

FOREST COMMUNITY CONNECTIONS

*Implications for Research,
Management, and Governance*

Edited By

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**RESOURCES FOR THE FUTURE
WASHINGTON, DC, USA**

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An RFF Press book
Published by Resources for the Future
1616 P Street NW
Washington, DC 20036-1400
USA
www.rffpress.org

Library of Congress Cataloging-in-Publication Data

Forest Community Connections: Implications for Research, Management, and Governance / edited by Ellen M. Donoghue and Victoria Sturtevant.

p. cm.

Includes bibliographical references and index.

ISBN 978-1-933115-67-2 (pbk. : alk. paper) —

ISBN 978-1-933115-68-9 (hardcover : alk. paper)

1. Forest management—United States. 2. Community forestry—United States.
3. Forests and forestry, Cooperative—United States. I. Donoghue, Ellen M.
(Ellen Mary) II. Sturtevant, Victoria Elmore, 1950-
SD565.F539 2008

333.75'150973—dc22

2007050918

The paper in this book meets the guidelines for permanence and durability of the Committee on Production Guidelines for Book Longevity of the Council on Library Resources. This book was typeset by Andrea Reider. It was copyedited by Patti Miller. The cover was designed by Circle Graphics. Photo Credits: Background photo of the silhouetted sunset and forested ridges, Frank Vanni; man reaching down to harvest/touch salal plants, Heidi Ballard; man standing next to small diameter log truck, Daniel Len; people standing in a stream, USDA Forest Service.

The findings, interpretations, and conclusions offered in this publication are those of the contributors. They do not necessarily represent the views of Resources for the Future, its directors, or its officers.

ISBN 978-1-933115-68-9 (cloth)

ISBN 978-1-933115-67-2 (paper)

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Communities and Wildfire Policy

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In 2000, federal wildfire policy shifted from a reactive approach dominated by wildfire suppression to a more proactive approach that aimed to reduce the long-term wildfire risk to communities and the environment (USDA and USDI 2000; WGA 2001). Since the 1990s, more people have settled in what is called the wildland urban interface (WUI)—the place where humans and forests meet. This expanding patchwork pattern of residential development has resulted in humans residing closer to the areas where wildfire occurs, so that human communities are a central concern in this new approach to wildfire management.

Every community in the WUI faces different challenges and possesses unique attributes to address their wildfire risk. A sustainable approach to mitigating the long-term wildfire risk at the community level would allow communities to craft their own distinctive responses to the risks they face. Initially, the new federal wildfire approach specified four broad goals that could be adopted and integrated by communities to achieve their desired wildfire response: 1) improving fire prevention and suppression; 2) reducing trees, shrubs, and other vegetative growth (known as “hazardous fuels”) near communities; 3) restoring fire-adapted ecosystems; and 4) promoting economic opportunity and social capacity-building through community assistance. However, more recent policy directives and subsequent allocation of resources have narrowed the federal approach to focus on fire suppression and hazardous fuel reduction to the exclusion of the other goals. These changes call into question the long-term feasibility of a sustainable, community-based wildfire policy.

This chapter explores wildfire policy from the perspective of communities. It begins by examining important trends related to the changing nature of the wildfire problem, including shifting settlement patterns and past and current

policy approaches that shape community responses to wildfire threats. The chapter then summarizes the limited empirical research about community response to wildfire threats. The chapter concludes with policy implications and suggestions for future work on communities and wildfire policy that could contribute to a more sustainable wildfire policy that reduces the long-term risk to communities.

Communities and the Wildland Urban Interface

Hundreds, if not thousands, of communities are at risk from wildfire throughout the United States (GAO 2001). The shift in community and residential patterns during the 1990s largely created the current WUI. Americans migrated to the West and South, and many settled in dispersed residential areas along the WUI. From 1990 to 2000, the number of houses in the WUI grew by 67.8% in the Rocky Mountains and by 29.4% in the South, while on the West Coast and in the North, the growth rate was lower at 17.7% and 12.7%, respectively (Stewart et al. 2005). States with the highest WUI rates of housing-unit increase include Nevada (59.5%), Arizona (31.9%), Utah (28.4%), Idaho (27.7%), and North Carolina (25%) (Stewart et al. 2005). These settlement patterns mean more people and property are at risk from wildfire.

The encroachment into the WUI is exacerbated by an increased risk of catastrophic fire due to prolonged drought, diseased forests, deleterious grazing and timber practices, and 100 years of fire suppression. The combination of these social and natural events has resulted in costly, catastrophic fires that impact communities in numerous ways. The 2000, 2002, and 2003 wildfire seasons burned 8.4, 6.9, and 6.7 million acres, respectively, resulting in enormous fire suppression costs and posing risks to hundreds of communities (NIFC 2005). Consider that in 2003, wildfires in Southern California destroyed 3,640 homes, killed 22 people, forced 40,000 people to evacuate, and cost more than \$2.04 billion in insured losses (Ferguson 2003; ISO 2003).

Communities are diverse, complex social systems made up of individuals with different perspectives. Consequently, fire can have multiple effects on a community and these can vary across groups, over time, and geographically across communities (Carroll and Daniels 2003). Fire events can provide opportunities for, "restoration, rebuilding, and community fire planning ... and develop the trust and shared understandings necessary for effective concerted action" (Carroll et al. 2005, 317). As a galvanizing event, a fire can provide the opportunity to share food, living space, labor, money, fellowship, and other resources. But wildfires also can contribute to "fragmentation within and among the communities and between communities and outside agencies" (Carroll et al. 2005, 317). As the threat and actual occurrence of wildfires in the WUI has grown and the number of people living in the WUI has increased, policy

has changed to reflect the need to protect communities from these catastrophic events, and we are learning how communities react in the aftermath.

Wildfire Policy Changes 1905–2005

Catastrophic fires in the late 1800s and early 1900s resulted in a national policy that emphasized suppression. Historically, the United States removed local influence from the professionalized and depersonalized infrastructure of fighting and researching wildfire (Pyne 1997 [1982]). This legacy has resulted in organizational structures and practices that sometimes are incompatible with community concerns and a more sustainable wildfire approach.

The Forest Service was established in 1905 in part to address wildfire and the erosion, flooding, and water quality problems that followed fire. Wildfire suppression enabled the emergent Forest Service to demonstrate its authority and expertise to the nation, while also squeezing out the influence and traditional practices (such as prescribed fire, which was deemed reckless and immoral by the Forest Service) of Native Americans and frontier inhabitants—the communities of the day (Pyne 1997 [1982], 101–112).

Historic philosophies about fire color contemporary possibilities in fire mitigation. Suppression is seen as the only realistic option in some places, whereas in others, prescribed fire, natural burning, and other measures are acceptable. The historic Forest Service conception of wildfire created a belief that fire could be controlled, thus giving way to policies based on suppression. But this is only one construct; different communities have understood fire in different ways. For instance, Native American communities celebrated the dual nature of creation and destruction of all forces, thereby embracing a notion of balance between these opposing forces (Kimmerer and Lake 2001). Consequently, prescribed fire was used by indigenous people throughout North America to shape the landscape and regenerate ecosystems. Appalachian hardwood forests were encouraged by indigenous burning that promoted resprouting after fire. Midwest tall-grass prairies were influenced heavily by Native American burning. Sugar pine in the Sierra Nevada was promoted by tribal groups through prescribed fire (Kimmerer and Lake 2001). In the early 1900s, Native Americans, as well as some timber owners, promoted the importance of fire use for their livelihoods (Pyne 1995).

In spite of the rich history associated with prescribed fire and natural burning, a suppression approach became the dominant focus within the Forest Service. The expertise of the agency was celebrated as the beliefs and practices of other communities were marginalized. The organizational infrastructure that accompanied suppression policy took years to evolve and resulted in a hierarchical, militaristic institution devoted to expert fire management. In 1908, Congress passed an appropriations bill that gave the Forest Service the ability to

receive advance funds to fight fire in cases of emergency (Busenberg 2004). This off-budget, deficit-spending provision allowed the Forest Service to spend money in excess of its annual appropriation and to be reimbursed by Congress through an emergency supplemental appropriation. Expenditures could be held accountable only after the fact, providing little incentive to reign in resources, which led to an expansion of suppression efforts. The Weeks Act of 1911 established interstate compacts to support fire fighting and created a grant program to support fire patrol and fire suppression on private lands by state forestry agencies. The 1924 Clarke-McNary Act expanded the grant program to build the administrative infrastructure of the state forestry departments and disseminated federal standards for fire protection to the states (Davis 2004). In the 1930s and 1940s, suppression policy and infrastructure expanded. Readily available labor from the Civilian Conservation Corps and military equipment from World Wars I and II contributed to the creation of a paramilitary organization that sought to protect civilians from the danger of fire (Pyne 1995). After the end of the Korean War, additional military hardware was channeled to state fire cooperators through the federal excess-equipment program (Pyne 1995). Over the following 50 years, the Forest Service strengthened the federal-state wild-fire fighting partnership, which emulated military efficiency. Nonetheless, despite of the enormous resources and infrastructure devoted to suppression efforts, the number and intensity of high-profile wildfires in the United States increased in the 1990s (Dombeck et al. 2004). Inadequacies of the suppression approach, including escalating damage to people, property and infrastructure; threats to citizen and firefighter safety; and injury to natural systems led to reconsideration of wildfire policy goals and purpose (Busenberg 2004).

New Goals—A New Approach

In response to the catastrophic wildfire season of 2000, the secretaries of the interior and agriculture submitted a report to then-President Bill Clinton making suggestions for reducing the effect of wildfires on human and ecological communities (USDA and USDI 2000). This new policy was a significant departure from the previous policy. These recommendations, along with funding from Congress, resulted in the National Fire Plan (NFP). In 2001, Congress directed the Departments of Interior and Agriculture to work with the Western Governors' Association to develop an implementation strategy for the NFP. The NFP and Western Governors' Association's 10-Year Comprehensive Strategy (WGA strategy) identifies four goals to reduce the risk of wildfire and to build collaboration among communities and all levels of government: 1) improving fire prevention and suppression; 2) reducing hazardous fuels; 3) restoring fire-adapted ecosystems; and 4) promoting community assistance, which entails creating economic incentives and industries to reduce fuels and

restore ecosystems while building social capacity (WGA 2001, 2002). The WGA strategy recognizes the importance of fire suppression, especially near homes and communities, but moves away from a reactive stance. The four goals are “designed to foster a proactive, collaborative, and community-based approach to reducing wildland fires that works side-by-side with effective traditional approaches to fire suppression and fire-fighting readiness” (WGA 2001, 3). These new, national goals—formulated in part with input from community, local, state, and federal representatives—were meant to be implemented at “the local level in an ecologically, socially and economically appropriate manner” (WGA 2002, 6). Each goal was deemed equally important to a successful long-term strategy of mitigating wildfire risk (WGA 2002).

In 2002, another policy initiative was launched in response to that year’s wildfire season. President George W. Bush announced the Healthy Forests Initiative (HFI), which emphasized the hazardous-fuel-reduction goals of the NFP. The HFI entailed administrative reforms to streamline and prioritize hazardous-fuel-reduction projects. The administrative reforms dealt predominantly with expediting hazardous-fuel-reduction projects through changes in the National Environmental Policy Act (NEPA) and the Endangered Species Act (ESA) (USDA et al. 2002). In November 2003, Congress passed the Healthy Forests Restoration Act (HFRA) in reaction to the catastrophic wildfires in Southern California, and this codified the NEPA and ESA reforms first articulated in the HFI administrative actions. HFRA allows the Forest Service and Bureau of Land Management to conduct hazardous-fuel-reduction projects on up to 20 million acres of federal land (P.L. 108–148). Priority areas for fuel-reduction projects include the WUI, which can be defined by the communities at risk. The law recommends \$760 million in annual funding for hazardous-fuel-reduction projects and directs agencies to spend half of congressional appropriations each year in the WUI. One of the most debated provisions of HFRA amended the NEPA to give the agencies an expedited review processes (cf 16 USC 6512 Sec. 102-108). More than 200 environmental groups opposed the HFRA because of the restrictions placed on NEPA and ESA procedures that altered their ability to appeal and litigate perceived problematic management plans (Berman 2003). Nonetheless, at the time of its passage HFRA had wide bipartisan support in Congress, as well as support among many community-based forestry activists.

As this brief history makes clear, in a relatively short time period the federal wildfire approach has been mandated to change from a top-down, militaristic-inspired suppression policy to a more collaborative and community-oriented approach with multiple goals. With an existing organizational infrastructure heavily invested in suppression practices, change has not been without its challenges. As the federal approach changed, communities sought to influence the direction of the new policy, and the new policy has shaped how communities can respond to their wildfire threats.

Community Influence on Policy

Although the new approach heralds from the federal government, the NFP, the WGA strategy, HFI, and HFRA did not originate solely through a top-down process. Leadership within and among communities tends to be diffuse, and the principal organized presence of communities in the wildfire arena has been through community-based forestry groups. Working from the grassroots since the late 1990s, community-based forestry groups have been a vocal and active participant in fostering change in national forest policy, including wildfire policy (Kusel 2003). They participate and seek influence because they are the most economically and ecologically dependent on the resources in question. For community-based forestry practitioners and activists in the western United States, healthy forests mean managing and restoring ecosystems so they are less prone to catastrophic wildfire, restore ecosystem functions, and capture the economic benefits from ecosystem restoration and hazardous-fuel reduction.

During the 1990s, a group of representatives from community-based forestry and watershed groups devised a set of principles and worked for legislative change to support their vision (Cromley 2005; Gray et al. 2001). Their self-identified goals—stewardship, investment, process, and monitoring—reflect substantive as well as social needs to effect meaningful change (Gray et al. 2001). Stewardship emphasizes a commitment to the health of land. Investment addresses the resource needs of communities to enable them to “restore and maintain healthy ecosystems and develop lasting stewardship between ecosystem and communities” (Gray et al. 2001, 22). Process is important because community-based advocates want open, democratic processes that enable the empowerment of communities. Monitoring involves gathering and sharing “information in ways that build trust, promote learning, and ensure accountability, including taking immediate corrective measures to inform future actions” (Gray et al. 2001, 22). These goals have led community-based forestry practitioners to work with Congress and other policy professionals to seek adequate appropriations and funding, revise contracting and procurement practices, and promote collaboration with communities to allow greater flexibility in management of federal lands for better stewardship (Cromley 2005). This advocacy agenda coincided with the wildfire events of 2000, 2002, and 2003, which created a window for policy change. As such, the ideas promoted by these community-based advocates were incorporated, at least partially, into the major legislative efforts that emerged in response to the catastrophic wildfire seasons.

One example of community influence on the new wildfire approach is the inclusion of a local-benefit criterion when awarding contracts for hazardous-fuel-reduction projects. Historically, the Forest Service and other natural resource agencies considered economic opportunities for businesses and people in rural communities as part of their decisionmaking criteria for federal projects and awards (Waggener 1977). These projects often were associated with

timber work, but the decline in timber harvesting on federal land reduced the number of work contracts awarded in many rural communities. When the NFP was crafted, community-based forestry organizations requested that Congress consider economic development opportunities when awarding contracts for hazardous-fuel-reduction projects. This local-benefit criterion made funding available to reduce hazardous fuels on public lands, while providing economic benefits to rural communities and workers. Moseley and Toth (2004) found, on average, that local contractors in Oregon and Washington captured more contracts funded through the NFP than other non-NFP contracts.

This example illustrates the interdependence of economic and ecological health from the perspective of community-based forestry practitioners. This interdependence extends to the overall principles that community-based forestry groups promote in forest policy. For the most part, community-based forestry groups have been successful in getting their goals—stewardship, investment, process, and monitoring—integrated into elements of the NFP, the WGA strategy, HFI, and HFRA. However, these groups have experienced less success in seeing these victories implemented on the ground (Cromley 2005).

Policy Influence at the Community Level

Communities are influenced by the NFP, the WGA strategy, HFI, and HFRA predominantly through the funding and programs that are available to them via federal and state agencies. For instance, federal and state agencies have discretion in how NFP money is requested and allocated to different priority programs in different states. These state-level programs roughly correspond to the goals laid out in the WGA strategy.

Communities can undertake many different activities to reduce their risk from natural disasters, including wildfire, and these can be categorized as either structural or social measures (Cigler 1988). Structural responses to wildfire disasters focus on concrete aspects of response, such as building materials that can withstand fire, vegetation management programs, building codes, land-use regulations, insurance, evacuation plans, and warning systems for predicting and tracking fires to assist in evacuation. Social responses entail decisionmaking, collaboration, organization, education, management, and planning techniques that help communities assess, choose, implement, and support structural responses. The two categories are not necessarily mutually exclusive but distinguish between more- and less-tangible actions. The goals of the NFP, the WGA strategy, HFI, and HFRA include fire prevention and suppression, hazardous-fuel reduction, ecosystem restoration and community assistance. For the most part, these are tangible, structural actions. The WGA strategy intended collaborative, community-based processes to emphasize the importance of social responses to accompany these structural activities.

The new federal approach includes specific policies that provide additional financial and organizational incentives to communities. Communities may use resources obtained through the NFP, HFI, or HFRA to respond to the threats they face, or they may draw upon their own resources. Most NFP, HFI, and HFRA funding goes to fire prevention and suppression and the reduction of hazardous fuels. A statewide study of community response to wildfire threats in Arizona, Colorado, and New Mexico found that comparatively smaller amounts of funding go to restoring fire-adapted ecosystems and providing community assistance (Steelman et al. 2004a). Consequently, one of the effects of the NFP, HFI, and HFRA on communities has been to prioritize fire prevention and suppression and hazardous-fuel reduction over ecosystem restoration and community assistance.

Hazardous-Fuel Reduction and Community Efforts

Communities have different perceptions about wildfire and the types of solutions that are acceptable for their specific locales. The HFI and HFRA emphasize hazardous-fuel reduction, and funding available through the NFP and HFRA has enticed communities to address this particular threat. Consequently, much more is known about community perceptions, attitudes, and behaviors related to hazardous-fuel reduction than to ecosystem restoration or community assistance.

Research has sought to understand individual and community perceptions of different hazardous-fuel treatments on public and private lands, how public education encourages homeowner support, and how agencies should interact with communities and the public. Two themes that play throughout the hazardous-fuel-reduction research is the importance of trust between government agencies and the publics with which they need to work (Manfredo et al. 1990; Vogt et al. 2005; Winter et al. 2004) and the need to appreciate the contextual variation from community to community and, potentially, from person to person (Nelson et al. 2005). In other words, government managers are more likely to be successful in their hazardous-fuel-reduction efforts if they consider contextual features that appeal to homeowners, rather than forcing one model on them (Nelson et al. 2005; Shindler et al. 2002), and focus on building and maintaining trust in citizen–agency interactions (Winter et al. 2004).

Different communities are concerned about different social, economic, and ecological values associated with hazardous-fuel-reduction efforts near their communities. Communities also have different levels of knowledge and experience that influence their thinking about wildfire management options (Vogt 2003). For instance, residents near California's Sequoia National Park were more worried about smoke effects from prescribed fire on public lands than property loss (Winter et al. 2002). A history of life and property losses related to prescribed fire in Michigan's lower peninsula led those communities to be more

circumspect of prescribed fire (Winter and Fried 2000). Individuals in Oregon's Blue Mountains, where logging is more widespread and supports many local economies, raised concerns about burning trees that could be harvested commercially and so favored mechanical thinning over prescribed fire (Shindler and Reed 1996). Urban residents in Utah were less aware of wildfire and thus less informed about fuel-management options than rural communities in Arizona, Colorado, and Oregon (Brunson and Shindler 2004). Grazing as a fuel-management technique was more acceptable in the Arizona and Colorado communities where livestock are more prevalent. The concerns of each community reflect the diversity of experience, skill, and knowledge in each environment.

Individuals within communities also value their own personal landscapes differently. Place attachment is partially a function of aesthetics, and these considerations are important to residents who also might want to reduce their threat from wildfire. Consider for instance that homeowners in Florida and Minnesota prefer "natural" landscapes, which include vegetated views, wildlife, recreation, quiet, solitude, and privacy (Nelson et al. 2003). Although homeowners recognize the risk posed by wildfire, they differ in their perceptions of what constitutes an effective prevention measure and the actions they will take to reduce risk. Reducing hazardous fuel around private homes or creating defensible space, therefore, depends on property-owner perceptions and an evaluation of trade-offs among uncertain and potentially conflicting values (Daniel et al. 2003). Property owners are reluctant to support uniform hazard-reduction treatments, like large fuel breaks, which do not consider aesthetic or other values (Daniel et al. 2003). Not taking any action to reduce hazardous fuels is an appealing option for some given these considerations. Nelson et al. observe, "Some very knowledgeable people understand the risk of wildland fire and purposefully decide not to alter their landscape to reduce their risk" (2003, 61).

Clearly communities approach the challenge of wildfire with multifaceted concerns, and these complexities are mirrored in the research on hazardous-fuel-reduction at the community level. Since most of the research on structural community responses to wildfire threats focuses on hazardous-fuel reduction, little is known about ecosystem restoration efforts or attempts to build sustainable economic enterprises to support ecosystem restoration or hazardous-fuel-reduction industries, which are equally important components in a long-term strategy to reduce threats of wildfires in communities. In addition to the research on hazardous-fuel reduction, there also is work on the social responses associated with the new wildfire policy.

Collaboration and Community Capacity

Collaboration is mentioned explicitly in the NFP, the WGA strategy, and HFRA as a key component to engender success in mitigating the risk of wildfire. Social

responses, including collaborative activities, are important for helping support and integrate various structural responses to wildfire, such as fire suppression, hazardous-fuel reduction, ecosystem restoration, and community assistance (Jakes et al. 2003; Kruger et al. 2003; Steelman and Kunkel 2004). Also, collaborative planning in HFRA was strategically intended to get parties involved in planning and to take ownership of forest management, such as hazardous-fuel reduction.

In communities, working relationships or networks between public agencies and private landowners enable information to flow in numerous venues, such as homeowner associations, parent-teacher associations, and stakeholder groups. Active and open communication facilitates numerous purposes in wildfire response, from the creation of defensible space to the implementation of new ecosystem-restoration industries. Collaboration through task forces, working groups, advisory councils, partnerships, committees, and teams are some of the ways people organize to share information, educate others, and coordinate responses among the many stakeholders relevant to their particular concerns. Some collaborative groups work to achieve one goal, like the Lawrence County Fire Advisory Board in Spearfish, South Dakota, which focuses solely on improving fire prevention and suppression (Hudson et al. 2003). Other groups, like the Orleans-Somes Bar Fire Safe Council in California, work simultaneously to reduce hazardous fuels, restore fire-adapted ecosystems, and improve fire prevention through the reintroduction of natural fire regimes (Sturtevant et al. 2005). Wallowa Resources in Oregon endeavors to restore the land while finding economic opportunity for current and future generations of rural people (Sturtevant et al. 2005). The Ruidoso Wildland Urban Interface Group provides a forum for local, state, and federal stakeholders to share information about hazardous-fuel-reduction activities (Stelman and Kunkel 2003b; Sturtevant et al. 2005).

Communities with the networks, leadership, and ability to mobilize resources (social capital); knowledge and skills (human capital); heritage and experience with fire; knowledge of the locality; and attachment to place (cultural capital) make a difference in the ability to carry out successful fire-management planning and implementation (Kruger et al. 2003). These different types of capital fortify a community's capacity to engage in effective fire-mitigation programs because responses are designed for specific audiences and take into account the history and current conditions of the community (Kruger et al. 2003).

The importance of collaboration also is built into the HFRA, through the urging of the Western Governors' Association and community-based forestry groups. A centerpiece of the HFI and HFRA is the community wildfire protection plan (CWPP). To receive funding from HFRA, a community must have a CWPP, which brings together residents; property owners; local, state, and federal agencies; and others to create and prioritize a vision for addressing haz-

ardous fuel treatments in the WUI. Although past collaborative efforts have given communities a say in public-land management plans, CWPPs are meant to provide communities with a leadership role in drawing the WUI boundaries and identifying the areas for priority hazardous-fuel treatment (Newman 2004). Different groups or individuals take the lead in different communities. Local government and fire departments, state foresters, private-property owners, and others have spearheaded efforts to reduce fuel on public lands, while also addressing the interjurisdictional challenges of working concurrently on private lands (Cope 2004; Jungwirth 2004; Lewis and Hubbard 2004).

Despite the acknowledged importance of collaboration and community-based focus, problems with collaboration, in conjunction with underinvestment in community capacity-building, have been identified as a shortcoming in the current implementation of the new wildfire policy (WGA 2004). Observers of the policy cite systematic challenges at the local, state, and federal levels (Daly 2004; Gregory 2005; WGA 2004). Some of these problems are due partly to a shortage of technical resources to conduct CWPPs and engage in collaborative practices, such as multi-party monitoring and stewardship contracts, especially in lower resource areas (Daly 2004; Tucker 2005). Other problems arise out of agency inexperience with collaborative practices and resistance to changing old habits. For instance, agencies find it more convenient to collaborate with each other than to include nongovernmental people. The time investment in collaboration can be seen as inefficient when there is great pressure within state and federal agencies to demonstrate that they are treating the maximum number of acres of hazardous fuels (Gregory 2005). As this summary of research indicates, the work on the social responses associated with the new wildfire policy emphasizes the importance of collaboration and community capacity-building. However, carrying out these practices has been challenging, thereby jeopardizing the effect that the structural responses, such as hazardous-fuel reduction, could have in the longer term.

Sustainable Community Responses

Much of the work by social scientists on wildfire has focused on individual attitudes, behaviors, and perceptions about hazardous-fuel reduction and the importance of collaborative processes and community capacity. As such, there is little work that focuses on holistic responses by communities per se (Field and Jensen 2005). A small number of case studies of community responses to wildfire have been conducted (Steelman et al. 2004b; Steelman and Kunkel 2003a). These case studies reveal that few communities take a completely integrated approach in terms of pursuing fire suppression and prevention, reducing hazardous fuels, restoring fire-adapted ecosystems, and promoting community assistance. In other words, most communities pursue one or two

goals, depending on their individual priorities and the incentives provided by state and federal programs; a minority pursue more holistic strategies.

Flagstaff, Arizona, has made progress toward all four goals in the new wildfire approach (Steelman and Kunkel 2003a; Sturtevant et al. 2005). Because Flagstaff has integrated these goals into a cohesive action plan, the community has a better chance of mitigating the threat of wildfire in the long term. The structural responses crafted for each goal area appear to be accompanied by strong social responses. For instance, Flagstaff improves fire prevention and suppression through the Ponderosa Fire Advisory Council (PFAC), a 16-member group that includes all fire agencies within the greater Flagstaff area, along with Coconino County, Northern Arizona University, and the National Weather Service. The PFAC meets once a month to discuss and act upon a variety of wildfire issues. These include joint training sessions, public-education activities, hazard assessment and response needs, general information sharing, special activities and projects, development of standard operating procedures, and purchase of specialized equipment. Although the principal mission is sharing information, over time that has evolved to include coordination, response planning to emergencies, and resource sharing. The City of Flagstaff Fire Department has a special Fuel Management Division that engages in home assessments and conducts its own hazardous-fuel-reduction programs. The Fuel Management Officer and Assistant Fuel Management Officer create stewardship plans for defensible space at no cost to the homeowner and carry out prescribed burning. The Greater Flagstaff Forest Partnership (GFFP) seeks to restore fire-adapted ecosystems, while also developing ecologically sustainable utilization industries tied to restoration projects. Working collaboratively with environmentalists, scientists, the Forest Service, and other governmental organizations, the GFFP focuses on 100,000 acres of WUI surrounding Flagstaff and uses restoration approaches involving mechanical thinning and prescribed fire.

The PFAC, City of Flagstaff Fire Department Fuel Management Division, and the GFFP work individually to pursue their respective goals, but the overall effect results in a more long-term, sustainable approach to wildfire. Fires are suppressed when necessary but efforts also are made to reduce hazardous fuels and restore ecosystems to prevent future catastrophic fire. The development of community economic opportunities results in new industries that can support sustained hazardous-fuel-reduction activities and ecosystem-restoration services. The ultimate goal is a self-supporting economy in harmony with the surrounding environment that reduces risk to human and ecological communities alike.

Flagstaff is an exceptional example. Other communities are most likely to pursue only improvements in fire prevention and suppression and reductions in hazardous fuels. Failure to develop industries that support hazardous-fuel reduction or recognize the importance of restoring ecosystems means communities will depend on federal, state, or local assistance to continuously reduce hazardous fuels or maintain the work already completed. Without an infra-

structure that can support a restoration economy, communities will remain at risk or dependent on an unsustainable flow of resources to mitigate their wildfire threat.

Implications

Despite existing efforts by federal, state, and local governments and communities, wildfire remains a high risk in many areas. It is not known if systematic progress is being made toward reducing the number of communities at risk. However, the conditions that contribute to the wildfire problem—human settlement in the WUI, drought, and dense, flammable vegetation on millions of acres of land—remain.

The adoption of the NFP, the WGA strategy, HFI, and HFRA broadened the approach to wildfire management to include hazardous-fuel reduction, ecosystem restoration, and community assistance to confront the problems facing human and ecological communities. The four goals were promoted by community-based forestry groups and many others to address the multiple facets of wildfire mitigation that are important at the community level. In the words of the Western Governors' Association, "This community-based approach to wildland fire issues combines cost-effective fire preparedness and suppression to protect communities and the environment with a proactive approach that recognizes fire as part of a healthy ecosystem" (2001, 2). To date, however, greater emphasis has been placed on hazardous-fuel reduction to the exclusion of the ecosystem-restoration and community-assistance goals (Daly 2004; WGA 2004). This has two effects. First, it limits the responses that communities can take. Second, it calls into question the ability to realize a long-term, sustainable response from the community level. Hazardous-fuel reduction is a necessary but insufficient solution to the wildfire problem. Without emphasis on ecosystem restoration, which reestablishes the natural role of fire on the land to result in more sustainable ecological conditions, and community assistance, which establishes local economic foundations for the continued removal of hazardous fuels and ecosystem-restoration practices, the federal government and Forest Service will continue to need to provide billions of dollars per year in perpetuity to address the wildfire problem. A sustainable solution must integrate the multiple goals intended in the NFP while giving communities the opportunity to shape these to their specific needs.

From a research standpoint, significantly less is known about ecosystem restoration or community assistance efforts, such as building capacity for small-diameter timber industries. Even less is known about how all four goals fit together at the community level, where they must be effectively integrated to achieve a long-term, sustainable solution. Researchers and practitioners could help promote ecosystem restoration or community assistance by learning more

about the opportunities for and obstacles to achieving these goals at the community level. The experiences and lessons learned in places that have succeeded in engaging effective ecosystem restoration and community assistance projects need to be documented and shared widely.

Collaboration, communication, information sharing, and capacity building are at the heart of the community-based planning and implementation advocated by the WGA strategy and community-based forestry groups. Effective community responses to wildfire provide evidence of the importance of community capacity to facilitate and integrate comprehensive responses to wildfire threats. However, problems with collaboration in all facets of wildfire response indicate that this social resource perhaps is suffering from underinvestment and inattention. Researchers have a role to play in documenting cases of successful community approaches and the social responses that contribute to these successes. Likewise, researchers can play a role in highlighting areas where collaboration is problematic and empirically assess the obstacles. Much more could be known about which agencies in which regions do a better job of fostering collaboration within and among communities.

If the building blocks to a sustainable wildfire policy rest on the foundation of the four goals of fire suppression, hazardous-fuel reduction, ecosystem restoration, and community assistance, then the mortar that holds them together is the collaboration and communication that happens within and among communities and between communities and agencies. At present, the foundation is fragile, due to an overemphasis on fire suppression and hazardous-fuel reduction, and the mortar is weak, due to an underappreciation of social resources. Researchers, practitioners, communities, and agency officials all have a responsibility to work through these challenges to cultivate a more sustainable, long-term wildfire policy that reduces the risk to communities.

Acknowledgments

The author would like to thank Caitlin Burke, Ellen Donoghue, Linda Kruger, Sarah McCaffrey, and Victoria Sturtevant for helpful comments on previous versions of this chapter. All errors remain the sole responsibility of the author.

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