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Abstract

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The last three decades have witnessed an exponential increase in wildfire-related costs and losses in the United States, in part the result of rapid population migration from urban centers into relatively-undeveloped rural areas. By 2005, one in three American households was residing in volatile areas where human development is co-mingled with unaltered wildland vegetation, the Wildland-Urban Interface (WUI). That proportion is expected only to rise in the coming decade.

Mixing people and unaltered wildland vegetation has proved a deadly combination: each year, wildfires take lives. During these fires, scores of injuries occur, and hundreds of structures burn as millions of acres of sometimes ecologically-sensitive land is scorched. Federal agencies now spend more than one billion dollars on fire suppression activities each year, fielding thousands of wildland firefighters, aircraft, and equipment to protect communities at risk. As development of the WUI continues, it is critical that the nation work towards creating fire-adapted communities in which people and values are prepared to tolerate inevitable wildfire events with minimal loss of life and property. The importance of this goal was affirmed in the 2011 National Cohesive Wildland Fire Management Strategy. Doing so will necessarily mean involving communities and stakeholders in planning efforts and mitigation activities to reduce fire risk and prepare communities to withstand wildfires.

This dissertation examines the issue of community involvement in fire risk abatement in order to identify the most effective tools to facilitate long-term engagement of the people who live and work in fire-prone areas. It presents several case studies in community fire risk abatement that focus on leveraging community involvement to achieve resource management goals and create fire-adapted communities.

In Chapter 1, I outline recent changes in wildland fire policy pertinent to managers of parks and protected areas. Grasping the rapidly evolving nature of wildland fire policy, particularly federal policy, is fundamental to understanding current challenges, successes, and opportunities in community fire planning. The rapidly developing formation of the wildland-urban interface has left many parks and protected areas virtual islands of wilderness, surrounded by increasingly dense development. This situation has created new challenges for park managers, who must now contend with uncharacteristic fires originating outside park boundaries that threaten park resources. Managers also face potential liability from fires within their parks that escape park boundaries and threaten communities. By enlisting new neighbors in these communities as stakeholders or even partners in fire risk abatement, however, park managers

may be able to leverage increasingly limited program funding to achieve resource management goals.

In Chapter 2, I deal with the challenges of implementing broad community fire planning mandates through a resource management agency with a decentralized organizational structure. Focusing on the state agency primarily responsible for fire management in California, I examine the difficulties experienced in the implementation of a community fire planning program. These programs were envisaged in the California Fire Plan and mandated by the California Board of Forestry and Fire Protection, the Governor-appointed group responsible for setting forestry and fire policy in the state. The program received full funding from the California legislature, and a decade has passed since its creation. This program required all of the organizational divisions of the California Department of Forestry and Fire Protection (*CAL FIRE*) create local fire plans, written by Pre-Fire Engineers. I find that, although efforts are in the works to revitalize the program, the local plans are challenged by a lack of currency as well as an erosion of stakeholder involvement in the plan development and implementation processes. These shortcomings reflect a common challenge experienced by decentralized natural resource agencies: an absence of clear frameworks for local implementation of policy mandates. The incongruity between the priorities of state policymakers and local leadership, as well as a lack of performance-based rewards or penalties tied to mandate implementation and a lack of a clear cost-sharing structure, has resulted in inconsistently implemented policy. I describe the institutional barriers that have barred effective policy implementation in the past, and identify changes that might result in greater policy actualization. Because most state and federal resource management agencies working on fire issues operate under similarly decentralized frameworks, my findings have as much relevance outside as within California for future attempts to implement state and national policy aimed at local community fire planning.

In Chapter 3, I present results from paired surveys of stakeholders and agency facilitators involved in the development of local fire plans in California. Locally developed fire plans are designed to be instrumental in the creation of fire-adapted communities, communities resilient to disaster. Since 2003, federal fire policy has encouraged the development of Community Wildfire Prevention Plans (CWPP), and communities have been offered incentives to create the planning documents, such as eligibility to apply for federal hazard abatement funding, define the perimeter of their local wildland-urban interface (WUI), and provide input on the location and prioritization of fuel hazard abatement treatment on nearby federal lands. Though 70,000 WUI communities were identified by state and federal processes as at risk of wildland fire, just 6,000 have created CWPPs in the seven years since the program was created. In order to succeed in creating fire-adapted communities and reduce out-of-control wildfire-related costs and losses, we must better understand better what factors drive long-term stakeholder involvement in local fire plans. Understanding parallels and divisions in stakeholder and facilitator perceptions of community engagement and planning is crucial to this process. A statewide network of 27 Fire Management Plans (FMP) have been in continuous development by the California Department of Forestry and Fire Protection (*CAL FIRE*) for more than a decade. I surveyed 810 stakeholders and 42 *CAL FIRE* Pre Fire Engineers involved in the FMP in two separate efforts to better understand multiple perceptions surrounding engagement and the planning process. Reports on fire planning efforts have typically focused either on the participants or the planners; rarely are results from both perspectives available. I found striking disparities between perceptions of stakeholder engagement by agency facilitators and agency-identified stakeholders.

Encouragingly, problematic stakeholder engagement did not seem to dampen their willingness to engage in future planning efforts.

In my fourth essay, I evaluate a group local Fire Management Plans (FMP) to determine their quality as planning documents. High-quality plans are more likely to be implemented, functional over the long-term, utilized by targeted stakeholders, and effective at achieving their goals. In constant development by the California Department of Forestry and Fire Protection (*CAL FIRE*) for more than a decade, *CAL FIRE*'s FMPs are plans aimed at efficiently reducing fire risk to communities through the creation of regional documents that list locally identified values and hazards and propose means of abating fire risk. Though locally-developed fire plans are increasingly wide-spread, with today as many as 10,000 in existence around the United States, only rarely are they evaluated as planning documents. Through a technique called Plan Quality Evaluation and heavily informed by prior hazard planning evaluations conducted by the Federal Emergency Management Agency (FEMA), I evaluated a network of 27 FMPs in California. Despite the fact that the planners were hired and supported by *CAL FIRE*, the FMPs were inconsistent in size and scope as well as overall plan quality. My findings demonstrated some of the clear challenges for developers of local fire plans.

In the fifth and final chapter of my dissertation, I examine how long-term collaboration between agencies, fire safe councils, and other stakeholders can significantly reduce the impact of a potentially catastrophic wildfire. This essay analyzes a recent significant human-caused wildfire event in California that burned in an area where extensive long-term interagency partnership with a local fire safe council had resulted in a network of shaded fuel breaks. Driven by extreme weather conditions, the wildfire had escaped ground and aerial suppression efforts and threatened multiple communities in central California's Kern County. Within three hours of its ignition, the Bull Fire was threatening homes. Firefighters, aided by the extensive network of fuel breaks around Kernville were able to stop the fire with minimal losses. I chronicle the eleven-year history of the Kern River Valley Fire Safe Council and the exceptional relationships forged with federal, state, and local agencies. This decade-long partnership gave rise to multiple opportunities for collaboration in fuel hazard risk abatement projects on public and private land. This study is a substantial demonstration of the value of devoting resources to collaborative planning and risk abatement activities, particularly in nurturing the success of community fire organizations in crafting and implementing CWPPs.

In summary, my results suggest that, though the importance of community outreach and collaboration is widely accepted in the fire community, in practice it is still in its infancy – and experiencing growing pains. A structure for educating collaborative planners and facilitators is only now emerging. Uncertainty still exists as to the best way to educate or train collaborative planners and facilitators. Particularly in agencies responsible for fire suppression, facilitators and planners are most likely to enter their positions with significant fire management expertise but only limited experience with facilitating meetings, developing plans, or collaborating with stakeholder groups. As more and more people move into fire-prone WUI areas, the importance of the collaborative planner and facilitator can only grow. Professionalizing this role and the continuing maturation of the education process is likely to increase the efficacy of future planning efforts and enhance the creation of fire-adapted communities.

As wildfire-related costs and losses continue to grow, finding ways to engage stakeholders who live and work in WUI areas is of increasingly important. The "Whole Community" initiative created by the Federal Emergency Management Agency recognizes the importance of the involvement of all levels of society in disaster preparedness. This new

initiative segues well with the 2011 National Cohesive Wildland Fire Management Strategy (Cohesive Strategy), that recognizes that in order to develop a truly representative plan, all stakeholders must have a voice and input into completed plans. The Cohesive Strategy goes on to encourage the development of new relationships between agencies and stakeholder groups in order to collaboratively generate solutions that would have been unattainable individually. Two of the vital components in creating resilient communities adapted to the occurrence of wildfire are: stakeholder involvement in the development of local fire management plans and collaborative implementation of risk management projects. My research investigates collaborative planning and identifies barriers and drivers of local collaborative fire planning efforts. I hope that the research outlined in this dissertation assists in the development and implementation of future planning efforts, moving communities towards the goal of creating fire-wise communities.

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Chapter 1. Management Response to Eroding Wildland Buffers Between Developed and Protected Areas Through Education and Collaborative Planning Efforts

Introduction

Fire as well as Park managers have historically benefited from a buffer zone of undeveloped wildland vegetation between human development and parks and protected areas. Development of wildland areas adjacent to parks and protected areas presents an escalating challenge for managers looking to balance liability with a need to utilize prescribed burns and manage wildfires to meet resource objectives (Mutch, Rogers, Stephens, & Gill, 2010). Land-use change can occur swiftly in such wildland-urban interface (WUI) areas (Stephens, Martin, & Clinton, 2009). In 2003, land conversion was identified as one of the top four threats to public and private forests in the United States by the head of the U.S. Forest Service (Bosworth). Such development also increases the risk of uncharacteristic fires that can damage public and private values (Syphard et al., 2007). This situation presents three major challenges for park management: (1) escaped prescribed fires increasingly threaten people, property, and wildlands, posing costly liability issues that may limit managers' capacity to administer resources effectively; (2) uncharacteristic wildfires, due in part to human activity, pose risks to protected areas, threatening endangered species, sensitive ecosystems and other public values at risk; and (3) today's managers need public support – or at least a lack of vocal opposition – to be able to implement prescribed burns or other management activities to achieve resource objectives. The rapidly evolving policy environment for park and protected area management provides considerable support for managers looking to use community engagement to address these challenges (Bosworth, 2001; WGA, 2001; NPS, 2008; USDA & DOI, 2011).

Discussion

Increased liability from escaped prescribed fires is a pressing issue for managers of parks and protected areas, even with attempts to provide a legal basis for appropriate exercise of professional judgment such as Florida's 1990 Prescribed Burning Act (Brenner & Wade, 1992). The risk posed by escaped prescribed fires is well illustrated by the 2000 Cerro Grande prescribed fire that burned 380 structures before being contained at 42,875 acres (Interagency Fire Investigation Team, 2000). This prescribed burn, which was intended to reduce hazardous fuel on the National Park Service's (NPS) Bandelier National Monument, resulted in a payout of $441 million to satisfy claims (National Park Service, 2001). Though rare, such spectacularly expensive events create intense pressure on protected area managers to mitigate the risk of escapes that is in direct conflict with their compelling need to employ prescribed burns or allow ignitions to burn in order to maintain or restore desirable ecological conditions.

Uncharacteristic wildfires – ignitions that occur outside of the season, frequency, location, or severity of the expected historical fire regimes for an area – pose a second rapidly increasing threat to parks and protected areas embedded in the WUI. In many WUI areas, wildland fires are primarily caused by people (Syphard et al., 2007). Such ignitions are costly for protected area managers, requiring significant time and resources to contain, and can endanger sensitive ecosystems, endangered species, protected area facilities, staff, and visitors and other public values at risk. This increased fireload is being experienced at a time when most parks and protected areas have flat or even declining budgets. The National Park Service (NPS) has had to

nearly triple its allocated funding for wildland fire management funding over the last decade (NPS, 2008), straining its ability to focus on other management priorities. Despite these expenditures, the number of NPS unplanned acres burned each year has continued to grow, averaging greater than 250 thousand acres burned annually since fiscal year 2003 (NPS, 2005; NPS, 2006; NPS, 2008; NPS, 2009; NPS, 2010). In 2008, a fire ignited on the boundary of Florida's Everglades National Park. By the time it was brought under control, the Mustang Corner Fire, a human-caused uncharacteristic wildfire, had burned through the habitat of the endangered Cape Sable Seaside Sparrow (*Ammodramus maritimus mirabilis*) and consumed 39,465 acres to become the park's largest wildfire in nineteen years.

A third critical problem facing park and protected area managers is their increasing need for public support for prescribed burning and related activities. The majority of who live and work in WUI areas are concerned about wildfire risk and prevention (Williams & DellaSala, 2004). Though many researchers hold that some residents, particularly newer residents, may lack knowledge about wildfire risk or defensible space (Pyne, 1991; Moritz & Stephens, 2008; Stephens et al., 2009), other studies have suggested that residents, including newcomers to the WUI areas, have significant knowledge of fire risk (McCaffrey & Jakes 2005; McCaffrey, 2010). This concern about wildfire risk is unlikely to change in the future (Stephens & Moghaddas, 2005) as residents increasingly demand a voice in how managers implement activities that affect their interests. Though they are influenced by the degree to which they trust agencies (Shindler, Toman, & McCaffrey, 2009), residents are often regard wildland fires with suspicion or wariness (Kauffman, 2004). Stakeholders' attitudes regarding prescribed burns are most significantly impacted by education about the process, and expected outcome of the activity (Fried, Gatziolis, Gilless, Vogt, & Winter, 2006). When their concerns have not been addressed or they lack trust in agencies, communities and stakeholder groups have successfully delayed or blocked agencies initiatives and projects (King, 1993; Kramer, 1999).

In 2009, citing a lack of prior communication with the community, the Los Padres Forest Watch and the California Chaparral Institute filed a lawsuit alleging that the Los Padres National Forest failed to involve local community members in planning the Tepusquet Fuels Treatment Project. They charged that this perceived exclusion from the project's development, which utilized prescribed burning as well as manual mastication to clear vegetation over 19,300 acres, violated the 1992 Forest Service Decision-Making and Appeals Reform Act. The courts were petitioned to halt the project until suitable engagement could take place. Citing changing conditions and a recent wildland fire in the treatment area, the Forest Service voluntarily withdrew project shortly thereafter. Though such actions are rarely successful in terminating projects, they create sometimes-costly delays and amplify perceptions of mistrust and ill will with local communities. In order to implement planned prescribed burns successfully, park managers will increasingly need to recruit community support.

Education programs can be a powerful tool to reduce potential liability from escaped prescribed fires, reduce the number of uncharacteristic ignitions, and increase public support for prescribed burning activities. By engaging proactively with the community, managers can communicate the realities of living in WUI areas and encourage residents to prepare their homes and properties to resist wildfires, reducing potential risks from escaped prescribed fires. Educational programs also provide managers the opportunity to explain how to avoid accidentally starting a fire that might become a damaging uncharacteristic wildfire. Educational programs and outreach can serve to improve acceptance of planned prescribed burns and other activities (Winter & Fried, 2000; Shindler & Toman, 2003; Shindler, Toman, & McCaffrey, 2009).

In 2004, the Butte County Fire Safe Council (BCFSC) developed distributing wildfire education materials and began distributing them to area elementary schools. "Wildfire in the Foothills" was a five-segment wildfire education program aimed at sixth grade students in local schools. Teachers were provided a kit including lesson plans for five one-hour lessons and as well as transparencies, handouts, and videos, and take-home materials for children to keep and share with their parents and families. This program, financed by local support and grant funding, has been an unquestioned success. It is requested by teachers in new schools every year who have heard about the lesson plans through word-of-mouth, and fire agencies have reported that the memorable lessons have helped the community understand wildland fires better, expanded recognition of prescribed burning and fuel reduction as important activities, and prompted families to identify practical steps they can take in their homes and communities to reduce risk.

Engaging in collaborative planning activities with stakeholders who live or work in WUI areas can be time consuming, but it can dramatically improve management effectiveness (Winter, Vogt, & Fried, 2002; Zaksek & Arvai, 2004; USFS, 2010). Including members of the community in fire planning activities can recruit citizens as advocates for good management, who proactively educate their families and neighbors about fire's appropriate place in the landscape. Community members who are engaged in collective planning often participate in on-the-ground fire risk abatement, stretching limited public resources through in-kind donations and work parties.

On July 27th, 2010, two men cutting pipe started a fire near the community of Old West Ranch in California's Kern County. Within 15 minutes of the West Fire's ignition, spot fires burning ½ mile away from the blaze were endangering homes and firefighters reported flame-lengths of 150 feet (Kern County Fire Department, 2010). With heavy fuel loading driving extreme fire behavior, nearly no recorded fire activity for 110 years, no established water system and access only via dirt roads, the disaster potential for this incident was significant – but losses were limited to 23 structures. Extensive preparation by federal and county fire officials working collaboratively with local stakeholders can claim credit for this outcome. Kern County Fire Department (KCFD) and the Bureau of Land Management (BLM), working with the Greater Tehachapi Fire Safe Council (GTFSC), had years earlier identified Old West Ranch as particularly threatened by fire. Beginning in 2004, KCFD had created an escape route to help residents evacuate and provide safe passage for incoming emergency equipment. The work to create the escape route had been funded through a grant won by GTFSC, with contributions from its members and agency partners. The completed escape route allowed every resident to evacuate safely. In the 2010 fire, a shaded fuel break project organized by the same group of agency and community stakeholders was used in a suppression action that halted the southern progress of the fire (KCFD, 2010). This event illustrates the point that when WUI residents act as stakeholders and participants in fire risk abatement, they reduce the likelihood of catastrophic wildfires as well as protecting the surrounding communities, limiting the risk of expensive losses.

An excellent example of a protected area in which managers have used education and collaborative planning to overcome community fire-related challenges and achieved enhanced management objectives is the Antioch Dunes National Wildlife Refuge (ADNW) in northern California. Refuge resource managers have long struggled with the challenge of how to adequately protect the endangered species that inhabit Antioch Dunes. Some, like the Lange's Metalmark butterfly (*Apodemia mormo langei*), exist nowhere outside the refuge. For others, like the Contra Costa Wallflower (*Erysimum capitatum angustatum)* and the Antioch Dunes Evening Primrose (*Oenothera deltoids howellii)*, the ADNWR comprises a major portion of their

remaining critical habitat. In fact, the ADNWR was established in 1980 to address the threat posed by sand mining to locally endangered species living in the dunes. Today, uncharacteristic fire can profoundly impact the fragile dune habitat, reducing the availability of the wild buckwheat Lange's Metalmarks depend on, and providing an opening for invasive species. Complicating its management, the refuge is comprised of two separate tracts, both of which border the city of Antioch (Contra Costa County) with more than 100,000 residents. In the last ten years, unwanted wildfires have burned acreage equivalent to 70% of the tiny 55-acre refuge. Effective management depends on local residents understanding the importance of preventing uncharacteristic ignitions on the fragile dune habitat, and support the use of carefully calculated prescribed burning to control invasive non-native species. Funding is a profound challenge for the ADNWR – in fact, the refuge is currently completely unfunded, and depends on volunteers to implement projects for resource objectives. On the heels of a 2006 'suspicious' and damaging 10.9 acre uncharacteristic fire, the U.S. Fish and Wildlife Service staff at the refuge in 2007 partnered with the Diablo Firesafe Council (DFSC) and the Contra Costa Fire Protection District to secure funding for an education and outreach campaign. Working collaboratively, they developed a proposal and won roughly $25,000 in grant funding. In 2008, Contra Costa Fire Protection District (CCFPD) initiated an education and outreach program to help visitors and local residents learn about the area's unique species and how wildfire helps protect or endangers them. This resulted in significantly increased awareness of the refuge as well as the importance of protecting it from uncharacteristic ignitions.

The CCFPD determined that the best groups to target for outreach were school children and young adults at local colleges to educate regarding the importance preventing fires. Acting as opinion leaders, it was thought they could pass on this information to their families. During the two-year program, the FWS in partnership with the CCFPD and the DFSC developed a specialized curriculum designed to inform residents about the existence and importance of the refuge. The program educated residents about the dangers uncharacteristic fire poses to the refuge and encouraged them to participate in the effort to help the endangered species protected within the refuge recover. The education program included posters, signs, and flyers, as well as workbooks and bookmarks aimed for student audiences. They created opportunities for the public to interact with fire officials and learn about the key significance of the refuge, including a display set up at a local library.

Though the refuge continues to struggle, the two-year outreach program has had lasting impact in helping the refuge continue to meet its resource management objectives. Lacking funding to employ California Conservation Corps workers to curb the influx of invasive species and reduce fuels through cautious prescribed burning, the reserve has instead relied on the student and community groups that were targeted in the educational campaign and have since grown into advocates. Over the last three years they have volunteered time and assistance to manually remove invasive species and excess fuels from the property.

The environment in which park and protected area managers confront the problems addressed here is continually evolving. Stakeholder engagement and education is today recognized as a key component of a cohesive management strategy (Bosworth, 2001; Steelman, Kunkel, & Bell, 2004; Mutch et al., 2010; USDA & DOI, 2011). Community-based fire planning was formally recognized in federal policy as one of three elements vital to reducing the threat of catastrophic wildfires in the wake of the damaging wildfires of 2000. By the time that year's fire season was over, 123,000 fires had burned more than 8.4 million acres at a cost of more than 2 billion dollars to American taxpayers. At the request of President Clinton, the Secretaries of Ag-

riculture and Interior jointly developed a report presenting suggestions for handling the aftermath of the wildfires and preparing for future ignitions. This report, "Managing the Impact of Wildfires on Communities and the Environment", came to be known as the National Fire Plan.

The National Fire Plan was a significant departure from previous federal fire policy documents, such as the 1995 Federal Wildland Fire Management Policy and Program Review. Earlier policies had discussed only the position and role of federal agencies in wildland firefighting efforts. The National Fire Plan passed by the U.S. Congress in 2001 introduced a collaborative theme, acknowledging that wildland fires do not recognize agency boundaries or property lines (FY 2001 Interior and Related Agencies Appropriations Act [P.L. 106-291]). It identified local community coordination and outreach as one of three crucial elements of the administration's fire policy, confirming the importance of coordination and capacity-building with stakeholders, agency partners, and communities adjacent to or near federal lands. In response to a Congressional mandate to develop reporting requirements for the National Fire Plan, the Western Governors' Association (WGA) wrote A Collaborative Approach to Reducing Wildland Fire Risks to Communities in 2002, emphasizing achieving goals through a collective, community-based process. In 2003, Congress passed the Healthy Forest Restoration Act (HFRA), which in addition to incorporating elements of the Healthy Forest Initiative developed by President Bush in 2002, also legislated increased involvement with communities.

In addition to streamlining the Environmental Appeal process for hazardous fuels reduction projects, the HFRA targeted federal lands near vulnerable communities with fuel reduction projects to slow the spread of fires near structures. Without risk reduction efforts on the private side of the WUI, however, Congress recognized that defending homes in WUI areas from fire would remain costly and difficult, if not impossible. In order to encourage local communities to take part in pre-fire planning and make appropriate efforts on private lands to prepare homes and communities for wildfire, they created a framework for locally developed pre-fire management plans, called Community Wildfire Protection Plans (CWPP). In order to encourage states and communities to create CWPPs, the HFRA established incentives, allowing groups that developed CWPP to influence the location and prioritization of hazardous fuel abatement projects on nearby federal lands. It also allowed those groups to define their WUI boundaries, which impact property value, insurance costs, and the availability of grant funding. Additionally, communities with CWPPs received priority access to U.S. Forest Service and BLM hazardous fuel reduction funding.

The passage of the HFRA marked the beginning of a greater national emphasis on engaging communities in all aspects of pre-fire planning. In fact, the 2008-2012 National Park Service (NPS) Wildland Fire Management Strategic Plan explicitly directs employees to engage with stakeholders through both education and collaborative efforts. The Strategic Plan repeatedly cites a lack of engagement as a barrier to success and identifies education or collaborative planning as a crucial component to achieving agency goals. Local stakeholders have helped develop CWPPs, and stakeholders have had the opportunity to provide input in land planning decisions and participate actively in fuel reduction projects that complement the efforts of the land managers on state and federal lands throughout the United States. The full potential of such programs, however, has not been completely realized. Limited financial and personnel resources dampened participation and leadership in community outreach and planning. With a paucity of resources, managers taking a leadership role in cultivating productive, diverse, collaborative planning processes has not been a priority.

Conclusion

As people settle in and around parks and protected places in ever-greater numbers, educating and working collaboratively with stakeholders must be a priority for managers. It is clear that parallel work on both the private and public boundaries of protected areas is required to accomplish wildfire risk abatement (Stephens & Ruth, 2005; Gill, 2009; Gill & Stephens, 2009; Masada, Radeloff, & Stewart, 2011). Without such complementary activities, the potential remains for liability due to prescribed fires escaping from as well as uncharacteristic fires burning into protected areas. Without the mutual trust and relationships that outreach can forge, communities will be isolated from resource management decisions and are significantly less likely to support prescribed fire activities (Shindler, Toman, & McCaffrey, 2009). Managers of protected areas may be able to catalyze significant reductions in fire risk by engaging a diverse range of stakeholders in collaborative planning and educational efforts. By working together, organizations and individuals may be able to eliminate unnecessary duplication and stretch limited budgets. Moreover, because collective implementation of pre-fire hazard mitigation activities is significantly supported in current resource management policy, additional sources for funding may be available to managers of protected areas and groups that work for mutual benefit.

The stakes have never been higher for managers confronting wildfire-related issues. Presently more than 38% of Americans live in the WUI, the zone in which structures and other human development mingle with undeveloped vegetation (Radeloff, Hammer, Stewart, Fried, Holcomb, & McKeefry, 2005; Hammer, Radeloff, Fried, & Stewart, 2007; Theobald & Romme, 2007). Americans are expected to move from urban areas into undeveloped or rural settings in increasingly large numbers (Nowak & Walton, 2005), making it ever more clear that the residents of these WUI areas play a pivotal role in preventing ignitions and limiting the impact of wildfires (USDA & DOI, 2011). Managers have been challenged by increased potential liability should a prescribed fire escape protected area boundaries, increasing numbers of uncharacteristic wildfires impinging on protected areas from outside, and increasing demands from the public for information and a voice in decisions regarding wildfire risks. At the same time, they are held responsible for achieving resource management goals despite budget cuts. In this era of shrinking budgets, community outreach through education and engagement is a comparatively inexpensive way to leverage limited funding to reduce fire risk both within and outside of the protected areas. The National Cohesive Wildland Fire Management Strategy (2011) urges a new level of collaboration and engagement in which all stakeholders have a voice in developing strategy and new relationships are forged between agencies and stakeholders. Park managers must seize the opportunity to build relationships and enlist their new neighbors as potential allies in achieving resource management objectives. Through collaboration with the public, managers of parks and other protected spaces may achieve significant gains in community education and support as well as protecting private lands from fires escaping protected areas.

Chapter 2. Institutional Obstacles to Success in Implementing a Statewide Community-Based Fire Planning Mandate

Introduction

This paper examines institutional barriers to the implementation of a state mandate to develop a statewide system of community-based wildfire planning strategies. The 1996 California Fire Plan for the California Department of Forestry and Fire Protection (*CAL FIRE*) outlines a guide for decreasing undesirable impacts of wildfires while advancing ecosystem benefits of wildland fires through pre-fire planning (Stephens, Martin, & Clinton, 2007; *CAL FIRE,* 1996). To this end, tens of millions of dollars have been spent to develop local Fire Management plans (FMP). A decentralized resource management agency, the success of the *CAL FIRE* FMP policy mandate relied heavily on the support of local leadership due to the lack of enforceable standards and performance-based management incentives. *CAL FIRE*'s FMPs are an example of a policy initiative that was mandated by the state institution charged with wildfire policy oversight, the Board of Forestry and Fire Protection, strongly supported by the leaders of the agency responsible for policy implementation, *CAL FIRE*, and well-funded by the state legislature. Today, however, these plans are challenged by inconsistent updates (Smith & Gilless, 2011) as well as an erosion of stakeholder involvement in the plan development and implementation process. These shortcomings reflect a major challenge experienced by decentralized natural resource agencies: in the absence of clear frameworks for local implementation of policy mandates, incongruence between the priorities of state policymakers and local leadership as well as a lack of performance-based rewards or penalties tied to mandate implementation can result in inconsistently implemented policy. This article describes the institutional barriers to effective policy implementation and identifies changes that might result in greater policy actualization.

Large wildfire events have grown in extent over the last decade (Stephens, 2005), resulting in widespread damage and loss of life throughout the United States. The size and severity of the burns are part of a trend spanning multiple decades in the American west (Trouet, Taylor, Wahl, Skinner, & Stephens, 2010; Stephens, Millar, & Collins, 2010). Nowhere have the losses been as great as in California, where in the last ten years an estimated 132 lives were lost, 3,119 structures destroyed, and 2,205,037 acres of (sometimes sensitive) land was burned over by wildfires (California State Office of the Fire Marshal, 2010). Despite significant investments in research aimed at identifying strategies to ameliorate fire risk, few resources have been specifically directed at accomplishing fire risk abatement in WUI areas (Massada, Radeloff, & Stewart, 2011). Local planning efforts that include the public are effective in increasing the ability of communities to endure wildfires, reducing loss of life or other values at risk (Cortner, 1991; Bright, Vaske, Kneeshaw, & Absher, 2003). Planning efforts that engage the diverse range of stakeholders who live or work California's fire-prone areas have been suggested as one way to approach fire risk abatement (California Board of Forestry and Fire Protection, 1996; Everett & Fuller, 2011).

Organizations ranging from volunteer fire departments to federal agencies increasingly view collaboratively developed community wildfire plans as a critical element of a cohesive strategy to reduce fire costs and losses (Kruger et al., 2003; Marin County Fire Department, 2005). Involving local stakeholders in planning can yield effective solutions to complicated issues (Bosworth, 2001) and increase the acceptability of fire policies and fuel management actions (Cortner, Wallace, Burke, & Moote, 1998; Shindler, Brunson, & Stankey, 2002; Shindler, Toman, & McCaffrey 2009). However, mandating cooperation with stakeholders in the creation

of local planning efforts has had a mixed history (Brody, Godschalk, & Burby, 2003). In organizations with decentralized organizational structure, this can result in incomplete planning efforts that vary widely in terms of the depth of the collaborative process involved. In more centralized organizations, such mandates can result in cookie-cutter plans that lack effective community involvement. In both types of organizational structure, degree of collaboration with stakeholders is a key issue. Mandating collaboration has proved to be challenging for organizations with both centralized and decentralized organizational structures, however federal policy is increasingly moving to favor stakeholder involvement (USDA & DOI, 2011). Research has positively shown that fire mitigation efforts are more likely to be effective if stakeholders are involved in an interagency collaborative planning and decision-making process (Winter, Vogt, & Fried, 2002; Steelman & Kunkel, 2004; Steelman, Kunkel, & Bell, 2004; Zaksek & Arvai, 2004). The need for effective community fire plans, and the challenges to their development and implementation, have been heightened by increasing ownership fragmentation as well as concerns regarding the effects of climatic change. In order to be effective, however, FMPs must be up-to-date, accurately reflecting local conditions, and represent the input and priorities of as many stakeholders as possible.

In 1996, the California Board of Forestry and Fire Protection, a governor-appointed independent board responsible for setting California forest and wildfire policy in non-federal State Responsibility Area (SRA) lands, adopted a new California fire plan. The Board recognized a growing need for community-level fire plans that incorporated all stakeholders as active participants. The 1996 California fire plan outlined a model for community-based wildfire planning, and charged the California Department of Forestry and Fire Protection (*CAL FIRE*) with developing FMPs for each of the agency's 27 operational Units and contract counties.

The 1996 California fire plan was intended to fundamentally change the way that *CAL FIRE* engaged with stakeholders, incorporating them as partners in the ongoing planning and hazard abatement process. The FMPs were intended to serve as a nexus through which California's fire management policies could be translated to local actions, particularly in the highly flammable and rapidly expanding wildland-urban interface.

Each FMP was intended to include a locally generated list of assets, both tangible and intangible, deemed to be particularly vulnerable to fire. The plans were also expected to incorporate an assessment of initial attack[1] success, and identify cost-effective ways of managing risk. Ideally, the FMPs would identify resources and hazards, prioritize risk abatement strategies, and reflect the input and priorities of local stakeholders. Their perceived value was in reducing future costs and losses through a more nuanced understanding of the local fire situation and facilitation of the strategic implementation of wildfire threat reduction projects.

Decentralized natural resource agencies frequently contend with the issue of how to effectively implement and enforce broad policy mandates. The issues faced in the implementation of the FMPs mandated in the 1996 California Fire Plan are typical of the challenges frequently encountered by natural resources agencies with decentralized organizational structures. *CAL FIRE* has long reaped the benefits of devolving power to the local level, imbuing the leadership of the state's 27 Units and contract counties with the authority to make command decisions and direct

[1] A planned response to a wildfire given the wildfire's potential fire behavior. The objective of initial attack is to stop the fire and put it out in a manner consistent with firefighter and public safety and values to be protected (National Wildfire Coordinating Group)

resource allocation that were responsive to widely varied local situations. As an agency with increasingly broad fire protection responsibilities, empowering Unit Chiefs allows the agency to swiftly respond to emergent issues, such as rapidly developing wildland fires that threaten lives, homes, and resources. Unit Chiefs typically amass considerable local knowledge during their tenure, and are able to use this understanding to direct appropriate allocation of resources within their spheres of influence. However, this devolution of power means that some policies may go unimplemented or inconsistently implemented without clear standards for enforcement, including performance-based management incentives (Colfer & Capistrano, 2005). Other policies are implemented successfully.

Three primary archetypes of natural resource organization structures exist in California: decentralized organizational structures, centralized organizational structures, and single-county systems. Organizations with a centralized organizational structure are those in which authority is retained by the organizational or state management, and high-level decisions are made by one individual or group of and disseminated throughout the organization; the U.S. Forest Service is one example of such an organization. Natural resource agencies with a centralized organizational structure have the advantage of being able to create and effectively implement agency-wide policies and changes. However, by their very nature such organizational structures lack the ability to easily effect policies with regional variation reflecting local conditions. This results in organizations that are less nimble in responding to changing local conditions. In organizations with a decentralized organizational structure, decision-making authority is devolved throughout the organization, with the central authority or body retaining only limited authority. *CAL FIRE* is an example of such an organization, having historically spread significant decision-making power to local leadership in each of its Units around the state. Single-county systems, including six counties spread throughout California such as Los Angeles, Santa Barbara, and Marin counties, are somewhat unique, operating within the *CAL FIRE* system as entities contracted by the state to provide fire protection for state responsibility areas (SRA) in their local counties, however retaining all decision-making authority. Thus, though they are nominally part of a larger decentralized organization, they function as autonomous organizations with centralized decision-making power. The larger contract counties, such as Orange and Ventura, are themselves individually as large as some states in the eastern United States.

American natural resource agencies have long faced challenges of implementing policy objectives through decentralized organizational structure, which is widely agreed to be one of the primary dangers of decentralization (Colfer & Capistrano, 2005). Decentralized federal and state agencies can face significant challenges when stakeholders pressure local land managers not to implement policies (Colfer & Capistrano, 2005). A classic example is the Bureau of Land Management (BLM), which has historically struggled with the influence of local interests. In the first half of the 20th century, the agency revised policies and regulations to be acceptable to grazing stakeholders in order to get local land managers to implement them (Clarke & McCool, 1996; Merrill, 2002). Like other natural resource agencies, *CAL FIRE* has both benefited and struggled due to devolved responsibility. As an agency, its structure has at times been dexterous in responding to changing conditions. However, the decentralized organizational structure has made it difficult to cohesively and effectively implement mandates and policy throughout the state. Lacking enforceable benchmarks, as well as rewards or penalties, the success of the FMP program has been inconsistent throughout the state, relying heavily on local leadership to perceive the planning effort as a priority. While there was no identifiable decision to rely on Unit leadership to prioritize the FMPs, the Unit Chiefs are considered by *CAL FIRE* to have ultimate re-

sponsible for the plans, and state leadership did little to provide strong directives guiding and coercing plan development. The program's success depended on buy-in and cooperation from Unit leadership. It is likely that in this case a centralized organizational structure would have aided in the implementation of the planning mandate, however, it is possible that some of the unique qualities of the plans would have been lost.

The 2010 California Fire Plan recognized that the FMP standards had not been successful in the past. In January 2011, *CAL FIRE* released a new draft framework for the creation of the next generation of FMPs. This framework is currently being implemented with first wave of new FMPs expected in June 2011.

In 1999, the state legislature funded the creation of Unit- and Contract county-level Pre-Fire Engineer (PFE) positions. By 2000, most of the 27 positions had been filled locally. All 27 Units had Fire Management Plans (FMP) in development by 2001. Understanding the utility of creating plans and planning processes that were tailored to meet the unique needs of each area (Winter, Vogt, & McCaffrey, 2006; Monroe, Nelson, & Payton, 2006; Shindler, Toman, & McCaffrey, 2009) each PFE worked independently within their Unit to create a unique collaborative plan development process that incorporated stakeholder input. In 2003, the federal Healthy Forest Restoration Act (HFRA) was signed into law, offering communities in high fire risk areas, called Communities at Risk (CAR), the opportunity to influence the location of federal fuel treatments in their area and to apply for fire hazard abatement grants to engage in self-directed fuels modification projects. In order to be eligible for these grants, CARs had to develop a Community Wildfire Protection Plan (CWPP) through a collaborative effort between agencies and local stakeholders. *CAL FIRE* briefly directed all its PFEs to ensure that their FMPs were in compliance with CWPP requirements in 2003. The agency presently encourages, but does not require PFEs to create FMPs that fulfill CWPP standards. Several FMPs currently satisfy CWPP requirements. The 2010 California Fire Plan has yielded a new template for the FMPs. The agency is currently in the process of implementing the new format, which supports crafting FMPs that meet CWPP requirements. Presumably many of the remaining plans will be brought into compliance with the standard during their next revision, due June 2011.

The 27 existing *CAL FIRE* FMPs differ significantly from each other in length, scope, and relevance. In part, these differences reflect the complexity of the landscapes and communities for which they were developed, as well as the challenges of implementing state mandates in the face of institutional barriers. The variation in the plans may also be attributed to a lack of standards for PFEs' deliverables and an absence of any performance-based incentives or penalties to ensure compliance with the mandate. In some cases this has probably resulted in FMPs with an appropriately local flavor. The lack of a plan framework, clearly defined criteria, or a mechanism for mandate enforcement, however, has also resulted in some FMPs being inconsistently updated, reflecting limited or sporadic stakeholder involvement, and focused on reporting past outcomes rather than future needs. As a result, the plans' utility with respect to focusing resources or prompting community dialogue has been limited. On the other hand, the FMPs also represent an exceptional planning effort and a tremendous opportunity to activate a broad range of community members as active partners in fire hazard mitigation. The plans have been in episodic development for more than a decade, and represent one of the earliest widespread attempts in California to incorporate community members and agencies as partners in regional fire planning. They also offer a unique opportunity to determine whether institutionally consistent collaborative fire planning has any tangible effect on wildfire costs and losses, and to identify the most effective ways to involve stakeholders in a long-term planning process.

Methods

In order to understand the present state of the FMP program, we undertook a statewide census of all PFEs and equivalent contributors in all 27 Units and contract counties. We conducted the survey by phone, with a single interviewer reading a pre-approved script to survey each of the Pre-Fire Engineers. In many cases, the interviewer discovered during the survey that the current PFE was not the individual who had authored the current update to the local FMP. As a result, an effort was made to target not only the current PFE, but also to survey the individual who authored the most recent revision of each fire plan. Consequently, a total of 42 responses were gathered for the survey. One or more current or past PFEs were interviewed in each of the 27 Units and Contract counties.

Results

Our survey results revealed that local agency leadership has played a strong role in guiding the evolution of the FMPs and the responsibilities of the PFEs. Historically, *CAL FIRE* has conferred significant decision-making authority to leadership within the Units and contract counties. As a result, each Unit Chief has a great deal of discretion regarding the allocation of resources and how to implement statewide policy within the Unit. Over time, the Units have assigned significant additional responsibilities to their PFEs, ranging from information technology to law enforcement.

In most Units and contract counties, the role of the PFE has gradually transformed into a more general responsibility for managing, analyzing, and compiling location-based data. PFEs use geographic information systems (GIS) such as ArcGIS to create fire, fuel, and workload assessment maps. In the last few years, there have been several statewide initiatives that have had a heavy emphasis on information technology, such as the Fire Hazard Severity Zone (FHSZ) program. Almost without exception, PFEs have been assigned responsibility for taking part in or completing these initiatives, significantly or totally compromising their ability to engage with stakeholders and update the FMP. During 2007, *CAL FIRE* state leadership notified PFEs that because of the added responsibilities of conducting the FHSZ mapping process, they would not be expected to update individual FMPs at all that year.

In addition to the expansion of the analytic expectations placed on PFEs, the survey results also revealed that more than 60% of *CAL FIRE* Units suggest or require their PFEs become Peace Officers. This requires extensive law enforcement training, and creates scheduling constraints that conflict with the flexibility needed to engage effectively in community outreach.

The survey also revealed that PFEs stay in their positions on average for only two to four years. This seems to be partly the result of both the increasing responsibilities of PFEs and the lack of opportunity for promotion within a PFE role. The frequency of position cycling is also partly a reflection of *CAL FIRE*'s organizational culture, which rewards mobility within the agency. Frequent PFE staffing changes inevitably result in both a cyclical loss of institutional knowledge as well as an erosion of trust with the local community. It is rare that there is an organized handoff from one PFE to their successor, either because the previous PFE's new position didn't permit enough scheduling flexibility or because the position remained vacant for weeks or months before being refilled. As a result, many individuals coming into the PFE role find themselves with little guidance on how to perform their job. Most PFEs told us that they found themselves, to greater or lesser degrees, "reinventing the wheel" as it pertains to Fire Management activities. Sixty-two percent of PFEs reported that they had not written the most recent FMP,

and the majority said that the individual who had written the most recent plan was not available to provide them with assistance or support in their job. Just 15% of PFEs reported that they had been involved in the revision of a FMP in the past, so almost all PFEs revising local FMPs are doing so for the first time. The resulting plans are predictably idiosyncratic, and often lacking coherence between revisions.

Ultimately, relevance and utility of the FMPs are dependent on whether Unit leadership considers implementing *CAL FIRE*'s planning mandate a priority. Though some Units undertake regular updates of the FMP, most of the survey respondents reported that they revise the plans only when Unit leadership judges they have sufficient downtime from higher priority tasks to do so. In total, 48% of the 27 FMPs had not been updated in the twelve months prior to our survey, and 30% date back to 2004-2005 (a four to five year lapse). Of the plans that had been revised more recently, many lacked substantial alterations or updates. Numerous plans included significantly out-of-date information, including project data referencing "future" plan action dates now long past.

Discussion

In short, though the Fire Management plans were required by the California Board of Forestry and Fire Protection, supported by *CAL FIRE* leadership, and funded by the state legislature, the plans ultimately have not accomplished as much as they might have. The program's failure to achieve traction clearly reflects the institutional barriers to success identified in our survey and more broadly the challenges faced by natural resource agencies with decentralized organizational structure.

CAL FIRE's decentralized organizational structure means that widespread local success in policy implementation may only be possible through fostering a culture of local ownership in statewide policy formation. Research on decentralized natural resource agencies suggests that organizations with strong *espirit de corps* are demonstrably more effective at implementing policy mandates (Merrill, 2002). Early inclusion of *CAL FIRE* local decision-makers in program development could be vital to achieving goals and delivering results. Discovering means to incorporate the input of Unit-level agency leadership into the state policy decisions could result in leaders at all levels of *CAL FIRE* taking greater ownership of the resultant policy and could reduce barriers to implementation.

A yet more effective solution may be to develop clear standards for the enforcement of policy, including performance-based management incentives, which has long been acknowledged as a necessity for decentralized natural resource organizations (Ellefson, Moulton, & Kilgore, 2001). For example, linking approval of requests for increased funding by local government to compliance with state planning mandates might serve to incentivize active participation in the implementation of the mandate.

The way lies open for *CAL FIRE* to transform the FMPs into a yet more effective planning or community engagement tool. The 2010 California Fire Plan outlined a pathway forward for the FMPs. Recognizing the old layout didn't work, FMP program leadership have developed a new framework for the FMPs, overcoming limited resources and budget cuts to achieve statewide execution of the new framework. The new draft Fire Plan Template, presented to the Board of Forestry and Fire Protection in January 2011, is intended to be easier to use and update and includes step-by-step instructions for Pre-Fire Engineers. Given the high rate of turnover in the position, these detailed instructions are a crucial component to the creation of effective plans. Unlike prior guidance, the new template is designed with the intention of regular evaluation and

updates, including input from the Units and Contract counties.

As wildfire-related costs and losses continue to grow in the state of California, the need for cost-effective and efficient methods to reduce fire risk becomes increasingly urgent (USDA, 2006). In the last decade, millions of dollars in taxpayer resources have been spent in an attempt to reduce fire risk through developing and continuously updating local FMPs, and though the program has had its successes, its ability to deliver results has been hampered by institutional barriers. The decentralized organizational structure of *CAL FIRE* means that consistent policy implementation requires clear standards as well as performance-based management incentives. The 2010 Strategic Fire Plan (Board of Forestry and Fire Protection) as well as the new FMP draft template (*CAL FIRE* 2011) with its evaluation criteria may well presages a shift in this direction, resulting in consistent, impactful FMPs. Coordinated action between legislators, policymakers, foresters and fire officials at all levels may be an essential component in the effort to reduce the threat of catastrophic wildfire to people, communities and values at risk throughout California

Chapter 3. Early Results from Collaborative Fire planning in California: Disparate Perceptions of Stakeholder Engagement and Collaborative Planning

Introduction

More than one-third of American households live in the fire-prone Wildland Urban Interface (WUI) (Radeloff, Hammer, Stewart, Fried, Holcomb, & McKeefry, 2005). Their actions, both individual and collective, can considerably impact fire risk (Steelman & Kunkel, 2004). Fostering resident participation in defensible space creation and other fire abatement activities, however, can be a difficult task (Gill & Stephens, 2009; Massada, Radeloff, & Stewart, 2011). As WUI areas expand (Nowak & Walton, 2005), and fire-related costs and losses continue to rise, WUI residents' participation is crucial to achieving the creation of fire-adapted communities, one of three goals outlined in the 2011 National Cohesive Wildland Fire Management Strategy (USDA & DOI). Policies and planning efforts that fail to incorporate stakeholder input and concerns are inherently unstable (Cortner, Wallace, Burke, & Moote, 1998; Shindler, Brunson, & Stankey, 2002) and less likely to be effective (Shindler, Toman, & McCaffrey, 2009), but little presently is known about what encourages or limits stakeholder involvement in fire planning (Brenkert-Smith, 2010). Reports on prior efforts at engagement typically reflect either a stakeholder or agency facilitator perspective, and accounts representing multiple perspectives are rarely available (Toman, Shindler, & Brunson, 2006; Ganz, Troy, & Saah, 2007; Fleeger, 2008; Brummel, Nelson, Jakes, & Williams, 2010; Fleeger & Becker, 2010). In this study, we sought to measure consonance between stakeholder and agency facilitator impressions about local fire planning efforts, as well as determine whether stakeholder satisfaction and degree of involvement with past collaborative planning efforts influenced willingness to participate in future efforts. To that end, we surveyed agency facilitators and agency-identified stakeholders involved in the development of 27 local fire plans in California over the last decade. We discovered significant disparities in perception on the degree of stakeholder involvement in the planning efforts, but little indication that problematic experiences have diminished stakeholders' willingness or desire to engage with future planning efforts.

In spite of efforts to curb them, wildfires continue to burn out-of-control, particularly in the west, where each year fires claim lives, destroy or damage homes, and cause harm to a variety of ecosystem values. Firefighters' efforts to reduce the incidence of large fires have been hampered by an increasingly complex management situation in which more and more homes are built within or adjacent to undeveloped vegetation, creating and expanding the WUI. Research has demonstrated that WUI residents' actions, or lack thereof, strongly impacts their ability both individually and as communities to safely withstand wildfires (Foote & Gilless, 1996; Cohen, 2000; Dwyer & McCaffrey, 2002; USDA & DOI, 2011). Policymakers at both the state and federal levels have recognized the importance of WUI residents' involvement in planning and fire risk abatement (California Board of Forestry and Fire Protection, 1996; USFS & DOI, 2001; WGA, 2001; USFS & DOI, 2004). Stakeholder engagement is a key element to achieving the goal of creating fire-adapted communities, identified as one of three goals in the National Cohesive Wildland Fire Management Strategy (USDA & DOI, 2011). These goals are defined as simultaneously offering the greatest challenge and the greatest opportunities to resolve wildland fire problems today and together address the Departments' shared vision for the future, to "safely and effectively extinguish fire, when needed; use fire when allowable; manage our

natural resources; and as a Nation, live with wildland fire" (USDA & DOI, 2011). Increased community participation in fire planning efforts is critical in order to address the challenge of creating fire-adapted communities.

The Healthy Forest Restoration Act of 2003 (HFRA) inaugurated a national effort to encourage the development localized fire risk abatement plans, called Community Wildfire Protection Plans (CWPPs). A principal goal of the HFRA was to "reduce risk to communities, municipal water supplies, and other at-risk federal lands through a collaborative process of planning, prioritizing, and implementing hazardous fuel reduction projects" (HR1904 section 2(1)). In order to encourage communities in fire risk mitigation efforts, the HFRA directed agencies to support stakeholders in developing CWPPs (SAF, 2004). The HFRA also established a number of incentives to motivate the development of the local fire plans. Communities with CWPPs could define the boundaries of the local WUI and had a voice in identifying and ranking fuel hazard abatement projects on nearby federal lands. Supporting the development of CWPPs was a significant-enough goal that agencies were directed to grant preferential funding of hazard abatement monies in areas with CWPPs in place.

In the five years since the HFRA was authorized, minimal large-scale research has been completed to evaluate the success of the CWPP program in fostering long-term stakeholder support for collaborative fire planning (Grayzeck-Souter, Nelson, Brummel, Jakes, & Williams, 2009; Brenkert-Smith, 2010). Most completed studies have been focused in scope, centering on analysis of a handful of CWPP case studies or on the success of fuels treatment implementation (Brummel, Nelson, Jakes, & Williams, 2010; Ganz & Saah, 2007; Fleeger & Becker, 2010). This lack of research exists in part because traditional metrics of success, such as reduction in number of ignitions or homes lost to fire, are not entirely suitable for assessing the success of attempts at engaging communities in collective fire hazard reduction. Indeed, planners involved with CWPP creation have noted that the plans can be deemed a success simply because the stakeholders met and went through the process of making them, i.e. *res ipsa loquitur* (Council of Western State Foresters, 2006). This is true at some level, though the cost in time and resources of preparing CWPPs as well as the potential importance of the plans is great enough to justify more rigorous analysis (RIISE, 2008). Clearly, data such as acres burned and number of ignitions are more easily measurable than ideas such as stakeholder involvement or longevity of community support for fire risk abatement activities (Shindler, Toman, & McCaffrey, 2010). However, determining the degree to which local stakeholders have engaged in the creation of past plans, as well as their willingness to participate in future planning efforts, is a necessity in order to identify effective tools to engage communities in collective action and recognize evolving challenges to planning efforts.

Though engaging diverse stakeholders in long-term collaborative action has historically proved a challenging proposition in the varied and continually shifting WUI (McCaffrey, 2004; Gill, 2009), community involvement is intrinsic to the success of both the CWPP initiative and management in the complex WUI (Fleeger, 2008; Everett & Fuller, 2010; USDA & DOI, 2011). Therefore it is crucial to understand the degree to which past stakeholders remain committed to future involvement. Because the formalization of locally developed fire risk abatement plans is a relatively recent development, we know comparatively little about how a stakeholder's past level of engagement, or their perceived satisfaction with the planning process, might influence continued participation in fire planning.

In California, a statewide network of local fire plans called Fire Management Plans (FMPs) developed by the California Department of Forestry and Fire Protection (*CAL FIRE*) has

existed for more than a decade as a result of a mandate in the 1996 California Fire Plan (California Board of Forestry and Fire Protection). These FMPs share many similarities with CWPPs, with more than a dozen FMPs doubling as CWPPs. Recently, the release of the 2010 California Fire Plan, along with new agency leadership, has motivated *CAL FIRE* Units to bring their FMPs into compliance with CWPP standards (*CAL FIRE,* 2011; *CAL FIRE,* 2011).

The state of California is an ideal location in which to begin an analysis of stakeholder and agency engagement in local planning because it provides both a large number of local Unit replications and an extended history of plan development relative to other areas. *CAL FIRE* is among the largest state fire agencies in the United States, responding to around 5600 wildland fires annually across its protection area of more than 31 million acres (*CAL FIRE,* 2011). The agency's scope of operations spans 21 organizational Units and six counties that *CAL FIRE* contracts to provide services. *CAL FIRE* has long served as an innovator of new techniques and policies that have been later adopted in other states and countries. The agency's recognition that locally developed fire plans that engaged stakeholders in collective pre-fire planning and mitigation efforts could be an efficient tool to protect communities and values at risk was years ahead of the national trend (Hodgson, 1995). *CAL FIRE* FMPs were developed post-1996 as communicative policy acts intended to tally regional fire-related hazards and values at risk, to describe planned risk abatement actions, and to relate recent activities and successes (California Board of Forestry and Fire Protection, 1996; *CAL FIRE,* 2011). Though the Chiefs of each of the 27 Units and contract counties are responsible for ensuring the annual submission of the updated plans, the FMPs are effectively written by Pre-Fire Engineers (PFE), specialist planners whose positions were created and funded specifically for this task. Because the 27 California FMPs have been in continuous development for more than a decade, the experiences of agency facilitators and local stakeholders are a source of information that can be utilized to promote more effective collaboration among stakeholders in future planning efforts. Given the increasing weight placed on stakeholder participation in fire planning efforts through response to the Federal Land Assistance, Management and Enhancement Act of 2009 as well as the initiation of a National Cohesive Wildland Fire Management Strategy (USDA & DOI, 2011; USDA & DOI, 2011), these results have as much relevance outside as within California for future efforts to engage stakeholders in local community fire planning.

The FMPs for different *CAL FIRE* Units and contract counties have evolved differently throughout the state. Some Units used their FMPs for pre-fire planning to forecast future threats and enumerate regional risks. Others treated them as a periodic reporting mechanism for activities, successes, and challenges. Each Unit and contract county has revised and updated its original FMP at least once. Some, such as the Amador-El Dorado Unit, developed a uniform template for revised plans, while others created a wholly new document for each plan revision. Some Units revise FMPs on a nearly annual basis, while others update more sporadically. At the time of our survey, 29% of the FMPs had been last revised during or prior to 2005. Each *CAL FIRE* Unit FMP is as individual as the areas it represents, a quality consistent with the aims of the later Healthy Forest Restoration Act's CWPP program.

At a minimum, each *CAL FIRE* FMP incorporates some input from a diverse group of individuals and organizations with diverse interests or responsibilities in fire planning. Some stakeholders, including federal, state, and local agencies and selected industry and large landholders, were involved because they had responsibilities pertaining to fire issues. Others, like neighborhood associations, fire safe councils, and similar organizations, had diverse

motivations for involvement ranging from historical preservation and environmental protection to personal safety.

Methods

In order to understand both agency and stakeholder perceptions of stakeholder involvement in fire planning, we surveyed stakeholders listed as involved in the development of the *CAL FIRE* FMPs, as well as the PFEs who developed the plans. Our research sought to detail stakeholder involvement in the collaborative planning process by determining the degree to which individual stakeholders and PFEs described themselves as being involved in the fire planning process. We also sought to identify their perceptions of their local fire plans' impact in order to discern what variables might affect their level of involvement in future planning efforts.

Defining an appropriate population of wildfire planning stakeholders to sample for a survey is difficult, given California's size and diverse population. Moreover, every resident and visitor, as well as all agencies and organizations in the state, is affected in some way by wildfire. As the Station Fire burned in the summer of 2009, particulate matter and smoke around Los Angeles affected even California's most urbanized residents. Around the state, a gamut of organizations from basketweavers' associations and ranchers' collectives to historical preservation societies are involved in fire planning. Groups involved in fire planning range in size from neighborhood associations with a dozen members to multinational organizations employing tens of thousands of individuals. Given such a broad potential population, we determined that we could most accurately gauge stakeholder involvement and best distinguish parallels and divergences in perception between stakeholders and agency PFEs by limiting our study to stakeholders identified in the FMPs. We chose to exclude nonspecific or generic stakeholders. For example, a stakeholder description such as 'Fire Departments' was deemed generic and excluded, but 'Los Angeles Fire Department' was included in the survey population. Given that each member of our study population was specifically selected and identified as a stakeholder by the *CAL FIRE* Unit or contract county in which the FMP was written, the potential relevance of our results is significant, even with the possible omission bias associated with not expanding on this set of stakeholders. The 27 FMPs collectively identified a total of 810 specific individual and organizational stakeholders. Having the resources necessary to attempt a census of this entire population, we determined that sampling was not necessary. We therefore performed a census by contacting each of these 810 stakeholders, taking care to craft a survey instrument of limited length, phrasing questions carefully to avoid bias with an appropriate question wording (Appendix A; Willis & Lessler, 1999). The majority of the survey responses were obtained via phone, with the survey taking roughly fifteen minutes to complete with a typical respondent. The interviewer read from a script to ensure consistent survey administration.

A separate questionnaire targeted the 27 PFEs around the state who write and revise the FMPs (Appendix B). Because this survey population was so small, we also conducted a census for this group, contacting every PFE in the state. Our survey instrument was again administered via telephone, and designed to require between 10 and 15 minutes to complete. We conducted the survey using a single interviewer reading a pre-approved script to survey each of the PFEs. In many cases, the interviewer discovered during the survey that the current PFE was not the individual who had authored the current update to the local FMP. Thus, an effort was made to contact not only the current PFE but also the individual who authored the most recent revision of each FMP. As a result, we gathered a total of 42 responses from PFEs for the 27 FMPs under

consideration. In situations where the current PFE had not written the most recent FMP update, we omitted the portion of the survey dealing with the development of the FMP, with those data necessarily being drawn from the PFE responsible for the latest revision of the FMP.

In order to maximize our rate of response for the stakeholder survey, we utilized a combined data collection methodology, employing three different forms of communication (phone, electronic media, and mail) through four iterative attempts to contact stakeholders. The first contact attempt to solicit survey participation was by phone; the next by email; then, by a mailed postcard; and finally, by a mailed letter. We achieved an 85.3% response rate. Only 8.5% of the named stakeholders were unreachable, either because an individual was deceased or the stakeholder organization was no longer in existence. A further 6.2% of named stakeholders were nonresponders to all attempts to contact them, with some likely being actually "unreachable" as just defined.

For our PFE survey, we designed a combined data collection methodology identical to that of the stakeholder survey. We were, however, able to complete phone surveys with all PFEs through just phone and email contact.

Results

Our research revealed that while nearly every participating named stakeholder did indeed consider him or herself to be a "stakeholder in wildfire risk or community fire planning issues," only a small fraction of respondents considered themselves involved in any way in the most recent local fire plan update in which they were identified as a stakeholder. Of the 691 respondents, 14.6% described themselves as "Very involved" or "Involved" in the most recent fire plan update (with 6.1% describing themselves as "Very involved" and 8.5% describing themselves as "Involved"), while 85% described themselves as "Not involved at all."

In the survey administered to PFEs, 37% of respondents stated that all stakeholders listed in the plan participated in the most recent revision of the plan; 48% replied that not all listed stakeholders participated; and 15% replied that they didn't know. When asked how many of the stakeholders had an opportunity to participate in the most recent plan revision, 32% of respondents replied "All"; 11% replied "Most"; 21% replied "Some"; 11% replied "None"; and 25% replied that they didn't know.

Asked whether they were satisfied with their opportunity to provide input into the most recent fire plan update, 9.4% of stakeholders said they were "Very satisfied"; 6.1% of stakeholders said they were "Satisfied"; 2.3% said they were "Not satisfied at all"; and 82% said they were not involved in the most recent plan update. Asked to rate their satisfaction with how well their goals and input were incorporated into the completed plan, 8.7% replied they were "Very satisfied"; 6.2% replied they were "Satisfied"; 2.9% replied they were "Not satisfied at all"; and 81.5% replied they were not involved in the most recent plan update. Research suggests that communities and stakeholders are far more likely to be satisfied with fire policies and plans if the agencies involved conducted outreach and education, placing an emphasis on communication to the public (Winter & Fried, 2000, Shindler, Toman, & McCaffrey, 2009).

When PFEs were asked how satisfied they were that their most recent completed plan incorporated stakeholders' feedback, input, goals, and priorities, 15% replied that they were "Very satisfied"; 19% replied that they were "Somewhat satisfied"; 15% replied that they were "Neither satisfied nor dissatisfied"; 22% replied that they were "Somewhat dissatisfied"; 0% replied that they were "Very dissatisfied", and 30% replied that they "Didn't know."

Named stakeholders were then asked if they used the FMP, in any way, for any reason. Of the group, 47% replied "Yes," the majority explaining that they used it for grant-writing purposes. A small fraction said that they used the FMP for education or stakeholder outreach. An additional 45% replied "No," some anecdotally replying that the FMP was cumbersome and lacked useful material. Others explained they did not have a copy of the FMP and were not aware that copies of the document were available. Finally, 8% of respondents replied that they "Don't know" whether the FMP was used in any way, for any reason. These respondents explained that while they themselves did not use the FMP, it was entirely possible that someone else within their agency or organization used the FMP for some purpose.

Finally, we asked how likely stakeholders were to remain involved in future iterations of the local fire plan. To that question, 76% replied that they or their organization were "Very likely" to remain involved; 11% replied "Likely"; 5% replied "Neither likely nor unlikely"; 0% replied "Unlikely"; 2% replied "Very unlikely"; and 6% replied "Don't know."

Discussion

It is striking that although one-third of the PFEs responsible for developing FMPs stated that all named stakeholders were involved in the most recent plan update, and 64% of PFEs replied that either "All," "Most," or "Some" of the stakeholders were involved in the most recent FMP update, an overwhelming majority of stakeholders responded that they were not involved in any way in the most recent FMP update. This disparity is problematic, since our survey results revealed that the population we surveyed were appropriate stakeholders, at least from their perspective, for collaborative engagement in the planning process. Of the stakeholders included in the study population, 98% identified themselves or their organization as having a particular interest in wildland fire risk issues. The discrepancy between the perceptions of the PFEs and the named stakeholders suggests a disconnect between those responsible for writing collaboratively developed local fire plans and interested stakeholders, a disconnect which needs to be addressed in future plan revisions. Our results suggest that PFEs and stakeholders may define 'involvement' in different ways: PFEs may conclude that having a relationship and talking to stakeholders about matters pertaining to fire planning constitutes involvement, while stakeholders may expect to be offered a more active role in planning, revisions, and proposed activity to consider themselves involved in FMP creation. Even if this is the case, it is clear that a majority of the stakeholders who described themselves as not involved in the most recent planning process had not heard of the plan- or even recognized the name of the PFE responsible for its creation. Thus while some stakeholders have an existing relationship with *CAL FIRE* PFEs even without participating in the FMP development, many stakeholders identified in the FMPs lack any relationship whatsoever with the PFE or the plan.

In addition to the coded survey responses, our surveys captured qualitative responses. Survey participants were offered the opportunity to provide comments explaining or expanding on any of their coded responses. The comments were completely optional, with the interviewer prompting comments at several points in the survey administration by asking respondents if they wanted to explain or expand on any of their prior responses.

An analysis of the qualitative responses captured in the stakeholder survey revealed that more than 50% of respondents who indicated that they were not involved in any way with the most recent fire plan update additionally commented that they would have welcomed an opportunity to participate in the plan process. It is likely that these unsolicited comments are reflective of a larger population of uninvolved stakeholders sharing similar opinions.

When asked to rate their satisfaction with the degree to which they had an opportunity to provide input, the respondents who had been involved in the most recent plan update expressed a range of opinions. Roughly half reported they were "Very satisfied" and the other half replied that they were "Not satisfied at all" or "Satisfied" rather than "Very satisfied." Many respondents expressed frustration regarding the planning process. They noted a lack of clarity with regard to the structure and duration of the planning process and limited opportunities for involvement. Several stakeholders said they had rated themselves as "very satisfied" because any involvement was better than no involvement at all. Numerous stakeholders explained that their involvement in the plan came solely through the opportunity to provide comments via email on a review copy of the new plan. Several described receiving a lengthy document for review from the PFE but having only a few days in which to provide comments. Anecdotal conversations with PFEs indicated that such deadlines may have occurred because of workload pressures keeping PFEs from completing draft documents earlier. At other times, PFEs themselves received a FMP update request from their superiors with a short deadline. By contrast, the United States Forest Service (USFS), an organization with a centralized structure with policy and mandates coming from the top and being passed down to be implemented at the regional and forest level, requires a structured outreach process for all proposed agency actions (United States Forest Service, 2010). The USFS scoping process varies, with flexibility built into the system to make it adaptable for different situations, but requires that appropriate methods of outreach be utilized to reach interested stakeholders.

Given the degree to which individuals, organizations, and agencies that overwhelmingly self-identify as key stakeholders in wildfire risk planning have been silent partners in recent local FMP efforts, it is important to quantify what impact, if any, that lack of involvement has had on stakeholder willingness to participate in future planning efforts. Stakeholder participation in local planning is crucial to reducing wildfire-related costs and losses, and effective collaborative planning can prove difficult to achieve without long-term relationships (Healey, 1997). When questioned about their willingness to participate in future FMP planning efforts, however, 88% of respondents replied that they were "Very likely" or "Likely" to participate. Just 2% replied they were "Very unlikely," and 6% replied that they "Don't know" how likely it is that they or their organization would be willing to participate in future planning efforts.

Respondents who replied that they had not been involved in the most recent FMP were less likely to say they were "very likely" to participate in future planning efforts than the entire population. When asked to explain why that was the case, the respondents explained they would not be involved unless their future participation was solicited, a circumstance which they thought was unlikely. Encouragingly, only an extremely small fraction of respondents (just eight out of 691 responses) described themselves or their agency or organization as entirely uninterested in any future FMP involvement.

An unanticipated but understandable finding of our study may illuminate the reason that PFEs correctly identified but were not able to involve the appropriate stakeholders in planning – a simple lack of resources and limited staffing for the fire plan. PFEs positions were created and funded expressly to work on the FMPs, engaging in the creation and maintenance of the FMPs. They are, however, assigned a wide range of unrelated responsibilities at the discretion of the Unit Chief, such as law enforcement and mapping. Given the promotion structure of *CAL FIRE* and their heavy workload, individuals rarely stay in the PFE position for more than a few years. Each FMP update is therefore typically written by a PFE with no prior experience with such

plans or with collaborative planning efforts in general. In fact, at the time of the survey, 15% of PFEs said that they had not read the FMP they were responsible for maintaining.

The recent 2010 California Strategic Fire Plan charted a path toward the next generation of the FMPs which are currently in development around the state. This fact, as well as new leadership at the state level responsible for FMPs, is very likely to result in an entirely new vision for the FMPs. Best of all, this new generation should create a planning environment in which it is possible for PFEs to have adequate time in their position to develop the kind of trust and personal relationships with local stakeholders necessary for effective collaborative planning.

Regardless of their past involvement, it is encouraging that individuals and organizations that self-identified as stakeholders overwhelmingly welcomed the potential of future involvement in *CAL FIRE* FMP development efforts. Even though the process of identifying the diverse stakeholders in community-level hazard abatement is still evolving, past challenges or mistakes in the planning process may not seriously impair future planning efforts.

Conclusion

Despite the absence of recent stakeholder involvement in California local fire plan development, individual stakeholders who self-identify as having a stake in wildland fire-related issues remain interested in fire planning. Further, they are willing to participate in future collaborative fire planning. Our research identified the facilitation of collaborative fire planning as a significant stumbling block in the local FMPs developed around the state by Units and contract counties of the California Department of Forestry and Fire Protection. Change may be on its way for the FMP program: new policies expressed in the 2010 California Fire Plan will significantly impact FMPs around the state (California Board of Forestry and Fire Protection, 2010). *CAL FIRE* state leadership has already initiated revision of the fire planning program, creating a more structured framework to assist PFEs in developing and writing the local fire plans (*CAL FIRE,* 2010; *CAL FIRE,* 2011). The first of these plans is due in June of 2011.

Though key local stakeholders' reported only limited engagement in recent FMP updates, our research found that the PFEs developing the FMPs had accurately identified a population that included individuals, organizations, and agencies who described themselves with near-unanimity as being concerned with wildland fire risk and interested in collaborative fire planning. In their survey responses, stakeholders overwhelmingly declared themselves ready to participate in future planning efforts, even if their recent engagement was minimal. To create collaboratively developed local fire plans in the future, PFEs have only to invite the named stakeholders to participate.

The 2011 National Cohesive Wildland Fire Management Strategy (Cohesive Strategy) released by the U.S. Department of Agriculture and Department of the Interior places a high value on collaborative planning that recognizes and incorporates the contributions of all stakeholders. The Cohesive Strategy advocates not just a collaborative process incorporating diverse stakeholders, but the formation of new working relationships between partners (USDA & DOI, 2011). Research shows that plans that incorporate local collaborative input are significantly higher in quality (Brody, 2003). This recognition of the importance of involving and incorporating the input of diverse stakeholders ranging from local neighborhood organizations to federal national resources agencies dovetails with Federal Emergency Management Agency Director Fugate's recent conceptualization of the 'Whole Community' initiative, involving all levels of society in disaster preparedness. Understanding the weaknesses of past collaborative efforts can help inform future ventures. Further, the recognition that past

missteps may not preclude the development of effective future mutual processes is key. In order to minimize risk and prepare for the aftermath of natural disasters such as catastrophic wildfires, it is crucial to begin bringing diverse local stakeholders together to develop plans and implement risks collaboratively. At the same time, this cooperative process has the effect of establishing trust and improving relationships between stakeholders at all levels. A commitment to collaborative fire planning and collective action will help establish fire-adapted communities, building resiliency of a community to safely withstand and recover from inevitable natural disasters.

Chapter 4. Applying Plan Quality Evaluation (PQE) to Make a Quantitative Assessment of the Quality of a Network of Fire Planning Documents in California

Introduction

A set of 27 local Fire Management Plans (FMPs) have been in continuous development for more than a decade by the California Department of Forestry and Fire Protection (*CAL FIRE*). These FMPs are proactive attempts to reduce wildfire costs and losses through pre-fire planning and collective action. The mandate for their creation was set forth by the California Board of Forestry and Fire Protection in the 1996 California Fire Plan in recognition of the increasingly complex landscape of the state's extensive fire-prone wildland-urban interface (WUI). Finding effective ways to reduce wildfire costs and losses, particularly in the quickly expanding WUI continues to be a significant challenge for policymakers and planners (USDA & DOI, 2011).

Despite the *CAL FIRE* FMPs' critical role in guiding fire response and pre-fire mitigation actions, minimal research has been conducted on the plans individually or collectively (Smith & Gilless, 2011). Because high quality plans are more likely to be successful achieving their stated goals and useful to identified end-users (Berke & French, 1994), we quantitatively evaluated each of the FMPs to determine their quality as planning tools. We discovered that a majority of the plans scored poorly in this regard. Few were widely used by their targeted users, a fact which may be related to many being inconsistently updated, difficult to access, and lacking focus on the goals outlined in the 1996 California Fire Plan. Few of the FMPs scored well in either of the two primary criteria used to assess their analytical quality and policy focus.

Given that the FMP program is vital to meeting state and federal policy goals of fostering fire-adapted communities and reducing costs and losses through local collective action (California Board of Forestry and Fire Protection, 2010; USDA & DOI, 2011), our findings suggest that a greater emphasis on the development of effective, up-to-date, and appropriate FMPs might significantly enhance planning success in California. It should be noted in this regard that FMP quality may well be improved by the execution of the more detailed state mandate set out in the 2010 California Strategic Fire Plan (California Board of Forestry and Fire Protection).

One of the largest fire agencies in the United States, the California Department of Forestry and Fire Protection (*CAL FIRE*) responds to roughly 5600 wildland fires annually across its protection area of more than 31 million acres. Throughout its existence, the agency has innovated techniques and policies that other states and countries have subsequently adopted (Thornton, 1995; Professional Foresters Examining Committee, 2003). The agency's recognition that local fire plans could be an important asset in cost-effectively protecting communities and values at risk was ahead of the national trend (Hodgson, 1995).

In constant development for more than a decade, *CAL FIRE*'s 27 local Fire Management Plans (FMP) are plans aimed at efficiently reducing fire risk to communities through the development of regional planning documents. Mandated by the California Board of Forestry and Fire Protection, the FMPs' expected contents were outlined in the 1996 California Fire Plan (California Board of Forestry and Fire Protection, 1996). These include a description of values at risk, identification of high-value areas facing particularly high fire risk, and an explanation of local hazards and challenges. The FMPs were to be used to drive local efforts to prevent fires through education, fuels reduction, and other programs. The FMPs' creation and regular revision

was facilitated by allocating funds in each *CAL FIRE* Unit to establish and maintain a professional planning position known as a Pre-Fire Engineer (PFE). The new FMP framework was first implemented in the Riverside, Tuolumne-Calaveras, and Nevada-Yuba-Placer Units, then expanded throughout the state. The newly-created FMPs incorporated existing statewide fire prevention, land-use planning, vegetation management, and forest health improvement programs with a local focus. By 2004, thirty million dollars had been spent on the project, and 27 plans had been created representing all of *CAL FIRE*'s organizational Units and contract counties.

The potential for FMPs (or their analogs) to significantly reduce the impact of catastrophic wildfires on people and communities and stimulate the transformational development of fire-prone communities was the motivation for the research reported in this paper to assess the strengths and weaknesses of the *CAL FIRE* FMPs. Though the *CAL FIRE* FMPs play a potentially critical role in informing local planning and guiding pre-fire mitigation actions in California, limited research has been conducted on the FMPs (Smith & Gilless, 2011). Moreover, in the decade since the FMP program was launched, similar local fire planning efforts have become more widespread nationally, in large part stemming from the 2003 passage of the Healthy Forest Restoration Act (HFRA), which established Community Wildfire Protection Plans (CWPPs). CWPPs closely resemble the 27 FMPs in form and function. CWPPs around the U.S. began development in 2003, and today it is estimated that roughly 10,000 local fire plans exist around the nation.

High-quality plans are more likely to be consulted by targeted end-users than lower-quality plans and more likely to result in achieving their goals (Pitkin, 1992; Berke & French, 1994). But what is a "good" plan? Though this question is the subject of much debate in the planning literature (Berke & French, 1994; Kaiser, Godschalk, & Chapin, 1995; Hopkins, 2001), Baer suggests a high-quality plan is one which contains adequate content, expressed appropriately through format and quality of communication, including accurate and up-to-date data, clear goals and explicit guidance for implementation (1997). Such a plan is more likely to be a useful and accessible tool and achieve its goals (Berke & Godschalk, 2009).

One common approach to assessing planning documents is post-hoc evaluation of plan outcomes, judging plans based on their effectiveness in achieving their stated goals (Baer, 1997). Post-hoc analysis can measure either: (1) the difference between the plan's goals and what happened with the plan in place; or (2) the difference between what happened with the plan in place and what would have likely occurred in the absence of the plan. As an approach, post-hoc analysis lacks flexibility in accounting for changing real-world conditions; and it can only be conducted after a plan has been completely implemented. Moreover, post-hoc evaluation accounts only for outcomes; it does not facilitate assessment of the plan itself in terms of structure or quality.

In an evaluation of state planning mandates for natural hazard mitigation, Berke found that "plan quality was a strong predictor of local success" (1994): a well-written plan with clear and concise policy statements, clearly-articulated goals, and explicit strategies was found to be more likely to create the planner's desired outcomes than a poorly written, wordy, or indistinct plan. Unfortunately, while listing the qualities of a good plan is relatively simple, devising a mechanism for assessing the degree to which a plan manifests these qualities can be difficult. Given that the commonly-used post-hoc analysis assesses results rather than plan content, another technique must be employed to evaluate plans like the FMPs. A variety of techniques are

used by land-use planners to qualitatively assess planning documents, including qualitative plan critiques, literature reviews, 'bad' plan evaluation, and content analysis.

In qualitative plan critiques, a group of individuals is convened to informally discuss the observed strengths or weaknesses of a certain plan. The results of this dialogue or dialogues are distilled and written up to create a plan critique narrative. Qualitative plan critiques are inherently subjective and individual by their very nature, with each evaluation yielding unreproducible results (Baer, 1997).

Literature reviews, another method often employed by urban land use planners to evaluate plans, have been found to generate highly subjective interpretations of study findings and generally inaccurate results (Wolf, 1986).

A third option is to judge the plan on how poorly it is crafted, that is, how well it fits the criteria for a bad plan (Hansen, 1968). This is perhaps the simplest form of plan assessment, simply comparing a plan to a list of hallmarks of bad plans. But such minimalist criteria only serves to determine whether a plan is likely to be unacceptable, not whether it meets widely recognized standards for plan quality (Baer, 1997).

Using content analysis to gauge the internal consistency of plans is an increasingly common approach to assess the meaning of written communication in an objective, systematic, and quantitative manner (Berelson, 1974; Alterman & Hill, 1978; Berke & French, 1994; Babbie, 1997). Several U.S. states (including Oregon and Florida) utilize consistency reviews to determine the consistency of local plans (DeGrove, 1992; Knapp & Nelson, 1992). Content analysis can also be utilized to define a framework for assessing multiple plans, even when they have unique formats, content, stated goals, and/or proposed strategies. Over time, agreement on the broad characteristics that define high quality plans have emerged, greatly facilitating the use of content analysis to evaluate them (Chapin & Kaiser, 1979; Hollander, Pollock, Recklinger, & Beal, 1988; Kent, 1990; Berke & French, 1994; Berke, 1996; Conroy & Berke, 2004). First, good plans have a fact basis, detailing accurate local conditions and identifying challenges (Chapin & Kaiser, 1979), but contain no more information than is necessary lest the resulting document be "three inches thick and weight seven or eight pounds . . . [and] remain the proverbial doorstop in the homes of planning board members" (Pitkin, 1991). Second, good plans identify goals that address local conditions and challenges (Connerly, 1990). Third, good plans clearly detail strategies and projects that achievably chart a path towards meeting the identified goals (Berke & French, 1994). Broadly defined, standards for good plans alone, however, can still result in subjective evaluation instruments and criteria that are inadequately justified and poorly defined (Talen, 1996).

Plan Quality Evaluation (PQE) is a technique which has grown out of content analysis that provides a quantitative framework for objectively analyzing a plan by assessing it relative to standard evaluation principles and widely accepted criteria (Berke & French, 1994; Baer, 1997; Berke & Godschalk, 2009). Berke and French identified four indices of plan quality: the fact basis items, a goals index, a policy index, and the overall plan quality. According to Berke and French, the fact basis items include the quality of maps and data included within the plan; the goals index includes hazard reduction and environmental goals that should be enumerated within a hazard mitigation plan; and the policy index includes six categories of policy items: awareness building, regulation of land use, incentives, infrastructure, recovery, and preparedness. Finally, Berke and French suggested that individual items from each of the indices could be computed, summed, and standardized to yield scores for each of the indices, and plan quality could be expressed as an aggregate score combining scores for the fact basis, goal, and policy indices.

PQE methodological research has subsequently focused on two primary indices of plan quality: policy focus and overall plan quality, with subgroups for each index defined by a variety of policy items (Berke & Godschalk, 2009). Recognizing that aggregating dissimilar characteristics can yield misleading results, Norton suggests an approach that involves separating the policy focus, or communicative content of a plan, from the analysis of the manner in which the content is conveyed, or the plan's quality (2008).

Policy content drives planning efforts. Without a strong policy focus, the plan quality is of little importance. A plan that is not well organized, with insufficient detail or poor presentation or readability, is unlikely to be widely utilized, regardless of the quality of the policy contained therein. Plans that lack vertical or horizontal consistency with state or federal mandates or adjoining forces or stakeholders are unlikely to find wide usage. Where the planning environment evolves rapidly, plans that are not regularly revised may quickly lose relevancy to local conditions and cease to be useful. Finally, policies based on limited analysis of local conditions, or lacking data to inform the analyses, may lack credibility. Thus, though a plan's main focus must always be the reason it was written, that is, *policy*, equal attention must be paid to the overall quality of the plan in order for it to find wide use. By dividing a plan evaluation into two parts, the policy focus can be evaluated separately from plan quality, enhancing the utility of the assessment. This sort of nonaggregated approach to plan evaluation divides the presentation and analytical quality of a plan from the plan's policy focus. Such an evaluation yields a more detailed evaluation of the plan. The overall characterization of the plan would thus include separate indices for plan policy focus and plan quality. PQE has with these refinements gained increasing acceptance as a tool to analyze plan quality in the last decade (Berke & Godschalk, 2009).

Methods

A nonaggregated PQE technique was used to make a quantitative assessment of the degree to which each of the FMPs for *CAL FIRE*'s 27 Units and contract counties met criteria drawn from plan quality evaluation literature (Connerly, 1990; Berke & French, 1994; Burby & Dalton, 1994; Stiftel & Boswell, 1994). Our assessment was centered on two assessments of criteria specific to the plan format, framing, and success as a communication tool, and criteria specific to the content, goals, and intent of the plan. The evaluation utilized two plan quality indices developed and widely accepted by urban and regional planners (Berke, 1994) and revised by Norton (2008): (1) Plan Quality, and (2) Policy Focus. Each of the two indices had four primary categories. Figure 1 depicts the overall evaluation framework. Within each broad category was a varying number of sub-categories. Individual policy items, which are gathered in sub-categories, contain specific guidelines or benchmarks against which each plan was individually evaluated.

Figure 1. *PQE Framework for Evaluation*

Premised on Baer's concept that appropriate evaluation criteria should be "implicit in the concept that the plan embodies" (1997) and that the evaluation framework could be adapted to our particular needs (Hoch, 2002), we identified potential criteria for evaluating FMPs from hazard and fire planning literature. Though the FMPs are in some ways a unique planning effort, a variety of state and federal agencies have created hazard and fire risk reduction plans which suggest standards that could be applied to FMPs. The Federal Emergency Management Agency (FEMA), for instance, provides a list of benchmarks in its 'Blue Book' with which to evaluate State Hazard Mitigation Plans (FEMA, 2000). Characteristics of interest were also identified from the 1996 California Fire Plan (California Board of Forestry and Fire Protection, 1996), California Planning Law Analysis and Test Organizer (PLATO) (Governor's Office of Planning and Research, 1987), the Healthy Forest Initiative and Healthy Forests Restoration Act (USFS & DOI, 2004), the Western Governor's Association Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10 Year Implementation Plan (2001), the National Fire Plan (USFS & DOI, 2001), and the criteria used to assess Stafford Act 409 state hazard mitigation plans (Godschalk, Beatley, Brower, & Kaiser, 1999). Additional criteria implicit in the framing and goals of the FMPs were identified and included in the analysis with

the assistance of several *CAL FIRE* employees, including the individual who had been responsible for the statewide FMP effort since its inception and two regional managers who had provided guidance to many PFEs in the efforts to develop or update FMPs (Baer, 1997). Though many potential policy items were identified, the list was carefully winnowed to create an evaluation instrument with the appropriate number of categories, subcategories, and policy items, balancing a need for detail against the potential reduction in coder accuracy and instrument utility that too much detail might introduce. The final instrument incorporated four categories, 11 sub-categories, and 58 policy items within the Policy Focus index, and four categories, nine sub-categories, and 38 policy items in the Plan Quality index (Figure 2).

Index	Category	Sub-category	Number of Policy Items
Policy Focus	**Operations**	Firewise Building Standards	Four (See Appendix B)
		Local Regulatory Environment	Three (See Appendix B)
		Incident Management	Five (See Appendix B)
		Future Measures	Two (See Appendix B)
	Prefire Mitigation	Risk Mitigation Strategy	Seven (See Appendix B)
		Implementation of Prefire Projects	Six (See Appendix B)
	Preparedness Measures	Risk Mitigation Goals	Three (See Appendix B)
		Risk Assessment	15 (See Appendix B)
		Fire Situation	Three (See Appendix B)
	Community/stakeholder Inv.	Awareness Building	Four (See Appendix B)
		Stakeholder Planning Participation	Six (See Appendix B)
Plan Quality	**Consistency**	Vertical Consistency	Three (See Appendix B)
		Horizontal Consistency	Four (See Appendix B)
		Internal Consistency	Two (See Appendix B)
	Fact Base	Current Conditions	Five (See Appendix B)
		Trends Analysis	Three (See Appendix B)
	Planning Process	Plan Preparation Process	Three (See Appendix B)
		Plan Maintenance Process	Four (See Appendix B)
	Presentation	General Presentation	11 (See Appendix B)
		Articulation of Purpose and Policies	Three (See Appendix B)

Figure 2. *PQE Evaluation Indices of Plan Quality, Categories, and Sub-categories*

Ensuring that the evaluation instrument developed accurately assesses the plans under consideration is the primary concern of anyone engaged in plan or policy evaluation. The two main issues to address in the creation of an accurate evaluation instrument are measurement validity and assessment reliability. Measurement validity is primarily concerned with the correct characterization of assessment criteria (Norton, 2008). Measurement validity can be guaranteed both by ensuring that each text item actually measures the concept in question and by determining that each item identified has its own unique qualities that make it distinct from other related items. We made an effort to ensure that the categories, subcategories, and policy items were clear and unambiguous, precise enough to allow for any potential correct answer, and complete without overlapping or duplication. This end was primarily accomplished by basing the structure of the evaluation instrument on previous studies and other instruments broadly

accepted within the planning community (Baer, 1997; American Planning Association, 2002; Burby, 2003; Norton, 2005; Berke, Godschalk, Kaiser, & Rodriguez, 2006; Norton, 2008; Berke & Godschalk, 2009).

The evaluation instrument listing of all of the categories, subcategories, and policy items appears at the end of this paper (Appendix C). Basing the evaluation criteria on recognized indices of plan quality and using a broadly accepted evaluation technique ensured the evaluation instrument was grounded in past studies' 'Best Practices'.

A second component to ensuring the validity of the evaluation instrument involves determining how the individual policy items are scored or weighted (Norton, 2008). Some evaluation instruments have an intricate weighting scheme whereby a wide variety of scores may be applied to various criteria, such as separate scores for the presence of an item and its frequency or intensity in the text being assessed, or higher scores for a measure that has greater perceived importance by the researcher. Such weighting schemes make it vital that the weighting system be well justified, and that the researcher devising the system be a qualified authority in his or her field to avoid the assessment potentially being vulnerable to subjectivity. Scoring individual policy items on an ordinal scale as "0," "1," or "2" and then summing them is more common than weighting (Baer, 1997). This approach incorporates a weighting system by allowing a greater degree of a certain item to result in a higher score (Norton, 2008); but each individual items has the same potential score, that is, no one item is weighted more than another. We elected to use this weighting system in the assessment. Thus, individual policy items were scored "0," "1," or "2" ("0" or "1" in the case of policy items in which only presence/absence is being measured) summed, and divided by the number of items in each subcategory to yield a standardized measure in order for the results to be compared across measures.

For example, one of the policy items that each FMP was evaluated against in the Policy Focus index pertains to Prefire projects. The policy item is defined as follows: *Current/future projects are listed with status reports* (methods and collaborators are identified) or updates in plan*. This policy item was to be evaluated on a scale between zero and two. A score of zero for this policy item for any FMP would indicate an absence of any language pertaining to current/future projects in the FMP. A score of one would indicate that current/future projects were mentioned in the FMP, but that the intent of the policy item was not entirely realized. An example of an FMP that received a score of one for this particular policy item is as follows:

> Several areas have been identified as "target areas" by the [Unit/Contract county]. The identification of these specific areas was based on available data from Pre-Fire Engineering assessments and stakeholder input. Additionally, local employees provided anecdotal and historical information that was considered useful in understanding local conditions. Following the assessment of each Target Area, a series of potential mitigation actions was identified and agreed upon by the [Unit/Contract county]. [For each Target Area the FMP listed a series of proposed projects or strategies but did not detail methods or collaborators]. [Future project work will prioritize] reduction and/or removal of wildland fuels along primary access/egress routes to reduce the incidence of roadside ignitions, and to ensure safe access and egress by firefighters and residents in the event of a wildland fire emergency. The Vegetation Management Program (VMP) may begin to evolve more toward the following . . . Smaller projects near targeted assets at risk . . .
>
> VMP may now focus more on small scale, intensive treatment projects near or adjacent to homes (*CAL FIRE* FMP).

A score of two would indicate that the FMP fully actualized the policy item description. An example of a FMP that received a score of two for this particular policy item is as follows:

> During the past 10 years, the [Unit/Contract county] has treated an average of 1,000 acres annually under the Vegetation Management Program (VMP). Currently the [Unit/Contract county] has treated approximately 19,825 acres since 1982, with an estimated 1500 additional treated acres by the end of the year. Many of the projects undertaken in the [Unit/Contract county] have been within the wildland-urban interface. Due to the existing land use patterns within the [Unit/Contract county] and the increasing population densities in [Unit/Contract county], it is anticipated that the emphasis of the Vegetation Management Program will continue to focus projects within the wildland-urban interface areas. Future projects will concentrate on densely populated areas with high assets at risk. [FMP goes on to specifically detail all current and planned projects, including methods for project implementation/execution and a list of all collaborators for each project] (*CAL FIRE* FMP).

The evaluation instrument was additionally tested by a selective application of the instrument to a representative sampling of the plans being assessed. The results from this test application helped further refine the evaluation instrument and validate its ability to assess plan quality accurately and reliably.

The final version of the evaluation instrument was applied to each plan by two or more coders. Such double-coding allows for greater reliability in the results of the evaluation. The authors of the study carried out the preliminary investigative assessments, while independent coders not involved with the research conducted the actual assessments. The planning community generally accepts having researchers act as coders, while this can raise questions about validity of analyses based on evaluation instruments that might not be robust enough to be reliably utilized by independent coders (Kolbe & Burnett, 1991). Significant problems with reliability can also result from using coders with poor training, or coders who have insufficient understanding of the data. In our recruitment of independent coders, therefore, we focused on individuals with an interest or background in fire planning or wildfire policy issues. As part of the recruitment process, the assessment and training documents were published on the Internet as well as provided by mail at the request of invited participants. The online survey tool for the assessment, however, was made available only to invited participants in the survey.

Fifty-six individuals, including both academics and practitioners from the fire community were invited to volunteer as coders, including academics and practitioners. The commitment requested was substantial: a single assessment took roughly two to four hours to complete, depending on the length and complexity of the FMP being assessed. A total of 19 individuals received an extensive training document, specifically written to reduce as much as possible the chance of error due to incomplete or inaccurate training of coders (Appendix D). The evaluation instrument and the accompanying written instructions for the coders were carefully designed to ensure they were clear and concise as possible to minimize the likelihood of coders entering different values for a single element because of differing interpretations of the instructions. After reading the training documents, two individuals agreed to complete assessments of each of the 27 FMPs.

Each of the individual policy items were scored based on how well a particular FMP met the requirements of the policy items. The majority of policy items were scored on a scale from zero to two. Coders were directed to score policy items “0” if not present at all, “1” if mentioned only briefly or suggested (i.e., an exhortative policy statement), or “2” if discussed in some detail

or mandated by the plan (i.e., a prescriptive policy statement). Further, coders were asked to note the page number of the FMP on which item material could be found for each policy item and to make notes on each policy item, particularly when they judged that the item did not fully meet the standard (i.e., when they coded a score of zero or one out of a possible score of two). Some of the policy items were scored based on the presence or absence of a certain characteristic in the plan such as: *Table of contents or index provided in plan*. Policy items such as this were scored on a zero to one scale, and coders were directed to score the policy item "0" if absent or "1" if present.

Though there are many tools and techniques for assessing the reliability of an assessment with multiple coders, reliability is most commonly assessed through an intercoder reliability score, or percent agreement. Though it has been criticized as an overly liberal technique that is more forgiving of poor data or poor evaluation techniques than other reliability measures (Krippendorff, 2004), percent agreement remains the most widely used technique to assess reliability, being used four times as frequently as the next most popular technique, Krippendorff's alpha (Lombard, 2000).

Results and Discussion

The results of the PQE were scored as follows: the scores of each of the individual policy items were summed and averaged within each sub-category and converted into a percentile. In sub-categories that contained both policy items that were scored on presence/absence ("0" or "1") as well as policy items scored on the more widely used scale from zero to two, the policy items were individually converted into percentages (e.g. a "1" score on a zero to two scale would result in a percent result of 66.7). The percentages were summed, then averaged to yield the average percent success within the sub-category. The sub-category results were averaged to yield the average score within each category, and the categories were averaged in each of the indices of plan quality to produce a percentage representing the success with which each FMP met the standards. Each of the 27 FMPs yielded two percentage scores displayed as a percentage figure out of 100.

After each FMP had been evaluated by both coders using the evaluation instrument, we calculated the intercoder reliability score by summing the number of times the coders disagreed on their score for a particular policy item and then dividing that number by the total policy items assessed, revealing 92% agreement between the two coders. While there is disagreement within the planning community as to the percent agreement that is "acceptable", almost all would consider a score above 90% acceptable (Miles & Huberman, 1984); most would consider 80% or more acceptable; and some would consider even 70% or more acceptable (Lombard, 2000).

We will present results first considering the import of the high-level results between each of the 27 FMPs before focusing in on results with each of the indices of plan quality. First, we present the paired results of the 27 PQEs arranged randomly. Next, we arrange the plans by the date of the most recent plan revision, then visually present the average scores by date of the most recent plan revision to determine if currency had an impact on plan quality. We subsequently plot plan quality against policy focus to determine if a correlation existed between the plan scores, that is, if success (or lack thereof) in one of the indices predicted the results of the other index. Next, we divide the results by Unit and Contract county to ascertain whether there is a marked difference between the quality of FMPs created by the Units and Contract counties. We then present results from each of the primary categories in each of the plan indices. Finally, we present the results of selected policy items.

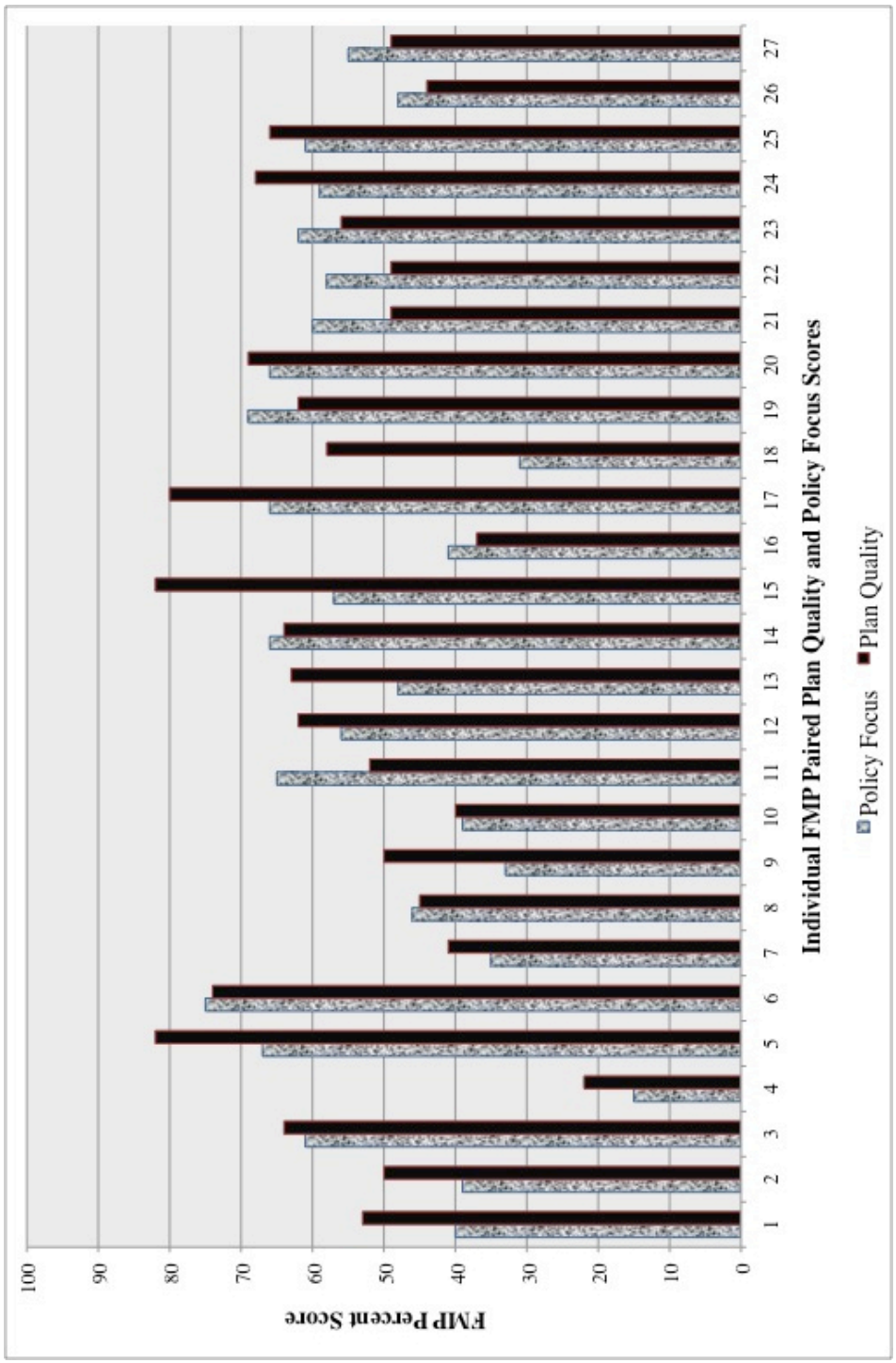

Figure 3. *PQE results with each FMP's paired percent scores for Plan Quality and Policy Focus arranged randomly*

Policy items were pooled and averaged within sub-categories, then averaged again between categories to obtain the score for each index. These results are represented as a percentage.

Averaging the results of the 27 FMP evaluations, we found that the mean policy focus score was 52.5, with Figure 3 showing that individual FMP evaluation results that ranged from 15 to 75; and the mean plan quality score was 56.7, with results that ranged from 22 to 82.

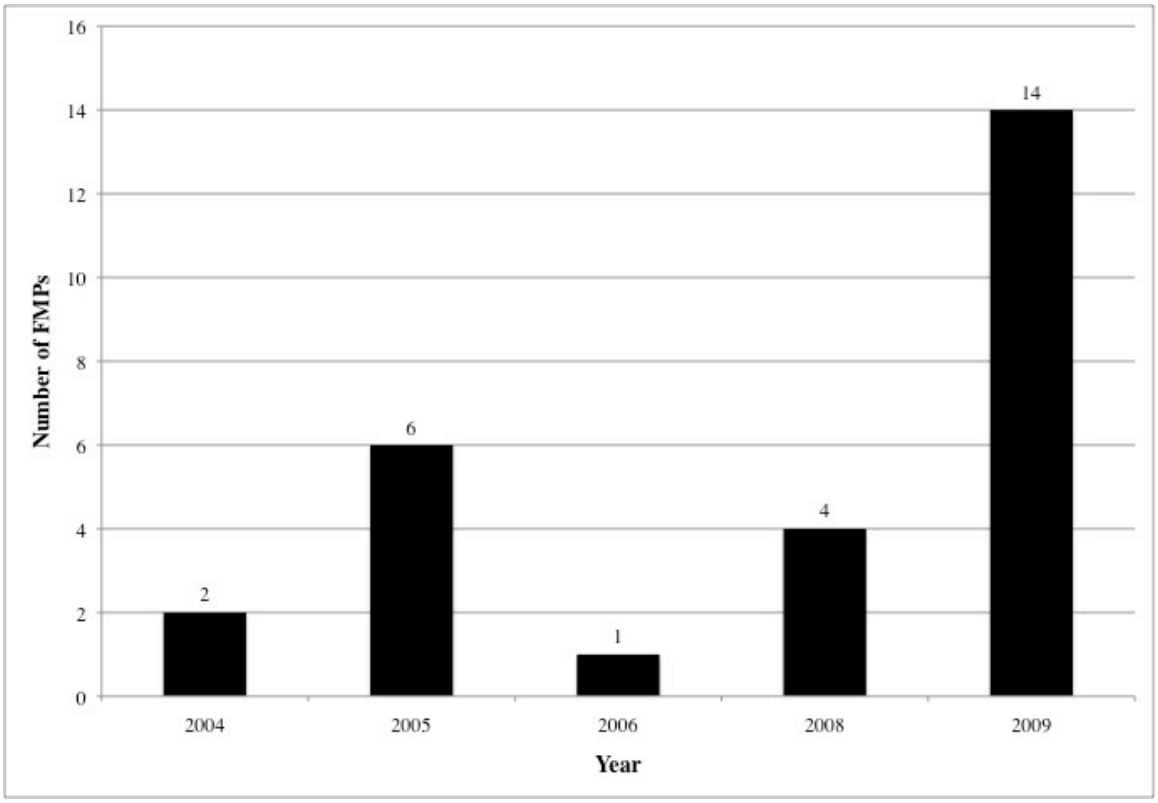

Figure 4. *FMPs' most recent revision date*

Though the planning mandate stipulates that the FMPs be evaluated on at least an annual basis (California Board of Forestry and Fire Protection, 1996), we found the plans varied widely in age, with their most recent update having taken place at some point between 2004 and 2009. One-third of the FMPs dated back to 2004, 2005, or 2006. We arranged the scores for both indices of plan quality by year in Figure 4 to determine whether there was a correlation between the currency of the plan and the average scores.

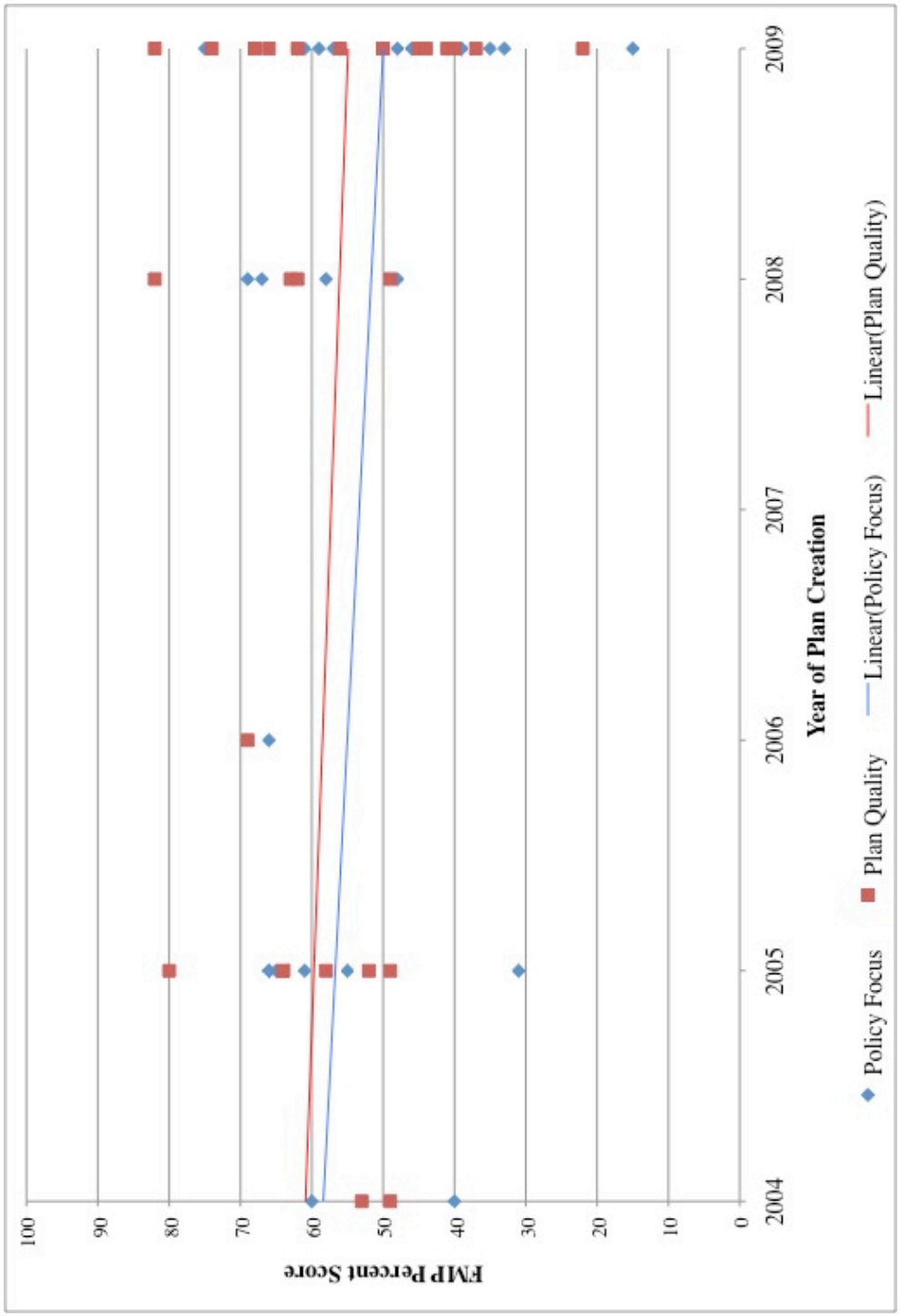

Figure 5. *Individual FMP PQE scores arranged by date of plan creation*

We plotted the FMP results data and fit a trendline to both indices of plan quality shown in Figure 5 to ascertain whether any correlation existed between the plan creation dates and either Plan Quality or Policy Focus. We found a weak negative correlation and a greater spread across plans between more recent plan updates and each of the indices of plan quality, but the R-squared values for each index (0.026 for Plan Quality, 0.051 for Policy Focus), did not indicate

that this correlation was significant. This suggests that there may be only limited control from Unit leadership and the state in requiring that the FMPs be completed at a reasonable standard of quality, or that the FMPs may simply not be considered enough of a priority by local and/or state leadership to require consistency in the planning effort.

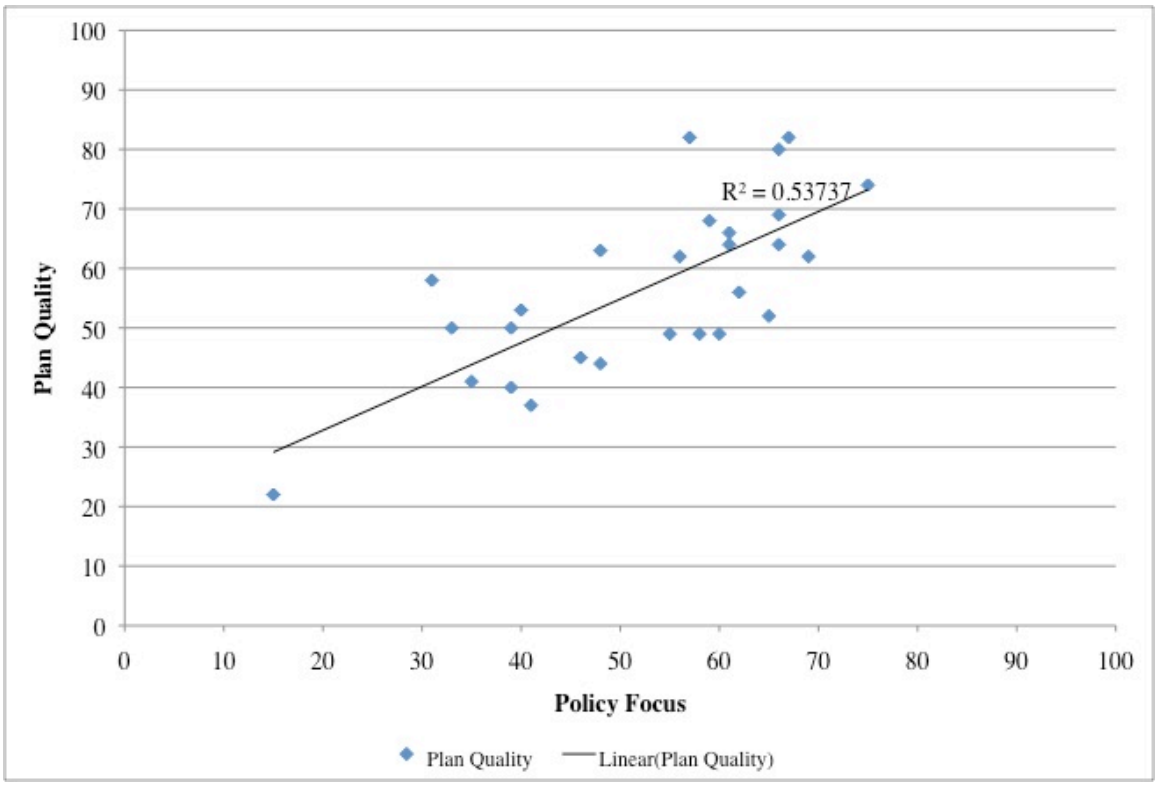

Figure 6. *Plan quality plotted against policy focus with trendline and r-squared value*

By graphing the Plan Quality scores against the Policy Focus scores, we discovered a moderate positive correlation between Plan Quality score and Policy Focus score depicted in Figure 6, with a R-squared value of 0.537. Both were significant at the 5% level. This suggests that planning efforts that had a strong policy focus also generally dedicated effort to constructing a high quality plan. These results suggest that the robustness of the effort placed in the plan development process may be as important as the regularity of the plan update in influencing both the Plan Quality and the Policy Focus.

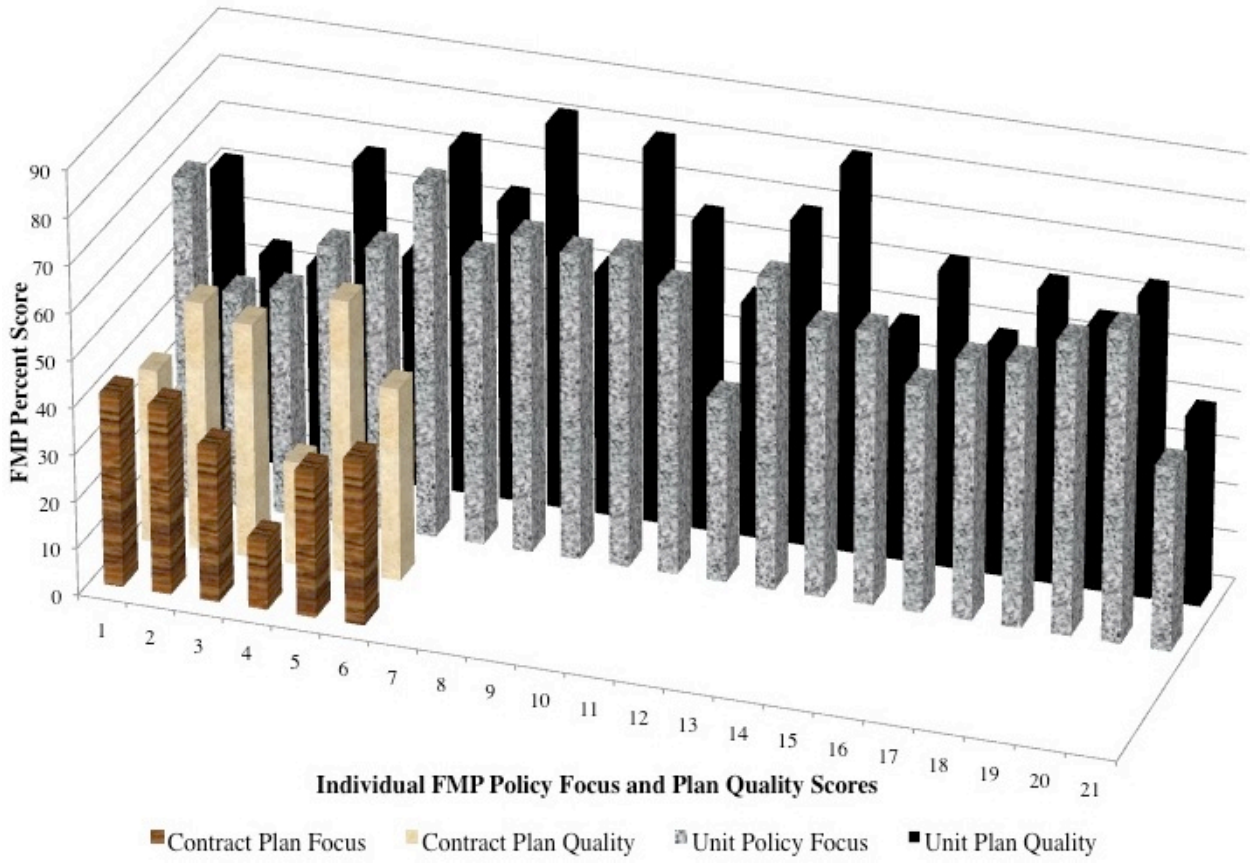

Figure 7. *FMP PQE Scores Sorted into Contract Counties and Units*

Contract counties are counties which *CAL FIRE* contracts the local county fire authorities to provide fire response in state responsibility area (SRA) lands. Though *CAL FIRE* is an example of a decentralized natural resource organization, with significant authority devolved to the local (Unit) level, the Contract counties are slightly different, acting as single-Unit centralized organizations. As such, though they nominally are bound to abide by *CAL FIRE* and California Board of Forestry and Fire Protection mandates, they often elect to only partially implement mandates, or do not fully implement mandates. Our results demonstrate that the Contract counties have significantly lower average plan quality scores than the Units with average scores of 32.5 for the policy focus index and 43.5 for the plan quality, as compared to an average score of 58.2 for the Units' FMP policy focus index and 60.5 for the plan quality (Figure 7). Because the Contract counties operate essentially as single-Unit centralized organizations, they are able to have a focus on novel techniques and nimbleness even more so than other Units to achieve agency objectives. Centralized leadership allows them to focus energy on what the Contract county deems to be most important, which can result in innovation or policy evolution. This suggests that the comparatively low PQE FMP scores may be attributable to Contract counties not perceiving FMPs as an significant prirority.

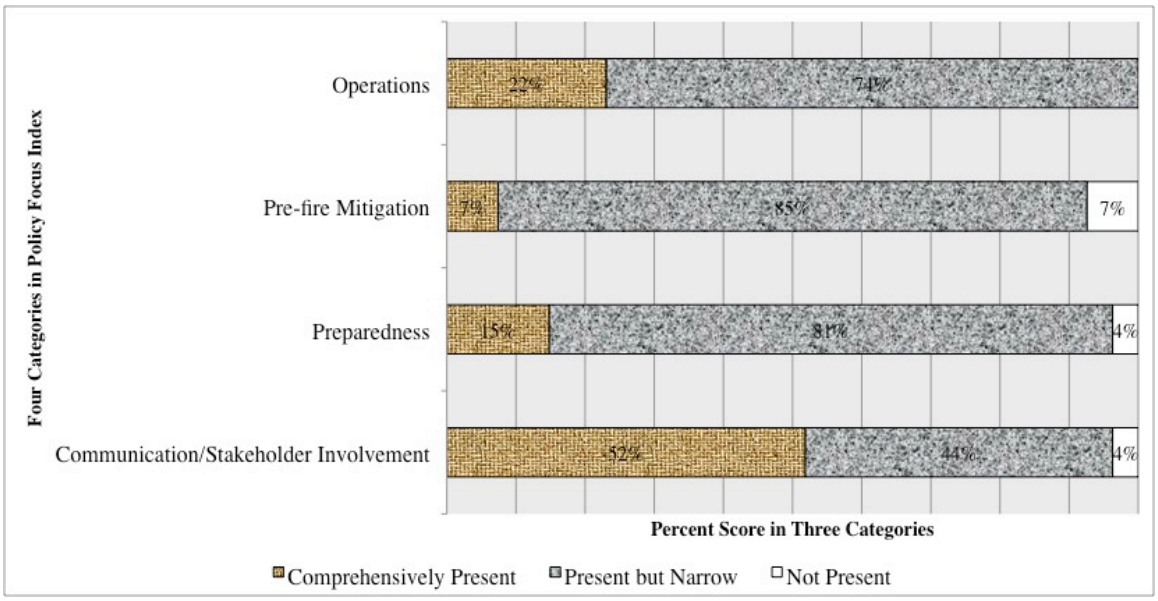

Figure 8. *FMP Policy Focus category scores (Percentage of 27 evaluated FMPs)*

The Policy Focus index, which evaluated the content of the plan as a communicative policy act, incorporated four categories, 11 sub-categories, and 58 policy items. The Operations category included Firewise Building Standards, Local Regulatory Environment, Incident Management, and Future Measures. The majority of the FMPs achieved some, but not all, of the expectations for this category: All of the plans included content that fulfilled at least part of the index (Figure 8). The Pre-Fire Mitigation category included Risk Mitigation Strategy and Implementation of Prefire Projects. Of the evaluated plans, 7% had average scores that completely or nearly completely achieved all of the policy items in the category. An additional 7% had average scores that achieved few or none. The Preparedness category included Risk Mitigation Goals, Risk Assessment, and Fire Situation. In this category, 15% of evaluated FMPs accomplished all or nearly all of the policy items; and an additional 81% of plans achieved some of the policy items. The Communication/Stakeholder Involvement category included sub-categories measuring Awareness Building and Stakeholder Planning Participation. The FMPs scored best in this category, with more than half fully or nearly fully meeting the requirements of the individual policy items. With a mean score of 52.5 within the Policy Focus index the majority of FMPs achieved partial success in the index's categories, and very few plans failed to achieve partial fulfillment of each of the individual categories. Despite the fact that the categories, sub-categories, and policy items were drawn directly from the 1996 California Fire Plan (Board of Forestry and Fire Protection) with the assistance of regional and state *CAL FIRE* employees responsible for overseeing and implementing the FMP program, few of the FMPs fully accomplished these categories or sub-categories. This finding suggests a need for a more clearly articulated framework for plan completion. Such a framework would assist in implementation of the state planning mandate that explicitly states that these items that must be included in plan revisions.

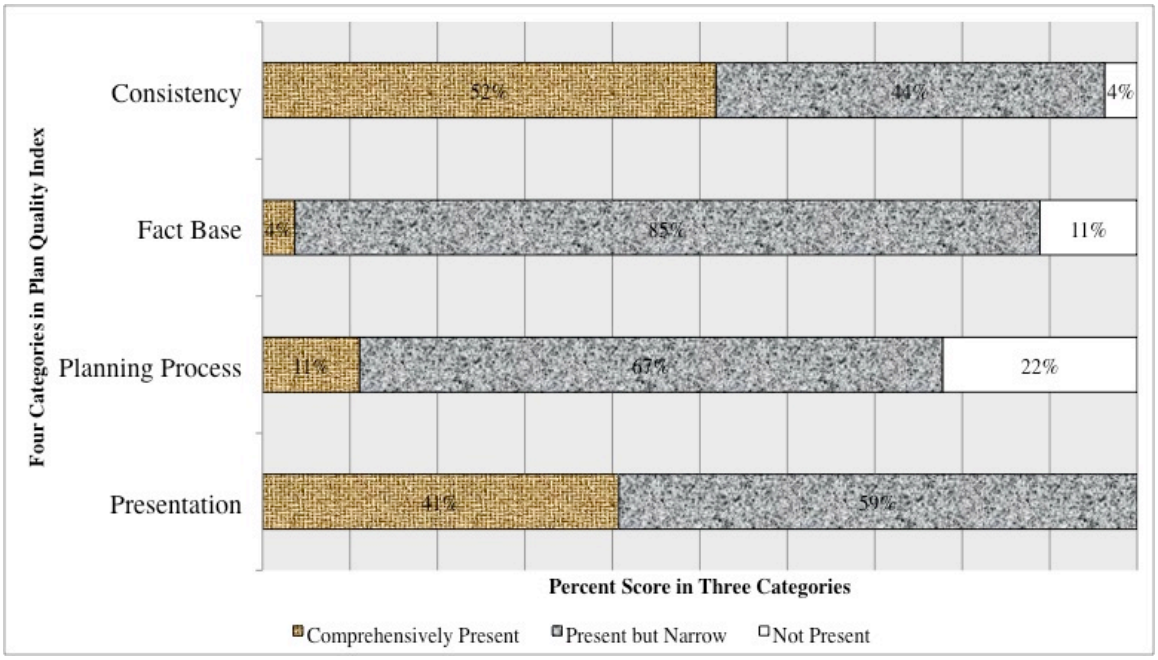

Figure 9. *FMP Plan Quality category scores (Percentage of 27 evaluated FMPs)*

The second of the two indices of plan quality that was assessed was the Plan Quality index. Plan Quality contained four categories, nine sub-categories, and 38 policy items (Figure 9). The Consistency category contained three subcategories: Vertical Consistency, Horizontal Consistency, and Internal Consistency. The plans were most universally successful at achieving this category in the Plan Quality index. A total of 52% of FMPs comprehensively achieved the sub-categories and policy items of the Consistency category, with a further 44% partially completing the standard. Internal, Horizontal, and Vertical Consistency was not present or nearly absent in 4% of plans. The Fact Base category contained the sub-categories of Current Conditions and Trends Analysis. Eighty-five percent of FMPs partially realized the sub-categories and policy items in fact base. The Fact Base was comprehensively present in just 4% of plans, and entirely or nearly entirely absent in 11% of plans. Plan Preparation Process and Plan Maintenance Process were the two sub-categories contained within the Planning Process category. Here, 67% of the FMPs partially fulfilled these requirements. The Planning Process elements were comprehensively present in 11% of plans, and absent or nearly absent in 22% of FMPs. The Presentation section included two sub-categories: General Presentation, and Articulation of Purpose and Policies. In this category, 41% of plans completely or nearly completely fulfilled the sub-categories and policy items, while 59% of FMPs only partially fulfilled the expectation. The Plan Quality index category results suggest that as in the Policy Focus index, the majority of FMPs partially fulfilled the expectation of the sub-categories and individual policy items. This finding is encouraging. It suggests that the FMP program has a core of plans that partially meet the plan quality expectations. These FMPs can be used to enhance future planning efforts throughout the state. The development and application of a clearly articulated framework for plan development is key to improving the quality of the planning document. During the evaluation of the FMP results, several key policy items were identified, the results of which are depicted in Figure 10 and can further inform understanding of the overall results.

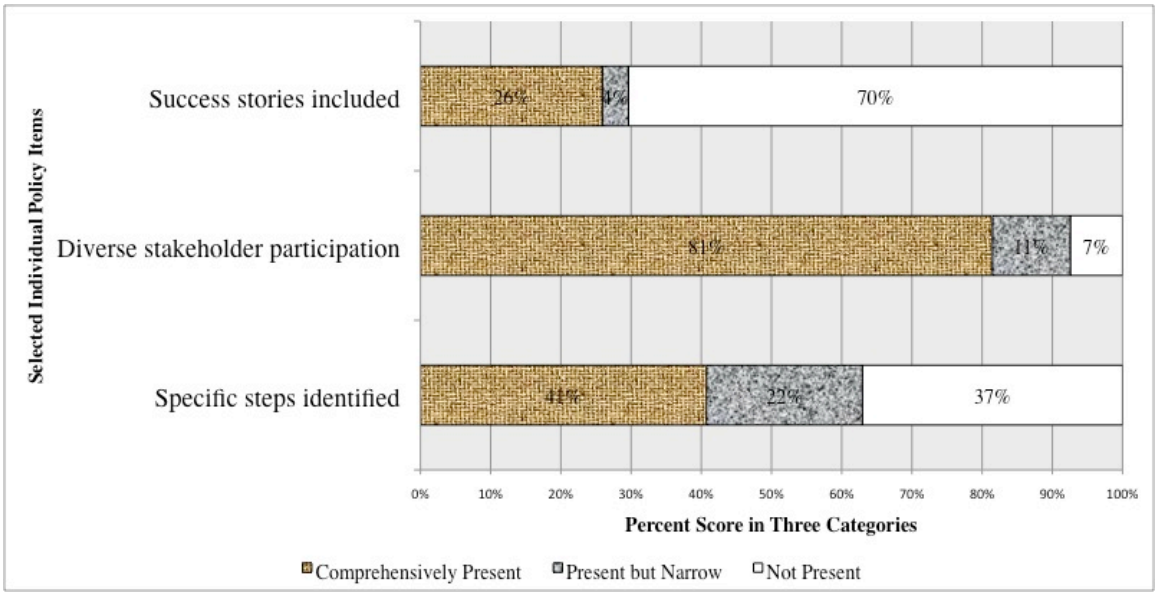

Figure 10. *Policy item individual results*

The Success Story policy item is defined as follows: *'Success stories' are included and updated as of the most recent revision of the plan* (Appendix C). This policy item was suggested by one of the *CAL FIRE* collaborators then responsible for the FMP program. Its inclusion in the evaluation instrument was substantiated by the 1996 California Fire Plan (California Board of Forestry and Fire Protection), the Disaster Management Handbook (Pinkowski, 2008), a guide designed for evaluating and updating Community Wildfire Prevention Plans (Resources Innovations Institute for a Sustainable Environment, 2008), and specific instructions contained in the 2009 *CAL FIRE* Fire Plan Template, "One of the goals of the California Fire Plan is to reduce costs and losses. This can be measured by the sharing of success stories which occurred during the last year" (2009). Our evaluation revealed that 26% of FMPs comprehensively executed the standard, with an additional 4% partially executing the standard. Despite clear instructions, 70% of the FMPs included no mention whatsoever of success stories.

A second policy item of interest is the degree to which Plan Development included Participation from Diverse Stakeholders. The policy item was defined as follows: *Development of the plan includes participation from a diverse and balanced stakeholder group which may include local governments, tribal representatives, industry groups, conservation groups, academics, community groups, and members of the public*. Inclusion of this policy item was substantiated by numerous sources in wildland fire and hazard planning, including the Western Governor's Association (2001), the *CAL FIRE* Fire plan template instructions (2009), FEMA Blue Book (2000), 1996 California Fire Plan (California Board of Forestry and Fire Protection), and The National Mitigation Strategy: Partnerships for Building Safer Communities (FEMA, 1995). In our research, 81% of FMPs completely achieved the policy item, with an additional 11% partially fulfilling the expectation. Just 7% of FMPs did not include any mention of an array of stakeholder involvement in the FMPs. Of the 22 FMPs that entirely achieved the diverse stakeholder policy item, however, only 50% had been updated within the last year; and 32% of the 22 plans had not been updated since 2006 or earlier. Though involvement from a diverse range of stakeholders is clearly a vital component to effective FMP creation and long-term planning (USFS & DOI, 2011), this finding raises the question of whether a more recent

update including timely information about hazards and planning might be an equally important goal.

A final policy item of interest was contained with the Risk Mitigation Goals sub-category of the Preparedness Measures category. The policy item was defined as follows: *The plan lists concrete steps necessary to achieve the Unit's risk mitigation goals* (Appendix C). This policy item was selected for inclusion in the evaluation instrument supported by the FEMA Blue Book (2000), the 1996 California Fire Plan (California Board of Forestry and Fire Protection). Likewise, the planning community shared broad agreement that effective plans include the identification of goals that are appropriate to the local community as well as the determination of specific steps that can be carried out to achieve those goals (Berke & Beatley, 1992; Norton, 2008; Berke & Godschalk, 2009). We found 41% of FMPs completely fulfilled the policy item expectation, while 22% of FMPs partially fulfilled the policy item. It was troubling to observe that 37% of plans did not address the policy item whatsoever. The concern is that a lack of specificity in these local plans may impede progress on risk abatement activities, given an absence of specific activities necessary to meet local goals. The results of these policy items are typical of the results of the evaluation throughout the plans, revealing a set of plans with substantial history and dedication to risk management that yet lack fundamental keys to success as effective plans.

Our PQE results revealed qualities about each of the FMPs which each fell into one of two areas: Policy Focus and the Analytical Quality. By conducting a Plan Quality Evaluation, we obtained a measure of plan quality, that is the quality of the formulation of the policy message, as well as a measure of plan policy focus, that is, the quality of the policy message in each plan. Though two characteristics cannot be separated within the plan, analytically, disambiguating them is crucial to assessing the individual quality of each (Norton, 2008). Taken together, these attributes reveal a great deal about the current state of the FMPs.

One weakness prevalent in the FMPs was that, though the state delivered clear goals through the 1996 California Fire Plan and the 2000 California Fire Plan Update, few of the FMPs included any identification of goals or discussion of how local goals related to regional and statewide goals. Even fewer plans detailed how success should be measured, or listed the steps necessary to achieve their goals. State planning mandates are most effective in prompting the creation of local plans with particular attributes if they have extremely specific goals (McFarlane, 1989). Unspecific or "vague goals (e.g. reduce losses from hazards) are subject to broad interpretation and leave open the opportunity for variation and deviation from state intentions" (Berke & French, 1994). Though the 1996 California Fire Plan detailed goals and broad expectations for the FMPs, it did produce an explicit framework for the FMPs and omitted a detailed listing of expectations of plans and planners. Those choices likely arose from an expressed desire for the FMPs to be flexible planning documents that could be tailored to fit the individual needs of different communities. The *CAL FIRE* Fire plan template and fire plan template instructions, however, included several extremely explicit requirements for the FMPs (2009). These requirements were not widely adhered to; 70% of FMPs included no mention of success stories, and very few of the plans were updated on an annual basis. In addition to specific planning requirements, planning requirements are most likely to be implemented as mandated if the mandate is tied to coercive actions (Scholz, 1984; Braithwaite, 1985; Berke & French, 1994). The challenge of intergovernmental implementation of planning mandates is that the policy is conceived at one level but translated into actions at another level. Enforcement of such mandates can be problematic. It is particularly challenging to ensure that a plan not only is

created as mandated, but also contains the specific mandated components. In theory, mandates "structure and facilitate intergovernmental implementation" (May, 1992); but absent a comprehensive effort to persuade planners that the mandated plan is important, it may be vital to compel participation in order to achieve mandate objectives (Berke, 1994). Berke and French (1994) found that states with stronger mandates were more likely to influence the creation of strong local planning efforts, and that states with weak mandates often lacked the ability to coerce the invention of well-crafted plans.

Conclusion

CAL FIRE's FMPs have been in continuous development for more than a decade. Over that time, the 27 individual plans have evolved into locally unique planning documents. In some areas of the state, this uniqueness reflects local conditions, communities, hazards, and key objectives. For the most part, however, these plans are idiosyncratic efforts that fail to meet the quantitative benchmarks for plan quality utilized in this study. This shortcoming arises from two problems: (1) the lack of specific, enforced requirements; (2) and an absence of a common planning framework.

Today the *CAL FIRE* FMPs are at a crossroads. With the publication of the 2010 Strategic Fire Plan for California, new expectations were established for the development and continuous revision of the FMPs. New leadership responsible for the FMP program has resulted in the development of a new strategy for future FMPs as well as the establishment of a new framework for writing and updating the plans. With the recent deployment of the first stage of the National Cohesive Wildland Fire Management Strategy (USDA & DOI, 2011), there is an increased focus on and support for local collaborative planning, which is a key component of developing fire-adapted communities. This federal policy development simultaneously presents both a challenge and an opportunity for the agency personnel maintaining the 27 plans. It is an opportunity in that planners have a new chance and more resources to develop plans with the capacity to impact fire planning and fire risk mitigation. Planners at all levels must also determine what the *purpose* of the FMPs are. On assessing the FMPs as a group, their intent as communicative policy instruments is not readily apparent as a group or even taken singly. There are numerous reasons the FMPs existence could be useful and even necessary to fire planning in the state. This purpose must be identified and made explicit. The FMPs must communicate this rationale through the planning documents themselves, individually and as a group. At the same time, it is a challenge to crafting 'good' plans containing a strong policy focus that also communicate their message. In order to implement the creation of the FMPs, state and local *CAL FIRE* leadership will need to consider what priority the plans should have and clear requirements of what components need to be comprehensively present in plans.

Chapter 5. Long-Term Interagency Fire Safe Council Commitment to Fire-Adapted Communities: Lessons from the Bull Fire

Introduction

Collective action by a group of dedicated stakeholders can potentially significantly alter the impact of catastrophic wildfire events on people and values at risk. In recent years, wildfires burning throughout the United States have killed or injured hundreds of people, destroyed thousands of homes, and in the process charred millions of acres of sometimes ecologically-sensitive land (NIFC, 2010). Though today more than one-third of American households are found in wildland-urban interface (WUI) areas (Radeloff, Hammer, Stewart, Fried, Holcomb, & McKeefry, 2005), of the 70,000 WUI communities at risk of wildland fire, just 6,000 have community wildfire protection plans (CWPP) in place to collaboratively develop risk abatement plans (Tidwell & Brown, 2010). Swift land-use change has progressed the development of wildland areas, and WUI areas are expected to continue to expand in the future (Nowak & Walton, 2005; Theobald & Romme, 2007). Urgent action is needed to create fire-adapted communities that are adapted and prepared to withstand and recover from assured future wildland fire events (USDA & DOI, 2011). Long-term agency commitments to collective action and communication build trust with local stakeholders and result in greater acceptance and support of prescribed fire and fuels treatments (Carpenter, Taylor, Cortner, Gardner, Zwolinski, & Daniel, 1986; Winter & Fried, 2000; Toman, Shindler, & Brunson, 2006). Local, collective efforts that incorporate diverse stakeholders at all levels and incorporates agency personnel as facilitators and participants rather than technical experts is one way to approach the goal of creating fire-adapted communities (Shindler, Toman, & McCaffrey, 2009).

This chapter presents a case study of a long-term collaborative planning effort that spanned more than a decade and included members of the public as well as federal, state, and local agency representatives in an effort to reduce fire risk. Together, these partners planned and implemented more than a dozen fuel hazard abatement plans throughout California's Kern County. One such project created a network of shaded fuel breaks around the rural community of Kernville. On the afternoon of July 26, 2010, a wildfire driven by extreme weather conditions ignited. It defied initial suppression efforts, jumping a dozer line, and within three hours threatened the Kernville community. Flamelengths decreased substantially when the wildfire reached the shaded fuel break, allowing firefighters to halt the southern progression of the ignition with no loss of lives or property in the Kernville community. This case study demonstrates the important impact that committed long-term collective action and the implementation of collaboratively planned activities by multiple diverse stakeholders can have on fire-prone WUI communities.

Review

Work on the 35 acre Burma Interagency Extension Fuel Break was still ongoing when the Bull Fire ignited on the afternoon of July 26, 2010. A crew from Kern County Fire Department (KCFD) had nearly completed the interagency project, extending a prior U.S. Forest Service fuel break to create a shaded fuel break that ran uninterrupted along the western boundary of the community of upper Kernville. The shaded fuel break project called for crews to remove all dead and down materials and limb trees up to a height of six feet. Material removed was chipped or piled and burned during planned winter prescribed burns The Kernville network of shaded fuel breaks was the result of years of interagency collaboration and the efforts of local stakeholders

all working through the Kern River Valley Fire Safe Council. Weather and fuel conditions prompting extreme fire behavior allowed the fire to escape early containment efforts, jumping a dozer line.

Even incomplete, the upper Kernville network of fuel breaks decreased observed flamelengths, allowing firefighters to halt the advance of the Bull Fire near Kernville with no loss of lives or infrastructure. By the time the Bull Fire was fully contained on August 9, 2010, Governor Arnold Schwarzenegger had declared a countywide state of emergency and the Bull Fire had consumed 16,442 acres and destroyed fourteen structures. Potential for an even more devastating blaze than occurred certainly existed. The Kernville area annually experiences some of the highest fire danger indices in the United States; and since 1990, four large wildfires have burned in the local area. The Bull Fire burned in California's Kern County, the state's third largest county in acres. The southern Sierra Nevada community of Kernville is roughly 160 miles north of Los Angeles in central California. Encouraging the development of fire-adapted communities is an important priority throughout the fire community and indeed has been identified as one of three national goals in the National Cohesive Wildland Fire Management Strategy (USDA & DOI, 2011). As found with California's Kern County, interagency partnership with local fire safe councils can significantly curb fire losses (Everett & Fuller, 2011).

The establishment of the Kernville shaded fuel break network reflects an enduring commitment to inclusive fire risk planning. The Kern River Valley Fire Safe Council (KRVFSC) was formed in 2000. Area agencies representing county, state, and federal interests have been significantly involved with the council from the start. The Kern County Fire Department (KCFD) represents both local and state interests, as it is under contract to the state of California to provide initial attack in state responsibility areas. Additionally, the Bureau of Land Management (BLM) and the U.S. Forest Service's Sequoia National Forest (USFS) are also partners significantly involved with the KRVFSC.

Working together with agency partners and area stakeholders, in 2002 KRVFSC completed a pioneering Community Firesafe Plan. One of the areas of concern identified in the plan was the town of Kernville, located in the south Sierra Nevada's in an area with heavy fuel loading. The plan noted that, aside from several smaller fires, the steep slopes adjacent to the town had not burned in nearly 80 years, and suggested the creation of a network of shaded fuel breaks. With the endorsement of KRVFSC, USFS representatives from the Sequoia National Forest developed a plan to create shaded fuel breaks in upper Kernville. Work began on the USFS' Burma Segment Hazardous Fuels Treatment Area after the environmental compliance process was completed in 2005. KRVFSC's community wildfire protection plan (CWPP), formally certified by KCFD and BLM in 2008, included mention of continued risk in the upper Kernville area. USFS crews completed the Burma Segment in 2009, and it is expected that it will be annually maintained by KCFD crews contracted with KRVFSC to execute National Fire Plan funded projects.

During the KRVFSC's 2009 annual project planning meeting, the interagency group considered the proposal of a shaded fuel break extending the Burma Segment on private lands. The group ranked the proposed Burma Extension project as their second most important priority for 2009. That same year, KRVFSC proposed funding the Burma Extension through a community protection grant, reasoning that the completed shaded fuel break would better protect both the community of Kernville and the surrounding wildlands from unwanted wildfires. KRVFSC applied for grant funding from the National Fire Plan through the California Fire Safe

Council to support the creation of the Burma Interagency Extension Fuel Break. They noted that the project would offer direct protection to 135 homes, 405 community members, and $30.9 million dollars worth of at-risk property (Kern River Valley Fire Safe Council, 2009). Contributions pledged by KCFD and the KRVFSC strengthened the grant request. KCFD provided a substantial contribution to the cost of employing a KCFD fire crew to carry out the fuels treatments. Additionally, they supplied expert assistance in implementing and focusing the fuels project. KRVFSC provided its match primarily through in-kind assistance. Both groups made good on their pledges after the KRVFSC's grant proposal was approved and funded by National Fire Plan funding through the California Fire Safe Council. In 2010 a KCFD crew contracted by the fire safe council began work on the fuel break (Kern River Valley Fire Safe Council, 2011). By July 2010, the majority of the work on the Burma Extension project had been completed. The crew had removed all dead and down material to a width of 150 to 200 feet in the Burma Extension fuel break area and pruned live trees to a height of six feet, creating 50 brush piles prepared for a proposed winter prescribed burn.

First reported at 2:30 p.m. on July 26, 2010 the Bull Fire quickly spread, burning through flashy fuels with heavy fuel loading. Though its cause is still under investigation, it is likely the ignition was human-caused. Spurred by extreme weather conditions, including low humidity and erratically gusting wind (USFS 2010), the Bull Fire resisted early suppression efforts by both ground and aerial resources. It grew quickly as it moved down a steep slope into the Bull Run Creek drainage. Intense downslope wind conditions drove the fire east towards the town of Kernville and northeast towards the smaller unincorporated community of Riverkern. Firefighters sought to halt the eastern spread of the blaze, putting in dozer lines at the top of an adjacent ridge; but the wind-driven blaze jumped the dozer lines and crested the ridge.

By four o'clock, as the eastern flank of the fire approached the network of interagency fuel breaks protecting Kernville, the already-low humidity had dropped to 9%. As of the 2010 U.S. Census, the town of Kernville has 1072 dwellings and a population of 1395, a number that grows during summers as a result of tourists visiting the picturesque south Sierra Nevada community. As the leading edge of the fire approached, firefighters from KCFD, the Bureau of Land Management (BLM), and the U.S. Forest Service (USFS) prepared to defend the town at the shaded fuel break, building hand and dozer fireline near outlying homes. Inside the Burma Interagency Extension Fuel Break's perimeter, 50 brush piles scheduled for prescribed burning during winter 2010 caught fire, increasing the Bull Fire's intensity; but the brush piles had been deliberately constructed far away from homes and property they did not pose a problem for suppression forces. The Burma Interagency Extension Fuel Break had not been completed by July 26, 2010. Crews working on the project had, however, prioritized clearances adjacent to homes and other structures, providing the defensible space firefighters needed to work safely and effectively.

The Kernville network of fuel breaks, together with the firefighter's direct suppression efforts and aerial attack from helicopters strategically dropping water, stopped the eastern spread of the Bull Fire at the shaded fuel break with no loss of lives or property. Elsewhere that afternoon the fire burned eight homes and six outbuildings. The long-term collective efforts of federal, state, county agencies, and local stakeholder groups all worked to avoid potentially more serious losses.

Discussion

The Burma Extension project completed a continuous shaded fuel break which proved its effectiveness when it shielded the community of Kernville from the Bull Fire. This network of shaded fuel breaks was made possible through long-term, committed collaboration between agency partners and the KRVFSC. After identifying the potential threat to the community of Kernville nearly a decade ago, the organizations worked together to generate a feasible strategy; and each contributed the creation of the shaded fuel break network.

Conclusion

The Bull Fire provides a recent example of the impact that committed collaboration between agencies and stakeholders can have on reducing the impact of unwanted fires. Started more than a decade ago, the KRVFSC's strong ties to agency partners have helped it thrive. This significant partnership with KCFD, BLM, and USFS was responsible for the interagency effort that resulted in the creation of the Kernville shaded fuel break network, which in 2010 successfully withstood the Bull Fire. An interagency commitment to collaboration as well as public education and outreach helped foster a culture of mutual trust with area residents, something that has been shown to result in public support for fuel management activities (Winter & Fried, 2000; Toman, Shindler, & Brunson, 2006; Shindler, Toman, & McCaffrey, 2009). Too, the actualization of this collaboration through the implementation of mutually-developed projects whose costs and benefits are shared by all involved is a key component to this success. The fire safe council and agency partners and stakeholders all work collaboratively, cognizant that the risk of unwanted fires is continuous, requiring long-term commitment. Though today 70,000 communities in the wildland-urban interface are at risk of wildland fire, just 6,000 have created CWPPs (Tidwell & Brown, 2010). By developing strong interagency relationships as well as through long-term commitment to collection action and carrying out significant on-the-ground projects collaboratively developed in partnership with area stakeholders, members of the fire community can encourage the evolution of fire-adapted communities.

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Appendix A

Directions to interviewer: read aloud to the respondent without changing or altering the script in any way. If the respondent has a question that you feel that you can answer, do so in your own words.

Printing in plain script is to be read aloud to the respondent. Printing in italics contain directions for the interviewer and should not be read aloud. Printing in all bolded caps indicates a word or phrase that should be replaced by the appropriate word or phrase in the particular interview. For example, when interviewing a person from the Nature Conservancy, **[ORGANIZATION]** *should be read aloud to the respondent as* "The Nature Conservancy".

The questions are numbered. If question has the letter 'a' next to the number, it indicates that one or more responses have related follow-up questions. These are indicated by questions with the same number but a different letter. After obtaining a response to the question, scroll down to determine if the answer the respondent provided requires a follow-up answer to be read. If the answer provided does not correlate to any of the questions, move on to the next numbered question.

Every answer has as a possible response 'don't know' or 'refusal'. These answers should not be read out loud but may be recorded if the respondent gives them.

Record each answer on the accompanying spreadsheet using the italicized codes beside each possible response. Record the answers to open-ended questions on a separate piece of paper.

***Stakeholder script*:**

Hi, this is Rachel Smith. I'm hoping to speak with someone at **[ORGANIZATION]** who was involved in developing the **[Unit]** prefire plan. Do you know who the best person would be for me to speak to?

-

I'm a UC Berkeley researcher working with CalFire to learn more about stakeholder involvement in the Unit prefire plans. Do you have a few minutes to talk?

We're trying to better understand the strengths and weaknesses of Unit prefire plans, to provide input into the revision of the California Fire Plan, which is currently underway.

I'm contacting everyone involved in the **[UNIT NAME]** fire plan, in which **[ORGANIZATION]** is listed as a stakeholder. I'm hoping to speak to the person in your organization who is most directly involved with the Unit fire plans. Are you that person?

[*if no- collect name and contact info, if possible]*

[*if yes*]

Great. The survey is confidential and should take less than 15 minutes. Your input is really important to providing accurate feedback to CalFire. Is now a convenient time for you?

[*if no*]

Is there a better date or time I could call back to talk to you about your impressions about CalFire's Unit Fire Plans? **[*end*]**

[*if yes*]

Thank you, your participation really means a lot. From here on out, I'll be reading from a script, to ensure that everyone gets asked exactly the same questions. Please don't hesitate to stop me or ask questions at any point, though.

First I'd like to ask you about your impressions of the **[UNIT]** fire plan's effect within local communities.

[1.1]

The Unit fire plans are intended to reduce risk through a planning effort that includes a broad range of stakeholders.

In your opinion, has the collaborative process contributed to implementing the fire plan and building capacity for communities to reduce wildfire risk in your area?

• Yes *(Y)*
• No *(N)*
•[*Don't know*] *(DK)*
•[*Refusal*] *(REF)*

[1.2]

Can you tell me how the collaborative process has assisted in implementing the fire plan and building capacity for communities to reduce wildfire risk?

[*Record answer word for word*]
•[*Don't know] (DK)*
•[*Refusal*] *(REF)*

[1.3]

This next question is multiple-choice. How would you describe the **[UNIT]** fire plan's effectiveness in reducing fire risk in your area? This can include bringing together stakeholders, pre-fire risk mitigation projects, education, local policy or governance, or anything else you consider important in reducing fire risk. Would you describe it as:

• Very effective *(VEFF)*
• Somewhat effective *(SEFF)*
• Neutral *(NEU)*
• Somewhat ineffective *(SIN)*
• Very ineffective (VIN)
•[*Don't know*] (*DK)*
•[*Refusal*] *(REF)*

[1.4]

You said that you think the **[UNIT]** fire plan is **[1.3 ANSWER]** at reducing fire risk in your area. Can you tell me what made you say that?

[*Record answer word for word*]
•[*Don't know*] (*DK)*
•[*Refusal*] *(REF)*

[1.5]

What would you say are the primary strengths of the **[UNIT]** fire plan?

[*Record answer word for word*]
•[*Don't know*] (*DK)*
•[*Refusal*] *(REF)*

[1.6]

What would you say are the primary weaknesses of the plan?

[*Record answer word for word*]
•[*Don't know*] (*DK)*
•[*Refusal*] *(REF)*

Next, I'd like to ask you about **[ORGANIZATION NAME]**'s involvement in **[UNIT NAME]**'s Unit fire plan.

[2.1]

This next question is multiple choice. How involved was **[ORG NAME]** in the creation of the **[YEAR]** Unit fire plan? Involvement could include providing input, discussing the plan revision, attending meetings or working on projects or anything else you would consider involvement. Would you say that you were:

•Very involved *(VINV)*
•Involved *(INV)*
•Not involved at all *(NINV)*
•[*Don't know*] *(DK)*

•[*Refusal*] *(REF)*

[2.2a]

Thank you. Was **[ORG]** involved in any previous revisions of the **[UNIT]** fire plan?

•Yes *(Y)*
•No *(N)*
•[*Don't know*] *(DK)*
•[*Refusal*] *(REF)*

[*if yes*]

[2.2b]

In which year or years was **[ORG]** involved in fire plan development or revision?

[*Record answer word for word*]
•[*Don't know*] *(DK)*
•[*Refusal*] *(REF)*

[2.3]

How did **[ORG]** first become involved in the **[UNIT]** fire plan?

[*Record answer word for word*]
•[*Don't know*] *(DK)*
•[*Refusal*] *(REF)*

[2.4]

Is there a particular person or organization who approached you to be part of the **[UNIT]** fire planning process?

[*Record answer word for word- if respondent answers simply answers yes, probe for more information*]
•[*Don't know*] *(DK)*
•[*Refusal*] *(REF)*

[2.5a]

Have you or your organization suggested possible pre-fire management projects as part of the planning process for inclusion in the Unit fire plan?

•Yes *(Y)*
•No *(N)*
•[*Don't know*] *(DK)*
•[*Refusal*] *(REF)*

[if yes]

[2.5b]

Have any of the projects you or **[ORG]** suggested been included in any of the revisions of the fire plan?

•Yes *(Y)*
•No *(N)*
•[*Don't know*] *(DK)*
•[*Refusal*] *(REF)*

[if yes]

[2.5c]

Were any of the projects you or your organization suggested in the fire plan partially or fully implemented?

•Yes *(Y)*
•No *(N)*

•[*Don't know*] *(DK)*
•[*Refusal*] *(REF)*

[if no]

[2.5d]

Why do you think the projects you or your organization suggested were not included in any of the revisions of the fire plan?

[*Record answer word for word*]
•[*Don't know*] *(DK)*
•[*Refusal*] *(REF)*

[2.6]

Have you or your organization taken part in pre-fire mitigation projects proposed in the [UNIT] fire plan?

•Yes
•No
•[*Don't know*]
•[*Refusal*]

Thanks. My next questions are about your impressions about the **[UNIT]** fire plan.

[3.1a]

This next question is multiple choice. Thinking only of the most recent revision of the **[UNIT]** fire plan, how satisfied were you that **[ORG]** had an opportunity to contribute and provide input into the planning process? Would you say that you were:

• Very satisfied *(VSAT)*
• Satisfied *(SAT)*
• Not satisfied at all *(NSAT)*
• [*Did not participate in the most recent revision*] *(NPART)*
• [*Don't know*] *(DK)*
• [*Refusal*] *(REF)*

[*If did not participate in the most recent revision*]

[3.1b]

Thinking only of the last time that **[ORG]** participated in revising the **[UNIT]** fire plan, how satisfied were you that **[ORG]** had an opportunity to contribute and provide input into the planning process? Would you say that you were:

• Very satisfied *(VSAT)*
• Satisfied *(SAT)*
• Not satisfied at all *(NSAT)*
• [*Don't know*] *(DK)*
• [*Refusal*] *(REF)*

[3.2a]

Thinking only of the most recent revision of the **[UNIT]** fire plan, how satisfied were you that **[ORG]**'s goals and input were heard and integrated into the completed plan? Would you say you are:

• Very satisfied *(VSAT)*
• Satisfied *(SAT)*
• Not satisfied at all *(NSAT)*
• [*Did not participate in the most recent revision*] *(NPART)*
• [*Don't know*] *(DK)*
• [*Refusal*] *(REF)*

[*If did not participate in the most recent revision*]

[3.2b]

Thinking only of the last time that **[ORG]** participated in revising the **[UNIT]** fire plan, how satisfied were you that **[ORG]**'s goals and input were heard and integrated into the completed plan? Would you say you are:

- Very satisfied *(VSAT)*
- Satisfied *(SAT)*
- Not satisfied at all *(NSAT)*
- [*Don't know*] *(DK)*
- [*Refusal*] *(REF)*

[3.3a]

Have you or **[ORG]** consulted the **[UNIT]** fire plan in the last twelve months or used the fire plan in any way, for any reason?

- Yes *(Y)*
- No *(N)*
- [*Don't know*] *(DK)*
- [*Refusal*] *(REF)*

[if yes]

[3.3b]

How have you have used the **[UNIT]** fire plan in the last twelve months?

[*Record answer word for word*]
- [*Don't know*] *(DK)*
- [*Refusal*] *(REF)*

[if no]

[3.3c]

You said that you have not used or consulted the **[UNIT]** fire plan in any way in the last twelve months. Can you tell me why that is?

[*Record answer word for word*]
•[*Don't know*] *(DK)*
•[*Refusal*] *(REF)*

[3.4]

This next question is multiple choice. How likely are you or your organization to remain involved with the **[UNIT]** fire plan in the future? Would you say you are:

• Very likely *(VLIK)*
• Likely *(LIK)*
• Neither likely nor unlikely *(NEI)*
• Unlikely *(ULIK)*
• Very unlikely *(VULI)*
•[*Don't know*] *(DK)*
•[*Refusal*] *(REF)*

[3.5]

Can you tell me why you said that you or your organization is **[2.4 ANSWER]** to remain involved in the fire planning process?

[*Record answer word for word*]
•[*Don't know*]
•[*Refusal*]

Is there anything else you would like to tell me about the subjects addressed in this survey or anything I didn't cover?

[if no]

That's all of my questions. Thank you again for participating in the survey. Would you like me to email you a little more information about my research, or be contacted with the results of the state-wide survey?

Appendix B

Directions to interviewer: read aloud to the respondent without changing or altering the script in any way. If the respondent has a question that you feel that you can answer, do so in your own words.

Printing in plain script is to be read aloud to the respondent. Printing in italics contain directions for the interviewer and should not be read aloud. Printing in all bolded caps indicates a word or phrase that should be replaced by the appropriate word or phrase in the particular interview. For example, when interviewing a person from the Nature Conservancy, **[ORGANIZATION]** *should be read aloud to the respondent as* "The Nature Conservancy".

The questions are numbered. If question has the letter 'a' next to the number, it indicates that one or more responses have related follow-up questions. These are indicated by questions with the same number but a different letter. After obtaining a response to the question, scroll down to determine if the answer the respondent provided requires a follow-up answer to be read. If the answer provided does not correlate to any of the questions, move on to the next numbered question.

Every answer has as a possible response 'don't know' or 'refusal'. These answers should not be read out loud but may be recorded if the respondent gives them.

Unit Chief/Pre-Fire Engineer Script:

Hi, this is Rachel Smith from UC Berkeley. I'm doing some research on the Unit fire plans and Community Wildfire Protection Plans. I may have met you in February at the Unit fire plan workshop in Ione, or you might have heard me describing my project on the March CalFire conference call.

Your name is listed as the pre-fire engineer on the list that Sass and Rich sent me. I'm hoping to speak to the person in your Unit who is most directly involved the Fire Plans. Are you that person, or if not, do you know to whom I should speak?

[if yes]

Great. As I was saying, I'm doing research on the CalFire Unit fire plans. The 1996 California Fire Plan is in the process of being revised this year, and understanding what the local Unit's plans impacts have been in the

last ten years will help inform the effort to reduce risk to communities and values at risk throughout California.

I'm contacting all of the pre-fire Engineers throughout the state. This interview is completely voluntary but what you can tell me is really important part of my research. All of the information I gather is totally confidential and the results will be averaged across the state, will not be linked to you or your Unit in any way. If you choose to participate, the survey should take less than 15 minutes. Is now a convenient time for you?

[if yes, skip to next]

[if no]

Is there a better date or time I could call back to talk to you? It is really important to CalFire and I think the results could help other states in future efforts.

[if yes, end]

[if no]

Could I give you a few days to think about it and call you back? Sass, Rich, and Wayne have all seen the survey and are supporting my research-maybe you could talk to one of them before you make a decision about participating? ***[end]***

[next]

Thank you, your participation really means a lot. Before we begin, let me tell you a little bit about the interview process. I'm going to read you a series of questions. Some of them will have a selection of possible responses, other responses I will record in your own words. Even if none of the answers fits your thoughts exactly, choosing the response closest to your views will enable me to compare your answers more easily with those of other stakeholders participating in the survey. It is very important that you answer as accurately as you can. Take your time, and feel free to consult your records or ask someone else in the Unit. Please ask me to clarify the question if you have any questions about what I'm asking.

First I have a few questions about your involvement in the **[UNIT]** fire plan.

[1.1a]

During the most recent update of the **[UNIT]** fire plan, were you the primary person responsible for writing/revising the fire plan other than your Unit Chief?

- Yes
- No
- [*Don't know*]
- [*Refusal*]

[if 1.1 a answered no]

[1.1b]

Who was the person primarily responsible for the most recent update of the **[UNIT]** fire plan?

[*Record answer word for word*]
- [*Don't know*]
- [*Refusal*]

[*if 1.1a answered no*]

[1.1c]

Are you now the person primarily responsible for the current/future update of the plan, other than the Unit Chief?

- Yes
- No
- [*Don't know*]
- [*Refusal*]

[1.2]

Thank you. Which other revisions of this or other Unit fire plans were you involved in, if any?

[*Record answer word for word*]
- [*Don't know*]
- [*Refusal*]

[1.3]

Was your Unit fire plan updated in the last twelve months?

- Yes
- No
- [*Don't know*]
- [*Refusal*]

[1.4]

What factors contributed to your fire plan being updated or not being updated in the last twelve months?

[*Record answer word for word*]
- [*Don't know*]
- [*Refusal*]

Thank you. Next I have a few questions about the most recent iteration of your fire plan. I'm referring to the **[YEAR]** fire plan, downloaded from the CalFire web site. Is that the current version of the plan?

[If yes]

[2.1a]

Your plan lists **[# OF STAKEHOLDERS]** agencies and organizations as stakeholders in your **[YEAR]** fire plan. Did all of those listed participate in the most recent revision of the plan?

- Yes
- No
- [*Don't know*]
- [*Refusal*]

[if no]

[2.1b]

Could you tell me which stakeholders were involved in the most recent revision of the plan?

[*Record answer word for word*]
- [*Don't know*]
- [*Refusal*]

[2.2]

Ok, thanks. In what ways did the named stakeholders participate in the creation/revision of the plan?

[*Record answer word for word*]
- [*Don't know*]
- [*Refusal*]

[2.3]

How are new stakeholders identified and invited to participate in the planning process?

[*Record answer word for word*]
- [*Don't know*]
- [*Refusal*]

[2.4]

Keeping stakeholders engaged and committed to active participation in the planning process over longer periods of time can be difficult. How much stakeholder turnover do you have?

•No turnover- all of the stakeholders from the last plan were active participants in the current plan's creation.
•Some turnover- most of the stakeholders from the last plan were active participants in the current plan's creation.
•Significant turnover- very few or none of the stakeholders from the last plan were active participants in the current plan's creation.
•[*Don't know*]
•[*Refusal*]

[2.5]

What strategies have you used to keep stakeholders engaged or involved in the planning process long-term?

[*Record answer word for word*]
•[*Don't know*]
•[*Refusal*]

[2.6]

Thinking only of the most recent revision of the **[UNIT]** fire plan, how many of the stakeholders named in the plan had an opportunity to contribute and provide input into the planning process? Would you say:

• All
• Most
• Some
• None of the stakeholders had an opportunity to contribute
•[*Did not participate in the most recent revision*]

•[*Don't know*]
•[*Refusal*]

[2.7a]

Thinking only of the most recent revision of the **[UNIT]** fire plan, how satisfied are you that the completed plan incorporated stakeholders' feedback, input, goals, and priorities? Would you say you are:

• Very satisfied
• Somewhat satisfied
• Neither satisfied nor dissatisfied
• Somewhat dissatisfied
• Very dissatisfied
•[*Did not participate in the most recent revision*]
•[*Don't know*]
•[*Refusal*]

[if somewhat or did not incorporate stakeholder feedback]

[2.7b]

Can you tell me why you answered that way?

[*Record answer word for word*]
•[*Don't know*]
•[*Refusal*]

[2.8]

Great. Thinking only of the **[YEAR] [UNIT]** fire plan, how current and up-to-date would you say the plan is, reporting on recent projects and events and reflecting local standards and changing conditions?

• Very current
• Somewhat current

• Neither current nor out of date
• Somewhat out of date
• Very out of date
•[*Did not participate in the most recent revision*]
•[*Don't know*]
•[*Refusal*]

Thank you. My next questions have to do with the function of the fire plan within your Unit and for the surrounding communities.

[3.1a]

The Unit fire plans are used in many different ways throughout California. Is the **[UNIT]** fire plan used or consulted by the Unit on a day-to-day operational level?

•Yes
•No
•[*Don't know*]
•[*Refusal*]

[if no]

[3.1b]

Can you tell me why that is?

[*Record answer word for word*]
•[*Don't know*]
•[*Refusal*]

[if yes]

[3.1c]

In what way or ways is the plan used at an operational level?

[*Record answer word for word*]
- [*Don't know*]
- [*Refusal*]

[3.2a]

To your knowledge, do the stakeholders named in the plan use or consult the fire plan in any way, for any reason?

- Yes
- No
- [*Don't know*]
- [*Refusal*]

[if don't know/refusal, skip to 3.3]

[if no]

[3.2b]

Can you tell me why that is?

[*Record answer word for word*]
- [*Don't know*]
- [*Refusal*]

[if yes]

[3.2c]

What are the primary ways the stakeholders use the fire plan?

[*Record answer word for word*]
- [*Don't know*]
- [*Refusal*]

[if 3.2c is asked, ask 3.2d]

[3.2d]

Which stakeholder groups, agencies, or communities use the plan in these ways?

[*Record answer word for word*]
- [*Don't know*]
- [*Refusal*]

[3.3]

Thinking only of the **[YEAR] [UNIT]** fire plan, what do you think the plan's most important accomplishment has been?

[*Record answer word for word*]
- [*Don't know*]
- [*Refusal*]

[3.4]

Have there been any accomplishments of the **[YEAR]** fire plan that you didn't anticipate while writing the plan?

[*Record answer word for word*]
- [*Don't know*]
- [*Refusal*]

[3.5]

How would you describe the plan's success in reducing fire risk within the Unit? This can include bringing together stakeholders, pre-fire risk mitigation projects, education, local policy or governance, or anything else you consider important in reducing fire risk. Would you describe it as:

• Very effective
• Somewhat effective
• Neither effective nor ineffective
• Somewhat ineffective
• Very ineffective
•[*Don't know*]
•[*Refusal*]

[3.6]

You said that you think the **[UNIT]** fire plan is **[3.5 ANSWER]** at reducing fire risk in your area. Can you tell me why you answered that way?

[*Record answer word for word*]
•[*Don't know*]
•[*Refusal*]

[3.7]

In your opinion, has the collaborative process contributed, contributed significantly, or has not contributed, to implementing the fire plan and building capacity for communities to reduce wildfire risk in the Unit? Would you say the collaborative process has:

• Made a significant contribution
• Made a contribution
• Has not contributed
•[*Don't know*]
•[*Refusal*]

[3.8a]

What part or parts of the **[YEAR]** fire plan haven't been implemented as planned?

[*Record answer word for word*]
- [*Don't know*]
- [*Refusal*]

[3.8b]

Why is that the case?

[*Record answer word for word*]
- [*Don't know*]
- [*Refusal*]

Next, I have some questions about the communities within your Unit.

[4.1a]

How many community wildfire protection plans are there within the Unit?

[*Record answer word for word*]
- [*Don't know*]
- [*Refusal*]

[4.1b]

Could you tell me the names of the CWPPs in the Unit and what communities they protect?

[*Record answer word for word*]
- [*Don't know*]
- [*Refusal*]

[4.1c]

Were any of the CWPPs created by or with the assistance of the Unit?

[*Record answer word for word*]
•[*Don't know*]
•[*Refusal*]

[if yes]

[4.1d]

Is the Unit an author or signatory to any of the CWPPs?

[*Record answer word for word*]
•[*Don't know*]
•[*Refusal*]

[4.2a]

Have any of the local communities enacted wildfire-related ordinances?

•Yes
•No
•[*Don't know*]
•[*Refusal*]

[if yes]

[4.2b]

Could you tell me what ordinances have been enacted, and whether they are county or local?

[*Record answer word for word*]
•[*Don't know*]
•[*Refusal*]

[if yes]
[4.2c]

Were any of these ordinances enacted partially, fully, or with support or input from CalFire?

- Yes [*if does not specify, probe for more details]*
- No
- [*Don't know*]
- [*Refusal*]

My last questions have to deal with your impressions and opinions about the Unit fire plans in your area and around the state. The answers you give in this portion of the survey will be aggregated with all other responses around the state and will not be associated with you or your Unit.

[5.1]

In your opinion, have the Unit fire plans resulted in reduced ignitions state-wide?

- Yes [*if does not specify, probe for more details]*
- No
- [*Don't know*]
- [*Refusal*]

[5.2]

In your opinion, has the Unit fire plan in your unit directly resulted in reduced ignitions within your Unit?

- Yes [*if does not specify, probe for more details]*
- No
- [*Don't know*]
- [*Refusal*]

[5.3]

In your opinion, have the Unit fire plans directly resulted in increased initial attack success around the state?

- Yes [*if does not specify, probe for more details]*
- No
- [*Don't know*]
- [*Refusal*]

[5.4]

In your opinion, has the Unit fire plan in your unit directly resulted in increased initial attack success within your Unit?

- Yes [*if does not specify, probe for more details]*
- No
- [*Don't know*]
- [*Refusal*]

[5.5]

In your opinion, have the Unit fire plans reduced fire risk to communities and values at risk state-wide?

- Yes [*if does not specify, probe for more details]*
- No
- [*Don't know*]
- [*Refusal*]

[5.6]

In your opinion, has the Unit fire plan in your unit reduced fire risk to communities and values at risk locally?

- Yes [*if does not specify, probe for more details]*
- No

•[*Don't know*]
•[*Refusal*]

[5.7]

In your opinion, does Unit leadership support the Unit Fire Plans and a focus on planning?

•Yes [*if does not specify, probe for more details]*
•No
•[*Don't know*]
•[*Refusal*]

[5.8]

How long have you been in the Pre-Fire Engineer position?

[*Record answer word for word*]
•[*Don't know*]
•[*Refusal*]

[5.9]

Are you a Peace Officer, and if not, are you going to become a Peace Officer in the future?

•Yes [*if does not specify, probe for more details]*
•No
•[*Don't know*]
•[*Refusal*]

[5.10]

Does your Unit suggest or require that PFEs become Peace Officers?

•Yes [*if does not specify, probe for more details]*
•No
•[*Don't know*]
•[*Refusal*]

Is there anything else you would like to tell me about the subjects addressed in this survey or anything I didn't cover?

[if no]

That's all of my questions. Thank you again for participating in the survey. Would you like me to email you a little more information about my research, or be contacted with the results of the state-wide survey?

If you'd like to learn more about this research, you can visit my web site at rachelcsmith.com, or call me with any thoughts or questions at 626.823.6964.

Appendix C

Reviewer Identification: This section MUST be filled in for every review. All information provided is strictly confidential and will not be released. Please contact Rachel Smith, 626.823.6964 smithrc@nature.berkeley.edu with any questions.

Title of Unit Fire Plan		See the first page of the plan
Creation date of plan		See first page of plan e.g., 2005
Name of reviewer		Fill in your name
Title of reviewer		Fill in your title or agency affiliation
Date of evaluation		Fill in today's date e.g., 7/26/2009
Contact address		Please fill in your address
Contact email address		Please fill in your email address

Criteria for measuring policy focus in CalFire Unit Fire Plans

Category*/subcategory*/policy item

Section 1: Community/stakeholder involvement					
1.1 Awareness building Score:	**0**	**1**	**2**	**pg#**	**Comments**
Unit community education efforts* listed in plan					Defined as pamphlets, meetings, presentations, radio and television ads, billboards or other
CWPPs, Firewise communities, or FireSafe councils within the Unit are identified and a description of the manner in which the Unit supports* them is included in plan					Defined as how the Unit facilitates community groups which may include technical, operational, or financial or facilitating
Plan describes how pre-fire activities are coordinated* with adjoining Units, agencies, and communities					Through communication of any kind, announcements, or collective action
'Success stories' are included and updated as of the most recent revision of the plan					

Section 1: Community/stakeholder involvement					
1.2 Stakeholder planning participation Score:	**0**	**1**	**2**	**pg#**	**Comments**
Outreach efforts* to engage stakeholders as participants described in plan					This could include phone, email, or print solicitations or presentations to groups or the public
Development of the plan* includes participation from a diverse and balanced stakeholder group which may include local governments, tribal representatives, industry groups, conservation groups, academics, community groups and members of the public					Participation in the planning process may include but not be limited to attending meetings, providing feedback, or any other sort of engagement in the development or revision of the Unit plan Should include three or more of the groups described in the item This should be specific- e.g. plan should say "Sierra-Pacific

					Forestry was a stakeholder" rather than "Industry stakeholders"
Plan activities* are implemented including participation from a diverse and balanced stakeholder group which may include local governments, tribal representatives, industry groups, conservation groups, academics, community groups and members of the public					Activities may include but not be limited to prefire management projects, educational events, neighborhood fuel abatement days, and any other activity that implements any part of the Unit plan
Collaboration possibilities* with stakeholder agencies, community groups, or organizations are identified in plan					Could include fuel treatments, projects, or anything that would increase effectiveness, engagement, better meet strategic goals or decrease costs through collective action
Plan fosters long-term* stakeholder participation in the planning process					Maintaining regular communication (at least once a year) and offering opportunities for involvement with all elements of the planning process
Issues important to stakeholders are specifically identified and described in plan					

Section 2: Preparedness measures					
2.1 Risk mitigation goals	Score: **0**	**1**	**2**	**pg#**	**Comments**
The plan describes how the California fire plan relates to the Unit plan					
The plan identifies specific goals for the Unit that the plan is intended to address					These should be more specific than the broad goals stated in the California fire plan.
The plan lists concrete steps necessary to achieve the Unit's risk mitigation goals					

Section 2: Preparedness measures						
2.2 Risk assessment	Score:	**0**	**1**	**2**	**pg#**	**Comments**
The plan identifies and describes hazards within the Unit						
The plan identifies and describes assets at risk* in the specific context of the Unit						High risk/high value areas where potential for a costly/damaging wildfire is high
Assets at risk are ranked with ranking methodology in plan						
Assets at risk are validated and corrected in plan using layers developed by FRAP and Units						
Fire statistics* are detailed in the plan						Annual fire ignition numbers, vegetation fire ignition numbers, ignition cause, average fire extent, etc
Ignition workload assessment (level of service) is described and performed to yield workload patterns in plan						
Status of data layer validation and assessments* is included in plan						fuels, assets at risk, severe fire weather, and ignition workload analysis
Fuels map is included in plan*						may include just vegetative fuels or both structure/veg fuels
Fire hazard severity zone map with explanatory text is included in plan						
GIS based fire history map with explanatory text is included in plan						
GIS based fire weather map with explanatory text is included in plan						
Description of the frequency of extreme fire weather events is included in plan						
Fire losses* detailed in plan						*Lives, homes, other values

Estimate of potential dollar losses to fire to values at risk is included in plan						
Obstacles to reducing risk* are identified in plan						such as lack of informed populace, financial/staffing, etc

Section 2: Preparedness measures						
2.3 Fire situation	Score:	**0**	**1**	**2**	**pg#**	**Comments**
Narrative description of the local fire situation is included in plan						
Fire ignition patterns and potential for initial attack success or failure is described in plan						
Future desired conditions are included in plan						

Section 3: Prefire mitigation						
3.1 Risk mitigation strategy	Score:	**0**	**1**	**2**	**pg#**	**Comments**
Viable ground-referenced prefire management projects are explicitly identified in plan*						Projects should be cost-effective, environmentally sound, and technically feasible
Description of how each proposed project contributes to overall Unit goals included in plan						
Financial benefit of proposed projects (cost avoidance) described in plan						
A ranking of projects under consideration and description of the ranking scheme is included in plan						
A discussion of Unit's funding capabilities for prefire management projects is included in plan						

Sources of funding to complement unit resources to implement prefire management projects or activities are identified in plan					Federal, State, local, or private
Opportunities for the Unit to build or participate in building local capacity* through collaboration, technical/training assistance, education outreach, or other means are identified in plan					Building capacity, that is local ability to prevent, prepare for and decrease severity of wildland fire

Section 3: Pre-fire mitigation					
3.2 Implementation of prefire projects Score: **0 1 2**				**pg#**	**Comments**
Current/future projects are listed with status reports* or updates in plan					methods and collaborators are identified
The implementation and administration of prefire management projects is addressed in the plan					
A timetable for implementation of prefire management projects is included in plan					
Achievement benchmarks or completion dates for prefire management projects are identified in plan					
Completed projects are listed in plan					
Description of acres [to be] treated, vegetation type, and funding source for all completed, current, and future projects is included in plan					

Section 4: Operations				
4.1 Firewise building standards Score: **0 1 2**				**pg#**

Comments					
2008 WUI Building Standards or local barriers to adoption are discussed in plan					
Standards for new building construction are discussed in plan					
Standards for new construction of street networks and developments are discussed in plan					
Standards for repair and renovation to existing housing stock discussed in plan					

Section 4: Operations					
4.2 Local regulatory environment Score: **0 1 2 pg#** **Comments**					
Identification of or collaboration in local policy ordinances (or planning) discussed in plan					
100' brush clearance standard and LE-38 home inspections are discussed in plan					
Local standards and support for/barriers to regulatory enforcement discussed in plan					

Section 4: Operations					
4.3 Incident Management Score: **0 1 2 pg#** **Comments**					
Unit incident management plan discussed in plan					
Interagency division of suppression					

responsibilities is discussed in plan					
Incident notification procedure* detailed in plan					local gov't and agencies, industry, fire safe councils, communities etc
Creating/maintaining safe ingress/egress routes and evacuation plans discussed in plan					
Training efforts to support safe/successful suppression are described in plan					

Section 4: Operations					
4.4 Future measures Score: **0** **1** **2**				**pg#**	**Comments**
Projected future needs are listed in plan					equipment, resources, training and/or policies or unmet goals
Future sources of Federal, State, local, or private funding to implement fire risk abatement projects or activities are listed in plan					

Criteria for measuring the analytical quality of CalFire Unit Fire Plans

Important note: scoring differs in this section, please pay close attention to instructions for each separate policy item.

Scoring System

In this category, policies will be scored **"0" if not present or discussed**, or **"1" if present or discussed**, **except where otherwise noted**.

Reviewers comments should be included for policy items which are scored "0".

Section 5: Presentation				
5.1 General presentation Score: **0** **1**			**pg#**	**Comments**
Cover letter/memo from Chief explaining plan implementation status present in plan				

Table of contents or index provided in plan					
Executive summary included in plan					
References provided or cited in plan					
No sections of the plan are blank or devoid of explanatory text					
Each map includes (or refers elsewhere in the text to) a narrative description of what the map depicts, methodology, and quality of data that went into the map's creation					
When technical terms are used in the plan, they are defined					
The plan is written in such a way that it can be easily understood by an interested member of the public					
Score:	**0**	**1**	**2**	**Pg#**	Score these three elemen not present at all, "1" if me briefly or suggested or "2" in some detail or mandatec
Use/quality of maps in plan (score 0-2)					
Use/quality of tables and figures in plan (0-2)					
Readability of text in plan (0-2)					

Section 5: Presentation					
5.2 Articulation of purpose, policies Score:	**0**	**1**	**pg#**	**Comments**	
A clear statement of goals and objectives is included in plan					
A clear statement of policies is included in plan					
Score:	**0**	**1**	**2**	**Pg#**	Score these three elemen not present at all, "1" if me briefly or suggested or "2" in some detail or mandatec
An explanation of the plan's purpose is included in plan (score 0-2)					

Section 6: Planning process

6.1 Plan preparation process Score:	0	1	pg#	Comments
A general explanation of how the plan was prepared is included in plan				
A description of how Federal and State agencies were involved in the current planning process is included in plan				

Score:	0	1	2	Pg#	
A narrative description of how the new or updated plan was prepared is included in plan (score 0-2)					Score these three elemen not present at all, "1" if me briefly or suggested or "2" in some detail or mandatec

Section 6: Planning process

6.2 Plan Maintenance process Score:	0	1	pg#	Comments
The plan was updated within the last calendar year*				E.g., if the plan is being reviewed c order to score a 1 on this element should have been updated after 1/
The goals and objectives remain current*				e.g., don't refer to events in the pa dated objectives

Score:	0	1	2	Pg#	
Procedure for plan update/maintenance described (how, when, and by whom) in plan (score 0-2)					Score these three elemen not present at all, "1" if me briefly or suggested or "2" in some detail or mandatec
A discussion of whether planned actions/activities from previous iterations of the plan were implemented is included in plan (0-2)					

Section 7: Fact base

7.1 Current conditions Score:	0	1	pg#	Comments
A general description* of the Unit to provide a context for understanding the Unit is included in plan				Can include size of unit and SRAs economic, topographic, and histori

A description of each of the Battalions within the Unit is included in plan				
Other Unit maps are included in plan				
Local and regional context* is described in plan				May include regional human, vege topographic data to give context to plan
Communities at risk (at-risk communities) within the Unit listed in plan				

Section 7: Fact base				
7.2 Trends analysis Score: **0** **1**	**pg#**	**Comments**		
Population data included in plan				
Land-use change described in plan				
Development trends described in plan				

Section 8: Consistency				
8.1 Vertical consistency Score: **0** **1**	**pg#**	**Comments**		
Plan is consistent with state and federal mandates, legislation, and policy				
Plan is consistent with the state and federal fire plans				
Coordination with federal agencies discussed in plan				

Section 8: Consistency				
8.2 Horizontal consistency Score: **0** **1**	**pg#**	**Comments**		
Interagency coordination discussed in plan				

Plan is consistent with the county or local fire plans				
There is a relationship between the plans of neighboring jurisdictions/Units and the plan				
Other local jurisdictions identified or coordinated with in plan				

Section 8: Consistency				
8.3 Internal consistency Score:	**0**	**1**	**pg#**	**Comments**
Policies expressed within the plan are consistent and mutually supporting				
Consistency with other plans, policies, and ordinances within the Unit				

Appendix D

Overview and Introduction to the Unit Fire Plans for Coders

Thank you for agreeing to be part of the collaborative process to give a realistic, up-to-date assessment of the status of CalFire's Unit Fire Plans. Whether you are able to code just one plan or can code several plans, your assistance makes this project possible.

In order to make the assessments as accurate as possible, please read this document carefully before using the coding instrument. One of the factors that introduces error into projects such as this is inadequate or unclear instructions; if there is anything that doesn't make sense, please contact me at any time for clarification! When you start using the coding instrument, please read the general instructions before beginning and look at the comments section for any instructions specific to each policy element.

The assessment is set up as a form that can be filled in using Adobe Acrobat. If you do not have Adobe Acrobat, Adobe Reader can be downloaded free at http://get.adobe.com/reader/. If you would prefer not to use Adobe, you can print out the coding instrument and fill it out by hand or fill it out on my web site at www.rachelcsmith.com.

As you go through the form, you should select a single radio button in the column that corresponds with your choice for each element. Where indicated, you can click into the form using the cursor tool and type in your response as well, but you should select one radio button for each of the elements. You can change which radio button you have selected by clicking a second time on the radio button to un-select it and then clicking on another radio button. Only one radio button should be selected for each element. If you are unsure, select the answer that you think best fits the element and record your concerns in the 'comments' box.

Though many of you are very familiar with the Unit Fire Plans used by CalFire, the state of California's Department of Forestry and Fire Management, I would also like to briefly introduce the plans as well.

In a state where wildfires threaten values at risk in the increasingly complex mosaic of the wildland-urban interface, in which extreme fire weather is common, fuels are plentiful, and where the fire season lasts all year, CalFire is the major agency responsible for protecting communities and land. It is a daunting task, but CalFire has long served as an innovator for new technologies and strategies that have since been adopted by other states and countries. CalFire has 27 organizational groups around the state, 21 Units and 6 contract counties, and since the 1996 California Fire Plan was created they have all been expected to create local fire plans with input from local communities and stakeholders to reduce risk and inform state-wide policies.

These plans are as unique as the Units that have created them, which is one of the challenges that you will face while coding them. They are not written using a uniform structure or written by the same individual or group of people. They are at their core local efforts, and the best of them are informed by a very unique group of contributors.

They differ in length as well as complexity, but there shouldn't be an assumption that longer or more complex plans are necessarily better efforts. If you are evaluating more than one plan, try to evaluate each plan independently without comparing them.

Though not required, any comments you might have at any stage of coding are invaluable to the assessment product, and if you could record them in the 'comment' section as you progress, it would be greatly appreciated.

I would be delighted to acknowledge you, or your agency's assistance in the coding in my final product, but will respect your privacy. Each of the assessments is totally anonymous; only I, the researcher, will have access to the individual assessments, and the results will be aggregated, not liked to individual coders.

Please feel free to contact me at any point in the process with questions or comments about the directions, the coding instrument, or anything else you might like to discuss.

Thank you again for your assistance!

Rachel Smith

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General Instructions

This is a tool developed to assess CalFire Unit fire plans (UFPs) based on the California Fire Plan, the California Governor's PLATO document, FEMA's Multi-Hazard Mitigation Planning Guidance (Blue Book), and the Western Governor's Association 10-YIP Implementation Plan.

Scoring System (unless otherwise specified)

Policies shall be scored **"0" if not present at all**, **"1" if mentioned only briefly or suggested** (i.e., an exhortative policy statement), or **"2" if discussed in some detail or mandated by the plan** (i.e., a prescriptive policy statement)

Unless otherwise specified in the coding instrument you should follow these instructions:

1. **Review all of the items** in a section of the coding instrument. Read the corresponding section of the Unit fire plan.
2. **Complete each item** in the section of the coding instrument as follows:
    a. Read the instructions in the 'Comments' column as your guide.
    b. Click the appropriate radio button. Do not click any other option.
    c. Mark the page number where the item material can be found in the Page # column; if there is no corresponding page number leave blank.
    d. Make any notes you feel are appropriate (such as something that might jog your memory if an item was unclear and you were not confident of your interpretation) in the white space to the right of the table.
    e. Notes are highly encouraged for items which do not fully meet the standard (for example, receive 0 or 1 out of a possible score of 2, or receive 0 out of a possible score of 1)
3. **Review** your coding of the section to ensure that all items have been completed fully and accurately. (This step is particularly important as it may be hard to remember your thought process at a later date. It is much better to go slowly and thoroughly now than have to redo coding later!)