environmental value orientations were thought to be associated with how people frame problems of forest management and the related concept, forest health.

A survey of the general public in Washington and Oregon was conducted to assess the relationship between respondents' self-reported environmental/economic priorities, or value orientations, and their opinions regarding the acceptability of general forest management practices, the appropriateness of specific management practices, and perceived threats to forest health. The survey (51percent response rate) was distributed to a stratified random sample to represent both urban and rural populations. Value orientations were measured using the Environment-Economic Priority scale (EEP) to cover a range of forest management actions and forest conditions. The EEP scale represents tradeoffs between individual preferences for economic and environmental benefits.

Consensus among the public that active management is necessary for the maintenance of healthy forests was shown to break down when people were asked about specific management practices. This contrast can be explained by the polarized views of economically-centered and environmentally-centered survey participants as measured on the EEP. The level of support for specific management practices was found to be contextual. For an overstocked stand, thinning was viewed as appropriate, where for a healthy stand it was not. What is deemed "healthy" is open to the interpretation of the individual. People who use an economically-centered frame of reference interpret "healthy" to mean stands with profitable returns, but from an environmentally-centered frame, healthy may imply that forests are negatively impacted by practices such as commercial harvesting.

Some evidence was reported that economically-centered respondents tend to view wildland fire as a threat to forest health, while fire tends to be viewed as part of the ecology of healthy forests by environmentally-centered individuals. Economically-centered respondents tend to view fire suppression as appropriate for protecting potential harvest value. Environmentally-centered respondents tend to believe that fire suppression causes unhealthy forest conditions, and they see wildland fire as a driver of appropriate forest changes. However, opinions on fire suppression and prescribed fire were only weakly correlated with EEP scores.

The implication is that the public examined in this study views a healthy forest as something with multiple dimensions and multiple definitions. Different frames used to understand the concept of forest health must be made explicit to prevent miscommunications. Study findings point to the need for more clarity regarding the components of a healthy forest and how specific management practices contribute to maintaining healthy conditions. Participants in this debate need to move beyond public opinions that are polarized. Nearly 40 percent of these respondents said that they believe that both economic and environmental factors should be given equal priority in forest management. Perhaps this middle ground position holds insight for developing shared understandings and a common language for addressing the forest health debate. Common goals for future desired conditions of forests need to be collectively developed before stakeholders discuss how to achieve successful outcomes for wildland fire and forest management.

Brunson, M. W.; Shindler, B. A. 2004. Geographic variation in social acceptability of wildland fuels management in the western United States. Society and Natural Resources. 17: 661-678.

Key words: Attitudes, knowledge, social acceptability, vegetative fuels

Annotation: Levels of acceptability of wildland fuels management practices were compared in four western states in this article. Social acceptability was defined as the amount in which citizens trust and support decisions affecting land management. This study used a mail survey in four geographically different areas to measure beliefs about a variety of wildland fuels management issues. The locations were selected based on the experiences of residents with wildland fire, federal agency fuel treatments, ongoing public outreach and education, and

consistent population growth above the national average. The areas studied were the Central Arizona highlands, the Colorado Front Range, Central Oregon, and the Utah Great Basin. The three fuel management practices examined were prescribed fire, mechanical removal, and livestock grazing.

A majority from each location reported all three practices acceptable in some or all situations. Acceptability of prescribed fire and mechanical removal of fuels differed significantly between locations. Oregonians responded more favorably to the practice of prescribed fire than respondents from Utah, who suggested that both mechanical removal and prescribed fire should rarely be used.

There were strong emotional components in the beliefs about the issues for the different groups. Utah residents were more likely to classify human safety, concern for smoke, and reduced scenic quality as most important. Whereas, Oregon respondents found that human safety was not a concern. Colorado respondents were more likely than the other groups to support fuel reduction efforts even if it meant reducing the scenic quality of areas.

The ecological and management histories associated with each of these states may help to explain geographical differences reported in this study. Oregon's experience with logging may increase the relevancy and support for mechanical thinning in that state. Utah and Arizona's experiences with livestock grazing practices may explain respondents' acceptance of this technique to reduce wildland fuels there.

This study showed that public acceptance and support for wildland fuels treatments cannot be achieved by simply supplementing citizens' knowledge. The public is knowledgeable about wildland fire, but this knowledge and the ways that it is used to frame these issues vary geographically, which affects how the goals of fuels management are achieved. Simple standardized education that provides additional facts about the appropriate management practices will not suffice because the facts differ from place-to-place. A focus on citizens' local frames of reference is relevant and needed to address their specific needs. Educational programs and messages should be tailored to local priorities in order to be effective.

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Burger, J. 2002. Restoration, stewardship, environmental health, and policy: Understanding stakeholders' perceptions. Environmental Management. 30(5): 631-640.

Key words: Ecological health, expert versus public perceptions, restoration, stewardship

Annotation: This descriptive study explored the premise that effective decision-making for addressing environmental risks should begin with an understanding of how various publics define, or frame, environmental management issues and concepts such as forest health and restoration. Ambiguities in how the concepts used in environmental management are defined seem to be commonplace, presenting barriers to communication. The author surveyed visitors to a Los Alamos air show regarding the Department of Energy's (DOE) response to contaminated areas in New Mexico. The survey was administered on location in Santa Fe County and included questions about which attributes are most important for defining the concepts of restoration, stewardship, environmental and ecological health, and environmental and ecological restoration.

The respondents demonstrated that they held differing definitions of these concepts. The most important attribute for the meaning of environmental health was found to be human sanitation, while maintaining functional ecosystems was rated most important for defining the concept of ecological health.

Restoration was defined by these respondents as protecting human and ecological health, restoring ecosystems, and reducing the hazards from environmental contamination. The DOE uses a limited definition of restoration: cleanup and elimination of radioactive materials. According to the DOE, stewardship is the act of mimizing hazardous waste risks to humans and ecosystems, while the respondents, similar to governmental agencies and conservation organizations, defined stewardship as long-term wise use and protection of natural resources.

Integrating public values with environmental management depends on the necessary first step of understanding of how publics frame management issues. Some conclusions drawn from this survey of people living around Los Alamos National Laboratory are (1) the purpose of restoration is to protect human and ecological health; (2) both environmental and ecological restoration mean removal of contaminated materials and reducing hazards associated with contamination; (3) ecological restoration means cleaning up the environment, restoring ecosystem function, and establishing natural plant and animal communities; (4) respondents rated enhancing the economic value of the land lowest relative to restoration, environmental restoration, and ecological restoration; and (5) stewardship primarily involves the wise use of natural resources and preservation of plants and animals.

The data suggest that the DOE and perhaps other governmental agencies should broaden their views of health, restoration, and stewardship to account for conservation oriented definitions, for example. In this study, the public primarily viewed restoration as ecological protection and stewardship as wise use of natural resources. Agencies and organizations that are committed to environmental restoration would profit by working with other groups to integrate agency, scientist, and public definitions of these various concepts to develop a common language before making management decisions.

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Findley, A. J.; Carroll, M. S.; Blatner, K. A. 2001. Social complexity and the management of small-diameter stands. Journal of Forestry. 99: 18-27.

Key words: Ecological restoration, public participation, social science

Annotation: This study was set in the Colville National Forest in northeastern Washington. The researchers conducted a social assessment to describe how stakeholders and communities view, participate in, and position themselves on policy debates regarding the abundance of small-diameter stands on the forest. Stakeholders were defined as groups of individuals sharing a common interest, activity, way of life, or other relationship relative to outcomes of small-diameter stand forestry.

Managers had shared concern over small-diameter, overcrowded stands on the Colville for two decades, leading to this study with objectives to (1) develop an understanding of local views and attachments, (2) categorize the human dimensions of the small-diameter stand issue, and (3) facilitate the development of public involvement programs. The grounded theory method of qualitative data collection and interpretation was employed to capture the diversity of stakeholder views surrounding the issue on the Colville. Key informant interviews were conducted. Snowball referral sampling was used and interviewing stopped when informants agreed that a successful cross section of communities was obtained. The interviews probed local attachments to the forest, perceptions of forest management, and views about small-diameter stands.

The assessment identified seven stakeholder groups: civic representatives, commodity users, environmentalists, non-industrial private owners, a recreation group, Native American tribes, and the United States Forest Service (USFS). The paper tabulated the key concerns, commonly held beliefs, and the positions generally taken by each group. Two main topic areas relative to stand management were discussed for each group including (1) attributes and risks of small-diameter stands and (2) preferred treatments for small-diameter stands.

Civic representatives perceived bigger trees and higher growth forest conditions as enhancing recreation, timber production, and aesthetics. They also perceived less risk of dangerous and destructive wildland fires with larger-diameter stand conditions. Civic representatives supported proactive thinning to enhance forest conditions and community well-being.

Commodity users were similar to civic representatives in their concerns for timber and forest health and generally believed that small-diameter stands handicap multiple-use forestry. They advocated for thinning and low levels of prescribed burning to reduce tree mortality and increase productivity. Commodity users believed that treatments would also benefit wildlife habitat and hydrological conditions.

Environmentalists valued the intrinsic naturalness and biodiversity of the forest above resource productivity. They believed that healthy forests required naturally regulated systems that cycle through periods of low productivity, but which function in natural succession. Regarding silvicultural treatments, the environmentalists were divided. Zero-cut environmentalists equated thinning with logging, road development, and severe impacts to soil, water, and vegetation. Light-impact environmentalists acknowledged the effects of past management on the forest and cautiously favored some thinning to restore historic ranges of variability.

Within the non-industrial, private forest owners group, environmental worldview and views on management intensity differed, focusing more on the health of their own lands than of the National Forest. They believed that private lands were generally unhealthy because they had been over cut, so private forest owners advised National Forest mangers to learn from private lands and manage for fire resilient species and to use selective harvest techniques instead of clear cuts.

The recreation group was less likely to value small-diameter stands because these were thought to offer fewer opportunities for riding, hiking, wildlife viewing, or huckleberry picking. They associated this stand type with higher risk of destructive wildland fire. The recreation group tended to advocate thinning treatments to improve recreation conditions in the short term and to increase overall aesthetics in the long term.

Native tribes were more interested in being consulted as sovereign nations than being consulted about the details of small-diameter stand management. Federally mandated communication and consultation in a nation-to-nation fashion was valued by this stakeholder group.

They indicated that use of that process would provide the appropriate opportunity for Native Americans to discuss preferred treatments on the National Forest.

Forest Service managers were concerned with forest health and biodiversity conditions. They recognized an abundance of small-diameter stands on the Colville and preferred thinning, harvesting, and burning to regenerate these stands. Forest Service views were based on broad management objectives such as age class, species, and size diversity. They also acknowledged stand uniqueness and a need for site-specific treatments.

Results indicate that social conditions in and around the Colville National Forests are not homogeneous. These stakeholders' evaluations of treatments and current and future forest conditions are grounded in diverse sets of experiences, attachments to the forest, and cultural and historic influences. The authors recommended focusing on linkages between extreme views and the interests in the middle rather than the polarized extremes. Various groups see the techniques and goals of forest restoration through different frames. Findings suggest that socially acceptable directions must offer a flexible range of management alternatives to account for these diverse views. The authors concluded that forest restoration as a management strategy may well prove to be as contentious and socially complex as conventional timber harvesting.

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Hull, R. B.; Richert, D.; Seekamp, E.; Robertson, D.; Buhyoff, G. J. 2003. Understandings of environmental quality: Ambiguities and values held by environmental professionals. Environmental Management. 31(1): 1-13.

Key words: Communication, ecological buzzwords, value-based knowledge

Annotation: The purpose of this paper was to document that scientific terms used by environmental professionals are both value-laden and ambiguous when used to communicate with publics on environmental management issues. The authors investigated how definitions of environmental quality (for example, forest health and healthy conditions) affect public negotiations and what managers can do with this uncertainty.

The heated debate over forest health, for example, can be viewed as embedded in the terminology used by environmental professionals, who start with the premise that applied environmental science seeks to improve the condition of nature or reduce damage to it. Definitions of terms like forest health, biodiversity, sustainability, and naturalness are confounded by different terms implying the same thing or similar terms meaning different things. For example, definitions of forest health include sustainability and sustainability includes forest health, leading to confusion and lack of a common language.

Individuals use different values when stating definitions of these terms. Some might use utilitarian (the greatest good for the greatest number) grounds to argue for managing forests, while others may use ecological values to justify a need for forest health. The values underlying a definition matter as much as the characteristics of forest health implied by the terms. The paper listed some common values that underlie the idea of forest health:

- Biological and ecological values assign intrinsic worth to each living thing in its own right above any value to humans.
- Enlightened self interest values include the value to sustain life from the flow of ecosystem services and ecosystem health for our own self interest.
- Utilitarian values highlight forest benefits for our own consumption and economic return, and educational value for science and learning associated with high levels of forest health.
- Aesthetic, spiritual, and recreational values of forest health include high-quality amenities, primitiveness, solitude, and related experiences.

When different people come together to talk about wildland fire and forest management problems, values tend to get mixed-up, creating an inefficient language for communicating about forest health. Stakeholders in this situation lack a common language for understanding. The authors suggested making the values explicit in environmental documents that engage stakeholders. Public understandings of forest health should also involve more democratic processes such as participatory research and collaborative decision making. If ecologists and forest/wildland fire managers embrace and make explicit the ambiguities in environmental management and its related concepts, efforts to develop and communicate using a common language can become more effective.

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Hull, R. B.; Robertson, D. P.; Kendra, A. 2001. Public understandings of nature: A case study of local knowledge about "natural" forest conditions. Society and Natural Resources. 14: 325-340.

Key words: Discourse, forest health, landscape, naturalness, wildness

Annotation: This article explored public understandings of the concepts of "nature" and "naturalness" related to forest conditions. The purpose was to acknowledge and communicate a range of public understandings. The assumption is that diverse people create diverse definitions of environmental concepts, making a common language difficult to achieve. Observed differences in the definitions of nature and naturalness reflect a diversity of cultures, worldviews, social values, and objectives about forest conditions, management, and successful outcomes.

The Jefferson National Forest in the Appalachian Mountains of southwestern Virginia served as the backdrop for the case study. Group interviews were conducted using a semi-structured question guide that directly asked about forest conditions identified in the literature, such as forest health. The interviews also indirectly probed meanings of naturalness, wildness, and other qualities of the forest. The small groups interviewed included: (1) local educators/teachers, (2) recreational outfitters, (3) tourism officials, (4) real estate agents, (5) local newspaper writers/editors, (6) elected community leaders/politicians, and (7) environmental group activists. The interview discussions were video taped, transcribed, and co-interpreted by two of the authors.

The research participants valued forest health for reasons that primarily benefited humans and the quality of human life. Community needs were of more concern than the rights of nature in and of itself. Many of the people interviewed thought that a natural forest is a healthy forest. The interviews revealed indicators of forest health such as green living trees, species diversity, and soil stability.

Qualities of a natural forest emerged including escape from the stresses of everyday life, recreational benefits, aesthetic beauty, and spiritual feelings such as being connected with God. Many participants had difficulty describing naturalness in objective and consistent terms because they felt that different people define the concept in different ways. There was some agreement that large-scale construction of human dwellings, structures, and other developments are separate from the natural forest. Randomness, unpredictable experiences, solitude, a lack of people, and perceptions that the forest was distant from society emerged as indicators of forest naturalness and wildness.

Interviewees described "cultured naturalness" as an image of a forest that was lived in, contained human stories, and was rich in culture. Local culture and history of the forest were described as valuable parts of the natural landscape because these told the story of local life in that place. Cultured naturalness was valued because it communicates local identity, reminds residents that people are living off the land, and creates intense recreation experiences. Access to the landscape, primitive technology, small-scale agriculture, and cultural activities were described as indicators of cultured naturalness.

The authors concluded by making a case for more specific and clear examples of how people living in and near the forested landscape understand or frame, nature, forest health, and desired future conditions. These examples of how nature is socially defined can help residents and wildland fire managers determine what outcomes of wildland fire and forest restoration projects are locally appropriate, deemed successful, and why.

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Kauffman, J. B. 2004. Death rides the forest: Perceptions of fire, land use, and ecological restoration of western forests. Conservation Biology. 18(4): 878-882.

Key words: Forest restoration, forest thinning, expert perceptions

Annotation: This paper demonstrated how some forest ecologists are currently discussing concepts of forest health and restoration relevant to wildland fire management. The author also discussed recent research in fire ecology and examined concerns with the Healthy Forest Restoration Act, suggesting better alternatives to thinning such as natural fires and prescribed burning. In this popular ecological frame of reference, prescribed burns and fire use are viewed as positive disturbances, promoting forest restoration.

In the last century, logging, building roads, livestock grazing, and fire suppression have caused changes in vegetation and other conditions in western forests. Under the Healthy Forest Initiative and the Healthy Forest Restoration Act, land managers have focused on thinning to restore forest health. Thinning fuels is seen as problematic since it does not mimic the natural processes of wildland fire because fuels immediately start to build up after the treatments, providing no sustainable solution. The author argues that prescribed burning sustains native ecosystem conditions by harnessing the disturbance process of fire across the landscape. Slash pile burns are part of the thinning process and damage the soil due to high temperatures, whereas prescribed burning decreases extreme fire behavior and fire severity.

The recent healthy forest legislation also directs attention to the wildland-urban interface to address human safety and private home protection. The author concluded that home safety can be more effectively addressed by preventing fire ignitions near interface homes than

by thinning treatments. The argument is that the volume of biomass to be thinned is so large, and the accompanying research on home ignitability is so expensive that thinning becomes inefficient. The author concluded that prevention of catastrophic fires and changes in current exclusion policies will not result from thinning alone; thinning fuels must be supplemented with prescribed burns and the use of natural occurring wildland fires.

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Nelson, K. C.; Monroe, M. C.; Johnson, J. F.; Bowers, A. 2004. Living with fire: Homeowner assessment of landscape values and defensible space in Minnesota and Florida, USA. International Journal of Wildland Fire. 13: 413-425.

Key words: Fuel treatment preferences, homeowners, landscape preferences, risk perception

Annotation: The goal of this paper was to better understand how homeowners in the wildland urban interface (WUI) assign value to the landscape, how they perceive wildland fire risk, and how they evaluate defensible space. This paper presented an in-depth investigation of differences in practices of maintaining defensible space among homeowners in Minnesota and Florida.

This study used purposively selected in-person interviews in two Minnesota, and six Florida, neighboring communities. The communities sampled in northeastern Minnesota were located adjacent to a fire prone wilderness area, the Boundary Waters Canoe Area. The six neighboring areas in north central Florida were in and near forested lands. Each respondent also completed a two page survey. This study did not use a representative sample, but sought to describe a range of homeowner perceptions.

To assist residents in speaking about their preferred landscapes, the researchers used photographs of homes that demonstrated a range of wildland fire preparedness. Four photographs of homes with computer-modified landscapes were used to symbolize different defensible space options for each state. The survey included questions about demographics, defensible space, and prescribed burning.

Comparative analyses indicated a complex relationship between homeowners and their landscapes. The main preference for both states was to maintain what they considered to be the natural setting of their surroundings. A "natural" landscape meant different things in each state. In Florida, about one-fourth of respondents valued open spaces around their home for gardening, crime reduction, or as a space for their pets and not necessarily wildland fire protection. They preferred a landscape that provides opportunities for recreation and to view wildlife while creating wildlife habitat. Participants also thought that a landscape should provide privacy and seclusion.

In the survey, 69 percent of Minnesota respondents thinned vegetation around their homes and most surveyed Floridians (70 percent) had completed some form of vegetation reductions around their homes. Less than one-third of all respondents had taken other preventive measures such as widening driveways or installing new fire resistant roofing. A majority of respondents supported prescribed burning especially when qualified professionals were responsible. The issue of thinning on public lands was resisted by several Minnesotans who think thinning opens up more logging in wilderness areas. Floridians rejected herbicide use on their public lands.

The challenge for managers is to acknowledge the differing frames of reference used by homeowners. To change homeowner behavior when addressing mitigation, the message should not be a simple reminder that wildland fire risk exists because WUI residents already know something about the risk and the alternatives for action. Some homeowners may have construed alternate meanings from the different wildland fire mitigation practices, such as defensible space implies that no vegetation at all should be near homes. By spending more time in communities discussing the situation with homeowners, managers can facilitate co-learning to create a more complete understanding of wildland fire behavior and risk and a common language for collectively addressing problem situations.

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Rodriguez S. M.; Carroll, M. S.; Blatner, K. A.; Findley, A. J.; Walker, G. B.; Daniels, S. E. 2003. Smoke on the hill: A comparative study of wildfire and two communities. Western Journal of Applied Forestry. 18: 60-70.

Key words: Community history, wildland fire suppression, worldviews

Annotation: This grounded theory study analyzed citizens' reactions to two fire disturbances that occurred in the Wenatchee National Forest in 1994. Two of its neighboring communities, Entiat and Leavenworth, lost homes and were partially evacuated. This article frames community response to wildland fire and fire recovery in a meaningful context by first reviewing the social history and composition of each community. Interrelated dimensions of community were explored including (1) physical locality bounded by geography and territory,

(2) the social system of interdependencies among residents and institutions, both external and internal, and (3) the shared identity of community as expressed in their networks of relationships.

Semi-structured interviews with residents of each community served as the primary data supplemented by participation in four public involvement meetings and an overview of historical studies and reports published by the United States Forest Service (USFS), local governments and historians, and newspapers. The interviews focused on: (1) local attachments to the land and forest, (2) perceptions of fire management and its effects, (3) perceptions of fire recovery and its impacts, and (4) perceptions of the USFS.

Entiat was described as a traditional rural place where the population worked close to the land and claimed to possess an intimate understanding of it. The main local stakeholder groups were timber workers and fruit growers supporting wise use and private property rights. Most residents of Entiat emphasized managing the surrounding forest for human material needs. Leavenworth was described as being historically based in agriculture and timber similar to Entiat, but had later diverged into a more diverse community with a focus on tourism. The main interests in Leavenworth are tourism, retirement, apple production, and timber extraction. The tourism-oriented residents tended to support most environmental regulations, but most interviewees in Leavenworth felt that the forest should be managed for multiple uses including sustainable extraction.

Views in Leavenworth were generally more polarized than in Entiat showing evidence of an economically- versus environmentally-oriented dichotomy. Results indicated that residents in both communities tried to make sense of the fires based on four main viewpoints, which were linked to broader views of appropriate forest management.

Four main positions emerged. The first group, represented by residents in both Entiat and Leavenworth, thought that fire was inherent in the forest, but with proper land management, such as intensive logging and grazing, wildland fires can be controlled and prevented. These people felt that the fire event was the result of mismanagement of the forest causing a build up of fuels. This group viewed reintroduction of fire as a management tool that could enhance commodity-centered forestry. These economically-oriented views of fire and forest management were held by long-time residents who had experience with fire and firefighting, whose livelihoods were tied to the land, and who supported wise use and private property rights.

The second group, again represented in both communities, saw wildland fire as a friendly and necessary act of nature and part of the forest system. They felt that humans can reduce the risk of bad fires through good forest management. These long-time residents tended to have less experience with forest management and were not economically dependent on resource-based activities.

The third group emerged in Leavenworth only. They viewed wildland fire as desirable because it is necessary for the whole of the forest, and humans should adapt to fire. This view was mainly described by newcomers holding environmental protection beliefs. They felt that members of the community needed to remember that living in the forest entailed inherent risks. This group stressed better fire insurance and more control over where people built homes.

A fourth group emerged during the interviews with residents of Leavenworth who moved there from cities to retire or conduct their business and hence had little or no experience with wildland fire or forest management. These residents were fatalistic in their beliefs that fire was an unpreventable force of nature similar to hurricanes or floods.

In Leavenworth, interviewees felt that the USFS had acted professionally in their role during the fire and went above and beyond the call of duty, while interviewees in Entiat generally expressed distrust and resentment toward the agency for not doing its job. In Entiat, most people believe that responsibility for forest fire protection and proper forest management to reduce bad fires lies with the government. Federal firefighters were seen as insensitive outsiders by those in Entiat who had previously served as volunteer wildland firefighters. There was a strong sense of local control in Entiat—the local history of which was substantially shaped by external forces—regarding fire and forest management.

Wise use and private property rights supporters in Entiat responded to the aftermath of the fire with general approval for salvage logging to recover value from the burned forests and with general disapproval of funds being directed toward ecosystem recovery. In Leavenworth, there was support for salvage logging, support for improving the town's view-shed and financial capital while leaving other parts of the forest to recover without management, and support from the environmental contingent to allow the forest to recover with no human intervention. Despite the different frames of reference attached to recovery efforts, many residents in both communities felt that if recovery and salvage were successfully completed by the USFS, the agency would gain respect among the local population.

One lesson of this research is that the history and shared identity of communities each play a part in shaping current understandings and future predictions of community response to wildland fire disturbances and subsequent recovery efforts: (1) people who live in a common space share common problems to a great extent; (2) a community experiences insider/outsider tension and conflict more so during fire events; and (3) residents of the wildland urban-interface (WUI) both within and across communities react differently to wildland fire management based on how they define wildland fire and forest management. The implication was that any management of large, potentially destructive fires can result in reduced trust in the agency because of the histories and values that underlie community response. What an agency does during a community wildland fire will most likely affect how they are received and what they can do to restore the landscape after an event.

Recommendations included transmitting a more complete understanding of the role of wildland fire to publics while at the same time acquiring a more sophisticated understanding of how residents of the WUI frame problems related to wildland fire and forest management.

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Wagner, R. G.; Flynn, J.; Gregory, R.; Mertz, C. K.; Slovic, P. 1998. Acceptable practices in Ontario's forests: Differences between the public and forestry professionals. New Forests. 16: 139-154.

Key words: Conflict resolution, environmental values, management preferences, communication, risk perceptions, social acceptability, trust

Annotation: This article examined differences between government biologists, government foresters, industry foresters, and the public. A survey of citizens in Ontario, Canada was compared with a survey of forestry professionals from government and industry. The five variables used in the telephone survey as the basis of comparison were environmental values, forest management goals and approaches, risk perception, trust in science and government, and acceptability of vegetation management practices.

The survey measured environmental values using five statements to assess respondents' beliefs. The belief statements asked for level of agreement on the following: serious environmental problems exist today, technology is destroying nature, willingness to sacrifice one's standard of living for nature, concern for change in the natural world, spiritual qualities of nature, and belief in the equal co-existence of species.

The government biologist group responded to questions about environmental values more similar to the public than did government and industry foresters. Biologists also were attracted to the spiritual qualities of nature and less concerned with the negative impacts of technology on nature than the public. Government foresters perceived the seriousness of environmental problems to be less than the public and were less willing to sacrifice their standard of living for nature. Industry foresters had the same beliefs as the government foresters, but industry foresters differed from the public sample. Compared to the public, the three professional groups perceived forestry activities to be less risky, were more trusting of science and government, and accepted most forestry practices.

This study illustrates the importance of recognizing that lay publics and forestry experts frame many aspects of the wildland fire social problem in different ways. Understanding how stakeholders define forest management can prevent miscommunication and uncover stakeholders' apprehensions about the forestry profession, leading to a situation that facilitates trust and the development of common languages for communication.

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Woolley, J. T.; McGinnis, M. V. 2000. The conflicting discourses of restoration. Society and Natural Resources. 13: 339-357.

Key words: Community, discourse, ecology, restoration, values, worldviews

Annotation: This paper examined the conflicting discourses of restoration. Discourse is the conversations and the interchanges of ideas that become evident and that evolve over time regarding a certain topic. Restoration takes place in a political context that shapes the discussion in planning for restoration management. Diverse stakeholders have different opinions regarding restoration and this article demonstrated divergent frames of reference employed when restoration is discussed.

Q-methodology was used to identify different types of restoration discourses. Respondents were asked to sort a set of statements of opinion on restoration. The statements ranged from pro- versus anti-restoration sentiments, preferences for ecological and technical solutions, and evaluation or advocacy positions. The researchers asked diverse stakeholders who were involved with a watershed restoration project to sort the competing statements of opinion to determine the structure of their restoration values. Using Q-factor analysis, they found four groups, illustrating four discourses of restoration that were labeled: (1) categorical

restorationists believed that restoration is ethically necessary; (2) conditional restorationists believed that restoration is optional only after other claims have been considered. The conditional discourse emphasized the local control of restoration projects and that restoration decisions involve tradeoffs with other values like private property; (3) ecophilosopher restorationists believed that restoration is impossible, and preservation is needed because science cannot replicate wilderness; and (4) ecosocietal restorationists viewed restoration to be politically and ethically grounded in community well-being.

This article discussed two of the dominant restoration discourses: categorical and conditional. Most of the respondents fell into one of these two groups. Categorical restorationists focused on their beliefs and assumptions that preservation and restoration are inseparable, ecological restoration must involve community health, and restoration is returning an area to its condition before human settlement. Conditional restorationists believed that restoration should reflect local concerns. They perceived restoration as a conflict of values and think that nature can never be completely restored. The tension between categorical and conditional restorationists reflects two fundamentally different worldviews, or frames of reference: the intrinsic rights of nature and the private property rights of individuals, respectively.

This analysis suggested that the charge for community-based restoration managers is to identify ways of engaging different groups to discuss and develop shared understandings of the concept of restoration management. Collaborative restoration can only be facilitated when agencies and partnerships have the ability, organization, and resources to deal with a host of conflicting discourses in a particular place and context. The awareness that restorationists' definitions of the problem situation are not uniform should necessitate discussions between the diverse groups to promote a common language for addressing problems of forest health and restoration management.

Mutual Trust: Public Relations and Inclusive, Interactive Communication

Preface

The seven studies reviewed and annotated in this section focused on public relations and communicating with stakeholders in ways that foster mutual trust and ultimately a common language (fig. 1) for addressing contentious problems that involve people and wildland fire. Partnerships that communicate using a common language tend to have trust within the group and have established relationships with outside stakeholders. The first step in establishing mutual trust for a collaborative partnership is using public relations approaches that are seen as positive and respectful (Farnsworth and others 2003), and competent and credible (Winter and others 2004) in the eyes of community members and other stakeholders. Mutual trust can be fostered, over time, through communication that is interactive, such as personal contacts between stakeholders (Edwards and Bliss 2003; McCaffrey 2004); workshops that focus on locally appropriate frames and issues (Monroe and others 2003); and guided field trips to project sites or interpretive centers that offer locally specific, hands-on experiences, rather than one-way persuasion strategies such as brochures and the Internet (Toman and others 2006). Interactive public outreach of this nature is characterized by open discussions where participants are free to talk and ask questions about whatever concerns they might have; this includes listening carefully to other participants' concerns.

Many residents of the WUI and other stakeholders involved with wildland fire risk management are aware of the issues related to living in fire-prone areas. Others may not be, but all are in need of early, often, and ongoing involvement in forest and wildland fire management (Farnsworth and others 2003; Edwards and Bliss 2003). Public acceptance of fire and fuels management is a product of the interactions and discussions between citizens, agency managers, and other stakeholders (Shindler and Toman 2003). Effective partnerships, which demonstrate a common language and shared goals for wildland fire and forest management, develop through a process of trust and relationship building that is long-term and not static.

Recent Works

Edwards, K. K.; Bliss, J. C. 2003. It's a neighborhood now: Practicing forestry at the urban fringe. Journal of Forestry. 101: 6-11.

Key words: Communication, public relations, urban forestry

Annotation: The intent of this study was to gain a comprehensive understanding of conflict related to forest resources at the wildland-urban interface (WUI) in the Soap Creek Watershed in northeast Oregon by identifying: (1) contentious forest issues, (2) stakeholders and their attitudes, and (3) opportunities to minimize conflict and to promote interactive communication and trust-building. The study employed multiple methods including interviews with key informants selected

to represent diverse stakeholder groups. Interview transcripts were organized into themes using grounded-theory and qualitative analysis software. A structured mail survey was developed based on the qualitative themes and sent to all property owners and to a sample of recreationists.

The primary stakeholder groups identified during the interviews included: (1) private forest owners, (2) private corporate forest owners, (3) non-forest landowners, (4) state forest managers, and (5) outdoor recreation participants. Interview and survey data indicated three overarching themes with respect to contentious forest issues including: (1) land use and policy, (2) land management practices, and (3) quality of life in the watershed.

Despite zoning laws in the state of Oregon restricting development, stakeholders across all groups consistently identified increased residential development, and its impacts, as the most important issue in the watershed. A majority of survey respondents (81 percent) agreed that active forest management was essential for sustaining the character of the watershed, and 84 percent of survey respondents opposed further residential development of forest or farmland within the watershed. A desire to maintain the rural characteristics of the watershed, which were associated with positive quality of life, was thought to partially explain stakeholders' preference for active forest management over increased residential development.

However, private property owners were not necessarily in favor of more regulations to keep the watershed underdeveloped; 57 percent of respondents felt that additional regulation of forestry practices on private lands was not necessary. Overall, residents of the watershed and recreation participants were more concerned about, and less supportive of, certain forest harvest practices (for example, clear cutting and herbicide application) than non-resident landowners.

Communication among the stakeholder groups (and lack thereof) emerged as an important factor associated with social discord within the watershed. Over 91 percent of respondents from each group agreed that property owners should personally inform their neighbors about their management intentions beforehand. This study indicated that a highly visible and open line of communication can build mutual trust and reduce opposition to management practices. Residents of this watershed held private corporate land owners and public forest managers to higher communication standards than individual private forest owners, and they felt that public land managers should be leading the profession in progressive practices that enhance forest health and quality of life over harvest volume and financial gain.

The paper concluded by explaining three observations that are salient to managing forest-related conflicts in the WUI including: (1) recognizing shared values, (2) considering regulatory structures, and (3) fostering open, inclusive communication. Shared values in the interface vary from place to place, but within Soap Creek they include such things as privacy, green space, wildlife habitat, and recreation access. The authors concluded that common goals set the stage for constructive dialog between forest owners and their neighbors.

Overall, this study indicated that most conflicts are due to a lack of communication and mutual trust among stakeholders. Interest groups and residents felt that they should be well informed about activities that might personally affect them. To foster trust and open, interactive communication, the authors suggested a need for highly visible forest owners and public foresters who serve as good neighbors and catalysts for communication in the WUI.

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Farnsworth, A.; Summerfelt, P.; Neary, D. G.; Smith, T. 2003. Flagstaff's wildfire fuels treatments: Prescriptions for community involvement and a source of bioenergy. Biomass and Bioenergy. 24: 269-276.

Key words: Wildland-urban interface, harvesting, bioenergy, partnerships, public relations

Annotation: This paper described a success story in Arizona by documenting the city of Flagstaff's wildland fuels treatment program in an extensive, ponderosa pine dominated wildland-urban interface (WUI). The Flagstaff fire risk reduction effort is a partnership among federal, state, local, and private organizations that began in 1997. The goals are to (1) reduce the wildland fire hazard by combining thinning, brush disposal/utilization, and prescribed fire, (2) maintain and enhance vegetation and structural diversity in the WUI, (3) improve overall forest ecosystem health, and (4) obtain the support of individual property owners and the community at large.

The paper described how project managers maintain personal contact with, consider the beliefs and the desires of, and gather and use input from residents and communities during each stage of the fuels treatment process. Small-scale, low-impact cutting techniques are used during thinning because these are less intimidating for residents than conventional harvesting techniques. This encourages interested residents to safely and comfortably approach thinning crews to learn about the operation and to better understand the process. Thinning immediately next to homes and neighborhoods is

usually done when most residents are not at home, and slash is removed daily to reduce criticism and concern among residents. The public is allowed to enter some treatment areas in the fall to collect free firewood thinned from the forest. The researchers recommend that access via neighborhoods for fire wood collection should be discussed with the adjacent property owners during initial planning stages, not after thinning has begun.

During winter, slash piles are burned in ways that eliminate or reduce scorching of live trees, escaped fires, soil impacts, and excess smoke. Air quality and smoke management are of primary concern to project managers. Before and during the initial prescribed burning stages that follow thinning and disposal of slash, intense public notification was described as an essential element of the Flagstaff program. This is achieved with signage throughout the WUI, news releases, and door-to-door contacts in adjacent neighborhoods. Managers and crew members make phone calls or personal visits to residents who express concerns about prescribed burning. Treatment projects are intentionally dispersed throughout the community to prevent any one neighborhood from being continually affected, and smoke-sensitive residents are relocated if necessary.

The authors concluded with a number of lessons learned from this public involvement process that have implications for positive public relations, trust building, and credibility of managers: (1) constant one-on-one community involvement and engagement with affected residents from the very beginning, (2) timely completion of treatment projects, (3) regular updates on the status of projects, (4) prompt notification and explanation of mistakes, and (5) documentation of action taken and follow-up on special concerns are critical for success.

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McCaffrey, S. M. 2004. Fighting fire with education: What is the best way to reach out to homeowners? Journal of Forestry. 102: 12-19.

Key words: Communication, public perception, wildland-urban interface

Annotation: Social scientists and mitigation practitioners have observed a disconnect: there is an abundance of available fire information and research evidence that indicates better public awareness of fire management practices, but there seems to be little public support for fuels management techniques. To explore this disconnect, this study described the awareness and usefulness of various kinds of fire mitigation information produced for residents in Incline Village, Lake Tahoe, Nevada. A survey was conducted to identify potential factors related to the usefulness of information that was designed to communicate wildland fire risk mitigation to residents. The sources of information evaluated were developed by extension agents working in the community, news paper/magazine articles, television broadcasts, personal contacts, actual experiences, neighborhood meetings, and government agency contacts. This study investigated how these sources of information might partially explain resident support and acceptability for thinning, prescribed burning, and maintaining defensible space.

The majority of residents reported that their awareness of mitigation practices was from newspapers or magazines and the materials specifically developed for the community by extension agents. Residents were most aware of information from fire departments, print news, and brochures/newsletters, and they also found these to be most useful. Information programs in the schools were also reported to be very useful, but respondents were substantially less aware of these sources than the print news and extension materials. Forty percent of the sample cited actual experience with prescribed burning as the way they became aware of prescribed burning practices.

Over 60 percent of respondents were unaware of fire information provided by neighborhood leaders and block parties. Of those residents who knew of these neighborhood sources, 74 percent had never used one or attended any events, indicating possible barriers to neighborhood communication and involvement. Moreover, 57 percent did not know that Nevada Cooperative Extension provided fire information, while 49 percent were unaware that local government representatives provided information. These findings may indicate a general lack of communication about where to find information on fuels management practices.

Residents (51 percent) who used newspapers or magazines to find information about defensible space tended to view fire planning as their individual responsibility. Regardless of respondents' use of print news, the majority felt that selective timber harvest was an acceptable method for reducing fuels. Respondents who cited television as a source of information about mitigation practices also viewed local fire planning as the responsibility of the state and not that of the individual; whereas, 95 percent of those who said that television was not a useful source of information had done defensible space measures themselves.

Respondents who had become aware of defensible space through education materials developed by extension agents tended to see fire as a greater hazard in the area and viewed local fire planning as the responsibility of the individual. However, the use of these educational materials was not connected to maintaining defensible

space. The materials developed for prescribed burning, however, were positively associated with acceptance and enhanced understanding of prescribed burning.

Personal interaction and contacts with residents by United States Forest Service employees and local fire chiefs during neighborhood activities were most influential. Residents who cited that planning activities in their neighborhoods were used as defensible space information sources tended to have taken some protective measures around their homes. Attending meetings in neighborhoods to get information also tended to be associated with greater awareness of the fire hazards. Similarly, both agency and personal contacts were associated with increased support for controversial practices such as thinning with heavy equipment and the application of herbicides. For prescribed burning information, agency and personal contacts were associated with decreased concerns about aesthetics, decreased worries about escaped prescriptions, and decreased concerns over damage to trees.

The author recommended coupling educational materials with more interactive and personalized communication approaches when providing information about risk mitigation. Interactive education practices may facilitate co-learning and trust building because these encourage homeowners to ask questions and express concerns while talking and listening to their neighbors, local government officials, and agency managers.

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Monroe, M. C.; Long, A. J.; Marynowski, S. 2003. Wildland fire in the Southeast: Negotiating guidelines for defensible space. Journal of Forestry. 101: 14-19.

Key words: Communication, public relations, urbanization, wildland-urban interface

Annotation: This Florida case study described a workshop process for reaching consensus about fuels management and defensible space to reduce risks from wildland fire for people living in the wildland-urban interface (WUI). The goal of the workshop was to agree on a set of guidelines that better matched the setting, climate, and environmental values of WUI residents in Florida. This was justified as a need because the standard national guidelines for defensible space, which were developed in the western United States, were seen as inappropriate for the local problem situation.

Representatives from nearly 20 agencies and organizations were asked to come together to initiate a process of negotiation, called alternative dispute resolution, to discuss landscaping recommendations for wildland fire. The list of invitees was compiled from key contacts, similar to snowball sampling. The invited participants were encouraged to bring others from their offices and to suggest additional participants. A range of interests was captured by the list of invitees including: city, county, and state fire and emergency services, wildlife agencies, horticulture groups, and those interested in native plants and biodiversity.

Defensible space recommendations were negotiated in small group discussions that considered the specific situations of suburban fringe landowners, large landowners, developers, and planners. During the discussions, fire experts dispersed themselves among the groups. A facilitator helped to focus the participants on areas of agreement. A one-day workshop discussion was found to be insufficient to resolve all of the issues, so participants were asked to review and correct the meeting notes and to give feedback on the resulting draft documents. After a review process that involved three revisions, defensible space recommendations were published in a brochure for homeowners and a fact sheet for developers and planners based on the workshop negotiations.

In this case, a combination of expert professional experience (one-way, top-down) and an interactive and well-facilitated negotiation of local concerns and issues (interactive, bottom-up) helped stakeholders agree on defensible space guidelines that were locally appropriate.

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Shindler, B.; Toman, E. 2003. Fuel reduction strategies in forest communities: A longitudinal analysis of public support. Journal of Forestry. 101: 8-14.

Key words: Fire, policy, public perception, wildland-urban interface

Annotation: The purpose of this study was to measure change in public attitudes toward fire management programs on federal lands in eastern Oregon and Washington over a four-year interval. This longitudinal panel study used a mail-back questionnaire and a stratified random sample of long-time community members living near Malheur, Umatilla, and Wallow-Whitman National Forests in 1996. In 2000, over half of the original participants completed the same survey items to examine changes in their attitudes regarding four issues:

- the usefulness of information sources about forest management;
- support for fuel reduction activities;
- factors that influence how citizens respond to fuel reduction programs, and

- relationship building, over time, between the United States Forest Service (USFS) and communities.

The researchers expected higher levels of support to have developed with the passing of time. They hypothesized that this support would be associated with knowledge about treatment effects. It was also thought that this support would be influenced by the relationship between citizens and the USFS.

Newspapers or magazines and relatives or friends were reported as the most useful sources of information about forest management by a majority of respondents in both 1996 and 2000. The Internet and environmental groups received the lowest ratings as sources of useful information. A significant change was recorded during the four-year interval where the usefulness rating of information provided by timber groups rose from 39 percent to 50 percent, while usefulness ratings of the information provided by the USFS decreased from 60 percent to 48 percent.

Overall support for prescribed fire and mechanized thinning administered by the USFS remained fairly constant with more support for mechanical thinning than prescribed burning. However, in both studies, participants reported low levels of trust in the USFS to implement a responsible and effective program. For prescribed fire, trust in the agency decreased significantly from 52 percent to 43 percent over the four-year interval. In 2000, only 52 percent expressed confidence in the agency regarding mechanized thinning, and they were significantly less tolerant of smoke from prescribed burning.

The more knowledgeable the residents were about prescribed burning and mechanized thinning the more likely they were to support the use of these in the forest. Similarly, as trust in the USFS to implement responsible and effective treatments increased, support for the use of these techniques increased.

Opinions about resident-agency interactions were mixed; however, significantly fewer residents in 2000 agreed that the agency did a good job of providing information about its management activities. The number who agreed that the USFS was open to and used public input to shape management decisions decreased from 41 percent to 31 percent over the four-year interval. The critical implication of these results is that the agency's relationship with local residents has deteriorated with time in this region of the country. The erosion of this relationship negatively affects fuels reduction practices even if they are judged to be scientifically sound and ecologically warranted.

This study suggests that public acceptance of fire and fuels management is a product of the interactions and discussions between citizens and managers, over time. Public acceptance of fire policies and perceptions of forest health are not static but develop by way of a process of trust and relationship building that is long-term and probably not final.

Longitudinal studies allow researches to measure and understand processes, social change, and the formation of productive, trusting relationships between agencies and local communities. How agency managers and local communities communicate is of particular importance because it addresses *why* people may or may not hold positive attitudes (and *how* these attitudes have formed and changed through time) toward fuel management practices, going beyond *what* the public thinks or feels about the issues at a specific point in time.

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Toman, E.; Shindler, B.; Brunson, M. 2006. Fire and fuel management communication strategies: Citizen evaluations of agency outreach activities. Society and Natural Resources. 19: 321-336.

Key words: Citizen-agency interactions, learning theory, public outreach, unidirectional and interactive communication

Annotation: This study explored how to use principles from adult learning theory to help focus and improve the outreach strategies used by land managers to communicate with publics about wildland fire management. The authors presented a framework that integrates learning processes with public outreach approaches. The principles of the framework are that adults take a dynamic problem-based approach to learning, fall back on a range of prior knowledge and experiences, and are more likely to believe information that they trust.

Using a mail survey of the general public sent out in three waves (47 precent response rate), this study examined citizens' reactions to 11 public outreach approaches commonly used by agencies. Individuals from fire-prone communities were selected from the sample in Arizona, Colorado, Oregon, and Utah. These respondents evaluated the various approaches by indicating if they had experience with each, if they thought each approach was trustworthy (yes, no), and by rating the helpfulness of each format for understanding fire prevention, prescribed burning, and thinning of fuels (not, slightly, very).

The outreach approaches were classified into two broad types: (1) unidirectional approaches that involve a one-way flow of information from the agency to the public often designed to persuade and to change citizens' views and (2) interactive approaches that provide personal contact with agency managers or on-the-ground

learning experiences. The authors made a general hypothesis that the interactive approaches would be evaluated more useful than the one-way approaches.

Survey results indicated that people were significantly more likely to be familiar with the one-way approaches. A majority of respondents, totaled across locations, had experienced all but one of the six one-way approaches. Total exposure to the interactive approaches was considerably less with only two of five interactive approaches registering with a majority.

Contrary to the researchers' expectations, the interactive approaches were rated just as trustworthy as the one-way approaches when they controlled for the low ratings of public meetings. Cumulative scores across sites indicated that all but three of the approaches in both categories were rated trustworthy by 90 percent or more of the respondents. Government sponsored public meetings, classified as interactive for this study, were rated the lowest of any approach for trustworthiness and helpfulness.

The interactive approaches to public outreach were rated significantly more helpful than the one-way approaches, supporting the hypothesis. Interpretive centers (69 percent) and guided field trips (66 percent) were rated helpful by more respondents than any of the other approaches.

Finally, the survey indicated relative consistency in ratings across the four study locations. The researchers expected geographic variation regarding familiarity and experience with the approaches, but little significant variation was found. Few approaches were rated statistically different across study sites in terms of their trustworthiness and helpfulness.

To summarize the findings, a greater number of respondents had experienced the one-way approaches to public outreach, but the interactive approaches appeared to be more helpful. The authors recommended that managers recognize the strengths and weaknesses of different outreach approaches and select the appropriate approach based on their objectives for communicating with local stakeholders.

Implications for the framework of adult learning were discussed. The authors suggested that public outreach that enables interactive exchanges (for example, guided field trips to management sites and face-to-face conversations with managers) are better suited to the problem-centered learning processes used by adults than are one-way approaches. This is because interactive formats, in contrast to brochures and television messages, tend to include citizens in the discussion and can be adapted to the concerns and views of stakeholders.

Interactive outreach approaches allow individuals to select from their prior experiences the information that is most relevant for solving specific problems. In addition, interactive approaches provide opportunities to clarify information by asking questions, which can enable public outreach practitioners to ensure that prior experience and knowledge on the part of stakeholders are used in ways that are appropriate to the local context.

Regarding the trustworthiness of the approaches and the agencies providing the information, study results were less clear; however, the authors highlighted the finding that respondents demonstrated a lack of trust in public meetings sponsored by agencies. Public meetings are at best nominally interactive, and such meetings, when used for public outreach, may erode trust and can frustrate individuals who are seeking to discuss and contribute to the collective development of wildland fire and fuels management practices.

The authors concluded that the primary advantage of the adult learning framework, facilitated by using interactive communication over models of persuasion, is an increased emphasis on stakeholders as genuine participants in the public outreach process and not as passive recipients of information from managers.

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Winter, G.; Vogt, C. A.; McCaffery, S. 2004. Examining social trust in fuels management strategies. Journal of Forestry. 102(6): 8-14.

Key words: Forest value orientations, public acceptance and opinion, social trust

Annotation: This study used focus group interviews and a mail survey to examine how social trust in governmental agencies affects approval for fuel management approaches (FMAs). Social trust is a willingness to rely on those who are responsible for actions related to risk management. Three (FMAs) were examined, including prescribed burning, mechanical treatment, and defensible space. A questionnaire was conducted to measure agency trust, agency competence, forest value orientation, and perceived benefits of fuel management approaches. Surveys were sent to the populations of El Dorado and Placer Counties in Northern California, Clay County in northern Florida, and Crawford, Oscoda, and Ogemaw Counties in Michigan's northern Lower Peninsula.

Analyses of the survey data indicated that trust was a strong and consistent predictor of FMA approval for all geographic locations. Focus group interviews provided further support that agency competence, care,

and credibility are influential in shaping public trust in land management agencies. Care emerged as a dimension of trust when focus group participants made references to agencies' efforts to communicate beforehand with the public about the upcoming management activities they had planned. Perceived competence on the part of the agency was found to be positively correlated with agency trust at all locations and for all FMAs. Respondents at the three locations indicated relatively high perceived competence on the part of the government for protecting private property. However, relatively low perceived competence was found for communicating with the public about forest issues.

The relationship between forest value orientations and agency trust was examined. They found a weak association between forest value orientation and agency trust with statistical significance for only one location. The authors concluded that negative correlations indicated that agency trust is more associated with an economical, or human-centered, view of the forest than with orientations that assign intrinsic rights to the forest beyond human needs.

An accurate understanding of the benefits and risks of FMAs for residents of the wildland-urban interface (WUI) may increase agency trust and/or increased trust in the agency may enhance the public's understanding of the risks and benefits. Either way, building mutual trust with WUI residents and other stakeholders is an important part of the process whereby public acceptability and collective management develop. The correlation reported in this study between trust and acceptance of each FMA across the three locations suggests that building and maintaining trust should be the primary goal of agency-citizen interactions. Citizens want to know that the land managers are competent and trustworthy. Demonstrating and maintaining competence and trust on the part of the agency is invaluable. When and where there is a lack of trust, bottom-up, two-way interactive communication is needed to build trusting relationships and a common language for risk management.

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Appendix A. Author by Topic Index

Collaborative Capacity

Daniels and Walker 2001. page 5
Frentz and others 2000. page 5
Innes and Booher 1999. page 6
Kaplan 2000. page 7
Schusler and others 2003. page 8
Selin and others 2000. page 8

Problem Framing

Abrams and others 2005. page 10
Brunson and Shindler 2004. page 10
Burger 2002. page 11
Findley and others 2001. page 12
Hull and others 2001. page 13
Hull and others 2003. page 13
Kauffman 2004. page 14
Nelson and others 2004. page 15
Rodriguez and others 2003. page 15
Wagner and others 1998. page 17
Woolley and McGinnis 2000. page 17

Mutual Trust

Edwards and Bliss 2003. page 18
Farnsworth and others 2003. page 19
McCaffrey 2004. page 20
Monroe and others 2003. page 21
Shindler and Toman 2003. page 21
Toman and others 2006. page 22
Winter and others 2004. page 23

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