Factors Influencing the Development of

Rangeland Fire Protection Associations: Exploring Fire Mitigation

Programs for Rural, Resource-based Communities

A Thesis

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Authorization to Submit Thesis

This thesis of Amanda M. Stasiewicz, submitted for the degree of Master of Science with a Major in Natural Resources and titled, "Factors Influencing the Development of Rangeland Fire Protection Associations: Exploring Fire Mitigation Programs for Rural, Resource-based Communities," has been reviewed in final form. Permission, as indicated by the signatures and dates below, is now granted to submit final copies to the College of Graduate Studies for approval.

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Abstract

Increases in wildfire frequency and extent in rangelands pose a growing threat to private property and ecosystem health. The state of Idaho, USA, recently promoted Rangeland Fire Protection Associations (RFPAs)—nonprofit organizations of local citizens who contribute to firefighting efforts on public rangelands—as one way to mitigate rangeland wildfire risk. This study used in-depth interviews with RFPA members and land management professionals to explore the local circumstances that influenced the establishment and functioning of one RFPA. Results indicate that intergenerational ties to "working the land," existing reciprocity among neighbors, a culture of self-reliance, and informal social networks all contributed to RFPA formation and functioning. Interaction between RFPA members and professionals improved their relationships and promoted shared understandings about wildfire response. We conclude by discussing conditions that might enable or inhibit RFPAs in other areas and how our findings advance research on adapting mitigation programs to local context.

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Dedication

This thesis is dedicated to the many wonderful people in my life. First, to my mother, father, and grandparents who support and encourage my academic pursuits and adventures despite the fact that these tend to take me very far away for long periods of time. Second, I dedicate this thesis to my sister and brother, who challenge me to be my best, keep me grounded, and are accomplishing many of their own academic and professional milestones. I'd also like to dedicate this thesis to the amazing mentors who spent countless hours answering questions, providing guidance, and teaching me how to do research during my undergraduate and graduate studies. This accomplishment pales in comparison to the encouragement and lessons I've learned from all of you. Thank you.

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CHAPTER ONE: Living with Wildfire: Archetypes and Programs

Wildfire is a prominent disturbance force across the western United States that often influences the health and functioning of local human populations. Policymakers and managers often aspire to create tools (e.g., policies and programs) that can assist communities in preparing for, responding to, and recovering from wildfire events. There is a long history in natural hazards mitigation and communication literature of tailoring these assistance tools to specific local populations. This is because each population is uniquely distinguished by locality-specific social, ecological, and political characteristics that create distinctive circumstances for that community. Populations often experience and perceive different risks from wildfires—they also may have varying capabilities and interests when addressing wildfire impacts. Customizing policies, programs, and strategies to the distinct interests and capabilities of a local population may enhance the effectiveness of these efforts.

A number of wildfire social science studies have sought to understand the ability of individual populations or communities to adapt to wildfire risks given their local circumstances. One conceptual framework suggests four key elements to consider when examining how diverse populations may address wildfire risks and go about the process of adaptation, namely: (1) demographic and structural characteristics, (2) place-based knowledge and wildfire experience, (3) access and ability to adapt scientific and technical information, and (4) interactions and relationships among residents (Paveglio, Carroll, & Jakes, 2010). Demographic characteristics can include income, education-level, age, and willingness to pay for fire mitigation actions. Structural characteristics include road

infrastructure, materials used in home and residential area construction, the type and density of private development, fuel loadings, and the functionality or absence of a wood products industry and facilities (Paveglio et al., 2015a). These characteristics tend to influence the resources communities can access to address local wildfire risks including viable evacuation routes, ability to execute fuel reduction projects, grant writing skills, and financial resources.

Resident knowledge of the ecosystem and experience with fire, also known as place-based knowledge, includes concepts such as local cognizance of weather patterns that can forecast hazard events and inform hazard management strategies (Knapp & Fernandez-Gimenez, 2009; Nyong, Adesina, & Elasha, 2007), local awareness of fuel loadings and fire-prone areas on the landscape, and perceptions of the role of fire in the local ecosystem. Past experience(s) with wildfire and knowledge of potential fire behavior are also considered (Paveglio et al., 2015a) because they may influence how locals perceive wildfire risks and what actions they intend to take when faced with various wildfire circumstances.

The ability to access and adapt scientific and technical knowledge relevant to particular community needs and circumstances is another element that influences community capacity to mitigate wildfire risks. Scientific and technical information often comes from expert consultation/professional input, which may be provided by local fire departments, homeowners' associations, agency professionals, or community-level wildfire mitigation programs (Paveglio et al., 2015a), such as Firewise Communities/USA or FireSafe Councils. Locals can use this expertise to evaluate wildfire risk management options for their private property or assess the feasibility of evacuating during a wildfire event. Scientific and technical information can also be accessed in more interactive settings, such as field tours or training sessions. For example, local volunteers in Wilderness Ranch,

ID received firefighter training through partnerships with nearby US Forest Service (USFS) and Idaho Department of Lands (IDL) offices (Paveglio, Carroll, & Jakes, 2010). Similarly, a volunteer-based suppression organization in Idaho called Rangeland Fire Protection Associations (RFPAs) also requires that members who intend to engage in suppression efforts participate in wildland firefighter training sponsored by a partnering land management agency. These training sessions disseminate what are considered the safest and most effective suppression tactics and up-to-date scientific knowledge of fire behavior from the experts who have the knowledge sets to localities where application of that knowledge occurs.

Some wildfire policies such as the Healthy Forests Restoration Act of 2003 promote the exchange of technical/scientific and place-based knowledge sets. These policies incentivize the USFS and the Bureau of Land Management (BLM) to give consideration to the priorities of local communities when developing and implementing land management plans and hazardous fuels reduction projects. Community Wildfire Protection Plans (CWPPs) are one mechanism for private citizens and communities to communicate their priorities for wildfire protection and risk mitigation actions with land management decision-makers (Communities Committee, National Association of Counties, National Association of State Foresters, Society of American Foresters, and Western Governor's Association, 2004). Ideally, land managers, fire professionals, and local citizens collaborate to develop a plan that fits the local social and ecological contexts where the CWPP is being implemented (Jakes et al., 2007). During this process, agency methods for mitigating risks and local concerns and knowledge can be considered and exchanged (Jakes et al., 2011), although this is not always the case.

The Cohesive Wildland Fire Management Strategy (2012) calls for stakeholders across the West to collaborate to address local wildfire risks and promote healthy landscapes, has set an expectation of new or revitalized agency-citizen partnerships to address wildfire issues. One new partnership for meeting these collaborative goals in rangeland systems is RFPAs. This program potentially represents one example of stakeholder collaboration where both local place-based and scientific/technical knowledge sets are integrated to enhance wildfire management efforts in a given locality. Previous studies suggest that local knowledge was an underappreciated component in past assessments appraising community capacity to dealing with wildfire risk (Paveglio, Jakes, Carroll, & Williams, 2009).

Finally, interactions and relationships among residents can support or limit locality-oriented collective action, defined as: "a process of interrelated actions through which residents express their common interest in the local society" (Wilkinson, 1991, p2). Interactions and relationships that can influence collective action to mitigate wildfire risk include whether individual community members identify with common hardships, the existence of shared values or norms, and how information is shared among locals (e.g., formal/informal communication networks). The prevalence of communal or familial ties within the community, the presence of respected and recognized local leaders who can motivate collective action, and interest in or support of volunteer firefighting or fuel reduction projects (Paveglio et al., 2015a) will also influence how and who within the community chooses to mobilize and act. This element accounts for the importance of how people connect to each other and how those connections can facilitate or inhibit wildfire mitigation action.

Previous and present relationships between stakeholders (e.g., agencies, local citizens, environmental groups) influences challenges and opportunities for collaborating on wildfire risk management across landscapes. For example, the agency-sponsored firefighter training that occurred in Wilderness Ranch, ID may not be possible in places where agencies and locals are mistrustful of one another or are unwilling to collaborate. Consequently, local independence or distrust of government authority also are important for considering the capabilities and reservations a population may have when taking actions to prevent, suppress, or recover from wildfire events. These characteristics are likely to influence how and if local populations interface with other actors to mitigate wildfire risks and impacts, including county, state, and federal land or fire management agencies and social recovery organizations, such as the American Red Cross, Salvation Army, or Federal Emergency Management Agency.

The framework we have described provides a means for assessing the capacity of an individual community to adapt to wildfire risks. Recent policies promote the establishment of fire-adapted communities (FACs) in order to motivate adaptation of human systems to wildfire conditions in their area. FACs are groups of people who collectively take actions to promote wildfire preparedness, prevention, and mitigation without significant loss of life, private property, or community function (FAC, 2016). Additionally, a FAC takes steps to promote community-wide recovery following a wildfire event. Fire-adapted communities across the West are likely to perceive, prepare for, experience, and recover from wildfire events differently due to the unique characteristics of the social and physical systems in that place. A growing portion of wildfire social science literature has begun to explore how differences in local characteristics and circumstances influence how different populations go

about becoming fire-adapted. Paveglio and others (2015a) identified patterns across 18 communities within the wildland-urban interface (WUI)-- widely recognized as the place where wildfire poses the greatest threat to human life, property, and interests because residences are intermixed with or adjacent to wildland vegetation-- that partially explain variations in community ability to adapt to local wildfire circumstances. These patterns generally followed a continuum, and four archetypes emerged (see Figure 1).
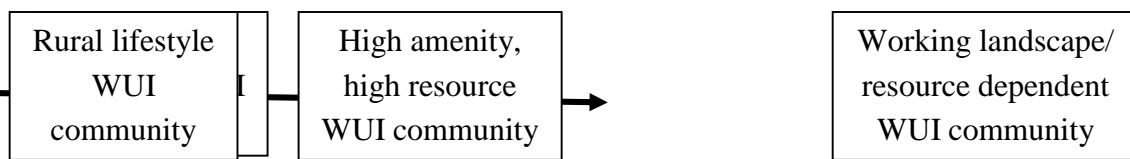

Figure 1: The continuum for wildland-urban interface community typologies adapted from Paveglio et al. 2015a.

Formalized suburban communities tend to exhibit trust in government authority, a higher incidence of collaborating with agencies, high expectations of firefighting services, and lower personal ability to perform risk mitigation actions (Paveglio et al., 2015a). Formalized subdivision communities often have codes and standards for mitigating wildfire risks that are enforced by local authorities. Individuals may prefer to contract professional services to perform the mitigation actions required by those codes rather than perform the actions themselves. Individuals within formalized subdivision communities tend to have more financial resources than other communities along the continuum. Finally, populations at this end of the continuum tend to both access and exchange information through formal communication networks, especially consulting land managers and perceived experts (Carroll & Paveglio, in press).

Working landscape/resource dependent WUI communities (hereafter called working landscape community or archetype) are commonly tied to resource extraction or utilization

industries, such as logging, farming, or ranching. Distrust of government authority may be prevalent, especially if professionals are not from the area or the government organizations enforce policies within the community without including or considering local interests in policy creation. Individuals in working landscape communities often are less likely to collaborate with land management agencies (e.g., state or federal) in comparison to the other archetypes. Individuals who are members of the working landscape archetype may prefer to address local wildfire problems themselves, including planning and executing fuel reduction projects and fire management. They are more likely to have the skills and resources (e.g., equipment) to actively engage in fuel reduction projects because their livelihoods may have involved land and fire management. Working landscape communities also tend to have less financial resources (Paveglio et al., 2015a) in the form of available capital, which may affect participation in programs that expect matching financial contributions from local communities (e.g., matching fuel reduction grants). Codes and standards that mandate wildfire mitigation actions are often unacceptable to the community, ineffective in motivating personal action, and difficult to enforce in these contexts. Informal social pressures, such as peer pressure, tend to be more effective mechanisms for motivating action or involvement in some working landscape communities (Ellickson, 1991; Paveglio et al., 2015a). Similarly, community members tend to mobilize to address and communicate community issues using informal relationships and communication networks, such as family members, neighbors, and word of mouth. This form of information dispersal is often more effective and trusted when compared to top-down, one-way information dissemination such as mailings or drop-by visits from agency personnel.

Many wildfire programs and initiatives appear to be better adapted to WUI communities on the formalized subdivision end of the continuum. These communities are more likely to have the financial resources and skills to apply for program recognition, negotiate with agency professionals, acquire grants, and participate in grant-matching options. For example, the Firewise Communities/USA program primarily focuses on reducing hazardous fuels on private property and promoting the construction of fire-resistant homes. This program likely matches the needs and circumstances of individuals concerned with the risk wildfire poses to their homes or places of value within the community. Conversely, communities on the working landscape end of the continuum may be more concerned with the risk wildfire poses to the natural resources they rely on for their livelihoods. Rural communities may encounter difficulties addressing their identified wildfire risks because other entities (i.e., land management agencies) often have the responsibility and receive the resources to mitigate wildfire risks on the public lands where residents make their livelihoods (Fleeger & Becker, 2010; Steelman, 2008). Existing programs, such as Firewise Communities/USA, may not enhance the capacity of a working landscape community to deal with their particular wildfire circumstances because members of working landscape communities likely already manage their property for hazardous fuels and have the skills and tools to perform mitigation actions themselves. Additionally, policies and initiatives prioritizing the protection of structures may aggravate members of communities that perceive other priorities, like natural resource protection, as more important.

RFPAs and rural fire districts (RFDs) have been identified by some agencies in Idaho as potential options for rangeland residents who want to engage in suppression efforts

on private and adjacent public lands. These programs may be viable matches because members of some working landscape communities already have experience suppressing or managing wildfire as part of their livelihoods, and because these populations often want to be involved in natural resource management decision-making (Brunson & Peterson, 2007). RFDs are active across the West and are already applied in rangeland contexts. RFPAs are new to Idaho, but have been active in Oregon since the 1960's. Each option requires volunteers to undergo firefighting training and allows trained individuals to participate in suppression efforts. RFDs are funded by local taxes and may engage in structure and wildland fire suppression efforts. As such, RFDs may be most applicable to areas where there is a sufficient tax-paying population that can fund department operation and where locals want to engage in structure suppression. RFPAs are non-profit organizations that can participate in wildland fire suppression efforts, but are not trained to participate in structure fire suppression (IDL, 2016). RFPAs amass funding directly from members and do not require a minimum population density from which to collect the capital necessary for Association operation. Therefore, RFPAs may be more applicable in remote areas with a lower population density than RFDs. Put another way, a RFD and RFPA could have the same number of members, but differences in how residents are dispersed across the landscape can make one program more applicable than the other. Although some land management agencies propose RFDs and RFPAs as mechanisms for rural, rangeland residents to engage in wildland fire suppression, few studies have investigated the roles of RFDs or RFPAs in rangeland wildfire management. In the following study, we investigate how the local context and circumstances of one population in southern Idaho led to

establishment of an RFPA and how that context influences the RFPA's role in rangeland

wildfire management.

CHAPTER TWO: Three Creek RFPA
Submitted to Society and Natural Resources

Introduction

Recent increases in rangeland wildfire frequency and extent are considered a threat to how people have valued and utilized range landscapes for generations (US Department of the Interior, Rangeland Fire Task Force (RFTF), 2015). These increases can be partially attributed to the impact of climate change, non-native plants, and past land and fire management strategies. The research on economic and social influences on rangeland wildfires or their impact (Riggs, Breazeale, & Myer, 2001; Torrel, Rimbey, Tanaka, & Bailey, 2001; Brunson & Shindler 2004; Brunson & Evans, 2005; Maher, 2007; Shindler, Gordon, Brunson, & Olsen, 2011) is less developed than research focusing on biophysical drivers of increasing wildfire impacts (Shindler, Toman, & McCaffrey, 2008). The emergence of Rangeland Fire Protection Associations (RFPAs) in Idaho may represent a unique adaptation to wildfire that addresses changing fire regimes and threats to human values while engaging community members as a resource during wildfire events. Although RFPAs have existed in Oregon since the 1960's (Oregon Department of Forestry (ODF), 2012) and Idaho since 2012, few research efforts have investigated how RFPAs function or are established. The research presented in this paper addresses that lack by exploring the influences behind RFPA establishment and insight on how they function as a local wildfire adaptation.

Idaho RFPAs are nonprofit organizations comprised of local citizens who provide or support initial suppression attack on public rangelands in cooperation with entities responsible for local wildland fire management. RFPAs represent a legal way for local

residents to suppress wildfires on public lands, especially in remote areas with little to no suppression capacity. Members of RFPAs also contribute local knowledge and resources to suppression efforts. RFPAs can help facilitate quicker wildfire response to keep rangeland wildfires smaller, which may prove particularly beneficial in places where the incidence and extent of wildfires are increasing and help reduce suppression and fire-recovery costs (Idaho Department of Lands (IDL), 2016).

Existing hazard literature recognizes the need to tailor policies, programs, and communication strategies to specific local circumstances (Linder & Peters, 1989; Schnider & Ingram, 1990; Shindler, 2002; Howlett, 2011). Likewise, a growing segment of wildfire social science research suggests that there are certain patterns and characteristics that distinguish how different communities in the wildland-urban interface (WUI) –places where residential development is intermixed with or adjacent to wildland vegetation – prepare for, respond to, and recover from wildfire events (Paveglio et al., 2015). RFPAs in Idaho are often closely associated with places where community identity, lifestyle, interactions and relationships are strongly tied to resource utilization or extraction (i.e.: ranching, farming), what some authors call working landscape or resource dependent communities (Flint & Luloff 2005; Carroll, Higgins, Cohn, & Burchfield, 2006; Cohn, Carroll, & Kumagi, 2006; Huntsinger, Forero, & Sulak, 2010; Paveglio et al., 2015, Paveglio, Carroll, Hall, & Brenkert-Smith, 2015). However, research investigating the influence of working-landscape social characteristics on community-based wildfire risk mitigation tends to focus more on timber communities and less on agricultural or rangeland-based communities. As such, there is an important need to better understand how range-based human populations can and are likely to respond to increasing wildfire risk. Ranchers, in particular, may have a vested

interest in preventing and suppressing wildland fire because of the potential to lose vital livestock forage (Brunson & Tanka, 2011) and access to burned grazing allotments for two or more years while the ecosystem recovers (Maher, 2007; ODF, 2012). Such members of working-landscape communities often have a long history of collaborating to suppress small fires that might damage resources important to their livelihoods (McGee & Russell, 2003). However, private citizens in Idaho could not legally participate in wildfire suppression on public rangelands until 2012 when ranchers in one community established a formal agreement with local state and federal land management agencies and formed an RFPA.

We conducted a case study of the Three Creek RFPA in south-central Idaho to identify characteristics salient to the establishment of the RFPA and those attributes and processes that play an important role in its continued functioning. There are multiple benefits to performing this study, including: (1) identifying the social characteristics or programs that may facilitate collaborative wildfire management between ranching/farming communities and land management agencies; (2) examining how RFPAs influence agency-citizen relationships surrounding wildfire or land management; (3) identifying the roles RFPAs may play in wildfire management on public lands, and (4) progress in identifying the most productive means to address wildfire risk in working landscape communities.

Literature Review

Rangeland Fire Protection Associations

The first Idaho RFPA actively participated in suppression efforts during summer 2012. The state legislature amended State Code permitting timber protective associations in forests to allow similar protective agreements between fire management entities and private citizens in rangelands under RFPAs (Idaho Code §38-104B). There were six distinct RFPAs

across the state as of 2016, with others in various stages of formation (IDL, 2016). RFPA members who want to engage in suppression must complete wildland firefighter training provided by a partnering fire management agency, such as the Bureau of Land Management (BLM), and acquire appropriate communication and personal protection equipment (PPE) (BLM, 2014). This satisfies concerns about citizen and firefighter safety during suppression collaboration by standardizing basic firefighting knowledge and establishing common communication networks. The RFPA must obtain liability insurance, the cost of which is internalized by operations who join. Members (or their trained employees) can participate in training and obtain the equipment required to respond to wildfires or access public lands during a wildfire to move livestock. RFPA formation also is contingent upon the state's ability to assist with start-up costs (i.e. PPE, radios, training), whether the proposed RFPA is capable of sustaining its own funding long-term, and the RFPA's establishment of a governing board (Idaho Code §38-104B 2013).

Idaho Department of Lands (IDL) and BLM support for RFPAs stems from a number of potential benefits RFPAs can provide during wildfire situations. These benefits include: quick identification of wildfires by members who live and work on or in close proximity to public lands; integration of valuable local knowledge of roads, land, and water resources that can enhance the speed, efficiency and safety of suppression; and incorporation of residents and their equipment (e.g. dozers, discs, water tanks) into suppression activities (BLM, 2014; IDL, 2016). These benefits help facilitate quicker initial attack, which is important for keeping wildfire impacts small. Quick wildfire suppression is particularly relevant for wildfire management in much of southern Idaho due to concerns about the

spread of invasive species following wildfires and protecting sage-grouse habitat (RFTF, 2015).

Community-based Wildfire Programs and a Ranching Context

Traditional wildfire policy in the United States tends to partition wildfire prevention and suppression activities between private landowners and fire management agencies. Private landowners are commonly allocated the responsibility for preventing wildfire events on private lands by creating defensible space and/or making renovations to structures to discourage fire ignition and spread. Social science research investigating how to motivate individuals to accept wildfire mitigation responsibility suggests that community-based programs can be useful mechanisms for encouraging property owners to reduce wildfire threats on their private property or contribute to reducing wildfire risk on adjacent lands (Jakes et al., 2007; McGee, 2011; McCaffrey, Toman, Stidham, & Shindler, 2013; Stidham, McCaffrey, Toman, & Shindler, 2014). Some wildfire mitigation programs (i.e. Firewise Communities/ USA, FireSafe Councils, homeowner's associations) may not work in every community and differences in local needs and social characteristics may partially account for variations in wildfire program success in otherwise comparable communities (Paveglio, Carroll, & Jakes, 2010; Paveglio et al. 2015).

Efforts to consider the local context of a community in wildfire planning and management are adapted from a long-standing tradition of designing plans, programs and communication strategies for the particular circumstances of a local population (Linder & Peters, 1989; Schnider & Ingram, 1990; Howlett 2011). Some fire management initiatives, such as Community Wildfire Protection Plans, promote locally-oriented wildfire planning and collaboration between local fire departments, management agencies, and community

members (Jakes et al., 2007, 2012; Fire Adapted Communities, 2016). Few existing wildfire mitigation programs and options completely align with the local needs and social characteristics typical of working-landscape communities as summarized by Paveglio et al. (2015), such as distrust of government agencies and a culture of self-reliance, which may partially explain how and why RFPAs emerged in southern Idaho rangelands.

Existing research suggests that community-based wildfire programs may be more successful when there is a strong local interest in collective action, especially fuel reduction and fire prevention programs. However, few studies investigate collective action focused on wildfire suppression such as rural fire districts or volunteer fire departments (McCaffrey, Toman, Stidham, & Shindler, 2013). Rural communities tied to "working the land" often address everyday problems, including wildfire suppression, collectively using informal relationships and communication networks (Ellickson 1991; Jakes et al., 2007; Nelson, Adger, & Brown, 2007; Paveglio et al., 2015; Paveglio, Carroll, Hall, & Brenkert-Smith, 2015). Rural ranching communities may also be unified to address wildfire by other local social characteristics such as a mutual stewardship ethic, history of self-reliance, and culture promoting neighborliness and reciprocal actions (Ellickson, 1991; Liffman, Huntsinger, & Forero, 2000; Yung & Belsky, 2007; Huntsinger, Forero, & Sulak, 2010). The resulting tight-knit social network, often reinforced by inter-generational relationships, and existing neighborhood organizations may be important for encouraging locals to adopt wildfire preparedness actions (Cohn, Williams, & Carroll, 2008), discussing community concerns, and identifying local leaders to champion the issue (Jakes et al., 2007, Paveglio et al., 2015). Livestock owners who utilize public grazing allotments may be united by a common struggle to take personal responsibility for mitigating wildfire risks to their private property

(i.e. livestock and forage) due to (1) an inability to perform wildfire prevention or suppression actions on public lands where their private property resides, and (2) limitations on land access during wildfire events, which can complicate moving livestock or opening gates (Paveglio, Carroll, Jakes, 2010; Paveglio, Carroll, Hall, & Brenkert-Smith, 2015). The risk wildfire poses to these values may provide an additional catalyst for unifying community members and facilitating collective action to address the wildfire risk (Flint & Luloff, 2005; Jakes et al., 2007).

Social science research has noted that local landowner trust in agency professionals can be important for building and sustaining effective partnerships. Local trust in agency managers can be related to perceived competence of agency personnel (Brunson & Evans, 2005), perceived fairness in land management plans, presence or absence of shared values, and whether managers execute commitments (Winter, Vogt, & McCaffrey, 2004; Vaske, Absher, & Bright, 2007; Olsen & Schindler, 2010). Distrust and poor agency-resident relationships were previously documented in the Great Basin, in part due to a perceived lack of consideration of local knowledge in management plans, a perceived lack of incentive for managers to act proactively, and conflict over resource utilization (Brunson & Evans, 2005; Brunson & Peterson, 2007; Gordon 2012). Other studies have noted that controversy over previous wildfire management was connected to agency-resident distrust, particularly in places where residents have lived for multiple generations, are tied to resource use (Carroll, Cohn, Seesholtz, & Higgins, 2005; Paveglio, Carroll, Hall, & Brenkert-Smith, 2015), or are historically self-sufficient in suppressing small fire events (Brenkert-Smith, 2011; Paveglio, Norton, & Carroll, 2011). Agency-resident partnerships in communities with these social characteristics may be influenced by distrust and an inability or unwillingness to collaborate

(Huntsinger, Forero, & Sulak, 2010; Paveglio et al. 2015). Wildfire social science research suggests that mitigation programs can promote resource sharing, overcoming jurisdictional boundaries, trust development, and provide opportunities for transparent decision-making that incorporates the public (McCaffrey, Toman, Stidham, & Shindler, 2013).

National-level policies such as the Healthy Forests Restoration Act and the National Cohesive Wildland Fire Management Strategy necessitate the collaboration of stakeholders across the west to increase landscape and community resilience to wildfire events and enhance the safety and effectiveness of wildfire response efforts. These policies encourage resource dependent communities, which often are in close proximity to public lands, to collaborate and negotiate with agency officials. Existing wildfire programs like "Ready, Set, Go!" prioritize resident evacuation and allocate wildfire suppression responsibility to fire management agencies, which may not be compatible with ranching communities due to limited ingress and egress, difficulty evacuating livestock (Pavegli, Carroll, & Jakes, 2010), and barriers to suppressing fires that threaten their livelihoods and families (Cohn, Carroll, & Kumagi, 2006; Strawderman, Salehi, Bakski-Reeves, Thorton-Neaves, & Cosby, 2012). Integration of rural community informal networks into multi-jurisdictional wildfire management and formal institutions like the Incident Command System (ICS) can be difficult and complicated. RFPAs may be salient to U.S. fire management objectives emphasizing collaborative approaches to wildfire management (United States Department of the Interior (USDOI), 2015) and may exemplify tailoring a wildfire mitigation program to the specific local needs and social characteristics of a working landscape community.

This study builds on existing wildfire social science literature calling for consideration of local social characteristics and concerns in wildfire policy and program-

making by examining one rangeland working-landscape community's adoption of an RFPA to address local wildfire risks. We use a case study of the Three Creek RFPA in Idaho to address the following research questions:

(1) What factors influenced the establishment of the Three Creek RFPA?

(2) How do local circumstances influence RFPA functioning?

Methods

We used an in-depth, qualitative and inductive approach in this research to study influences on the formation and organization of one Idaho RFPA. An inductive, case study approach is appropriate because research on the factors that influence RFPA functioning are in the exploratory stage, with few identifiable themes or patterns from which to formulate testable hypotheses (Strauss & Corbin, 1990; Glaser & Strauss, 1999). Qualitative methods focusing on a single case allow insights to emerge from our interactions with locals and professionals involved with or influenced by the RFPA (Glaser & Strauss, 1999; Bryman, 2012) and could form the basis for future testable hypotheses. We chose to treat the RFPA as the unit of analysis in our case study selection because each RFPA represents a unique organization with potentially different motivations and means for organizing their fire suppression efforts.

There were six RFPAs established in Idaho as of summer 2015 (Figure 3). Case study selection for this research began by considering the length of time each Idaho RFPA had been established, the amount of interaction between the RFPA and state or federal fire management professionals, and consideration of whether RFPA members had responded to wildfire events. These criteria ensured that the case study would allow us to understand the

influences on RFPA formation and functioning, including actions during fire suppression.

The Three Creek RFPA was ultimately selected for this case study because (1) it had been

active for three fire seasons, (2) at least some members had responded to multiple fires, and

(3) the organization had received a firefighting award (Pulaski Award) in recognition of its

contributions and accomplishments during the 2013 season (IDL, 2014).

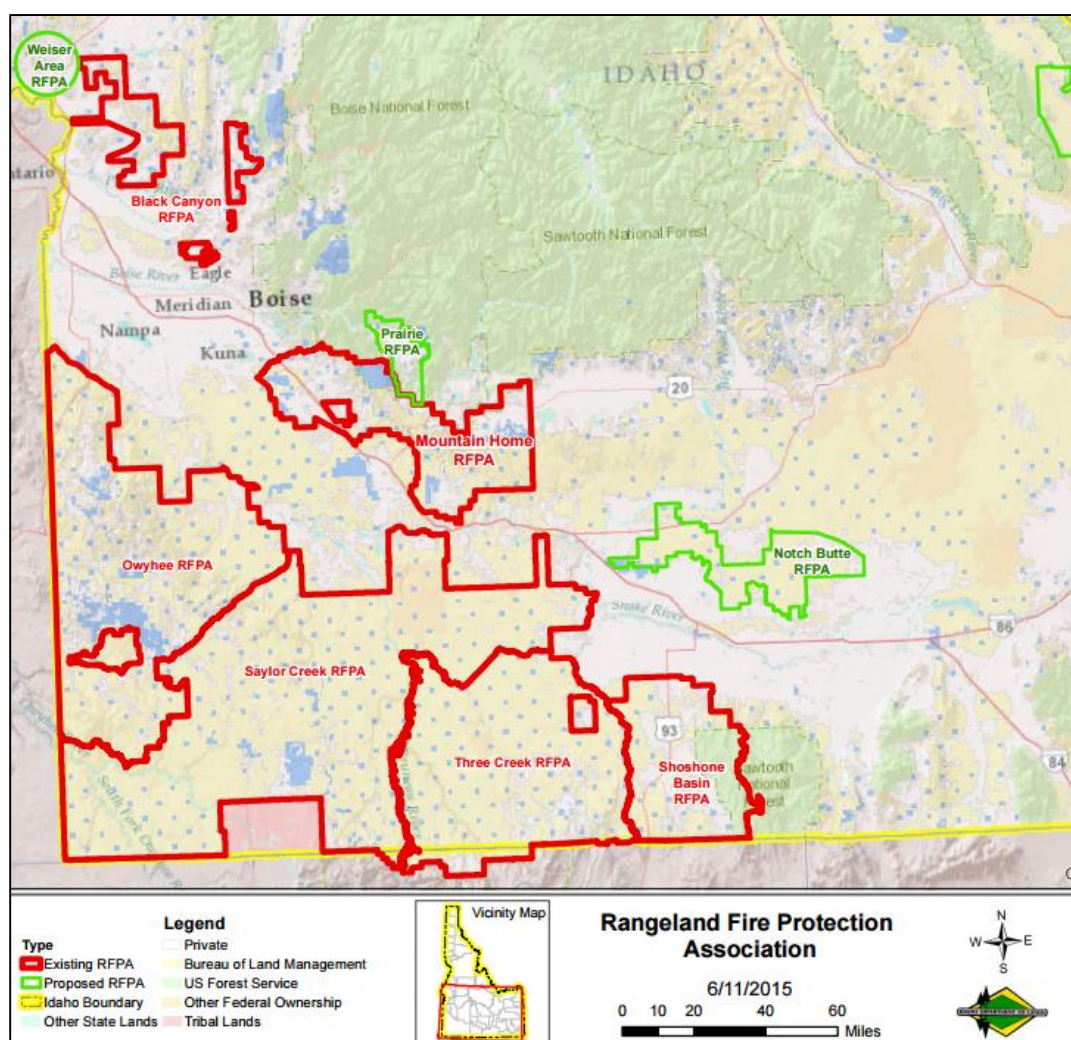
Figure 2: Map of Rangeland Fire Protection Associations. (Source: IDL, 2016)

Fifty-one members of the Three Creek RFPA helped protect 1,110,000 acres of

private, state, and federal lands in southwest Idaho as of summer 2015 (IDL, 2016). The

RFPA shares borders with two other RFPAs, a rural fire district and the state of Nevada. The BLM manages the majority of the public lands and IDL manages some smaller parcels (see Figure 2). Much of the public rangelands in the RFPA jurisdiction are leased to ranchers for livestock grazing and are unbroken by private development. Residential areas and towns bordering the large tract of public lands are commonly surrounded by irrigated agriculture, dairies, and private ranchlands, although residential areas are not included in the RFPA's suppression responsibilities (IDL, 2016). The Three Creek RFPA area is dominated by public rangelands typified by "…gently rolling plateau lands with deeply incised rivers," (BLM, 2015, p2). Much of the lands were historically dominated by sagebrush-steppe, although many areas have converted to native and non-native grasslands due in part to increased wildfire activity and noxious weed invasion, especially in northern portions of the jurisdiction (BLM, 2015) (see Figure 3). Much of the RFPA's southern jurisdiction is ranked in the highest fire response priorities in the Twin Falls District because of sage-grouse habitat (BLM, 2015).
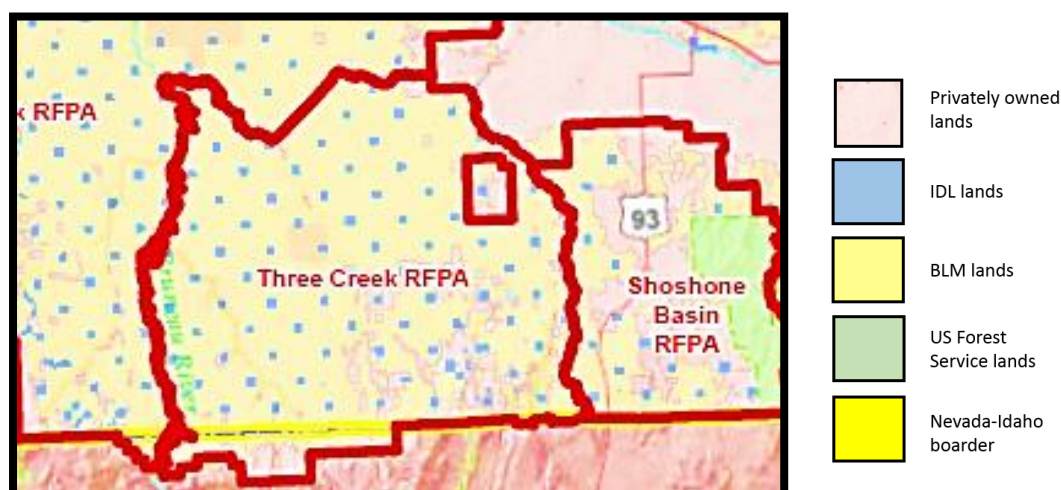

Figure 3: The Three Creek RFPA jurisdiction in south-central Idaho. (Source: IDL, 2016).
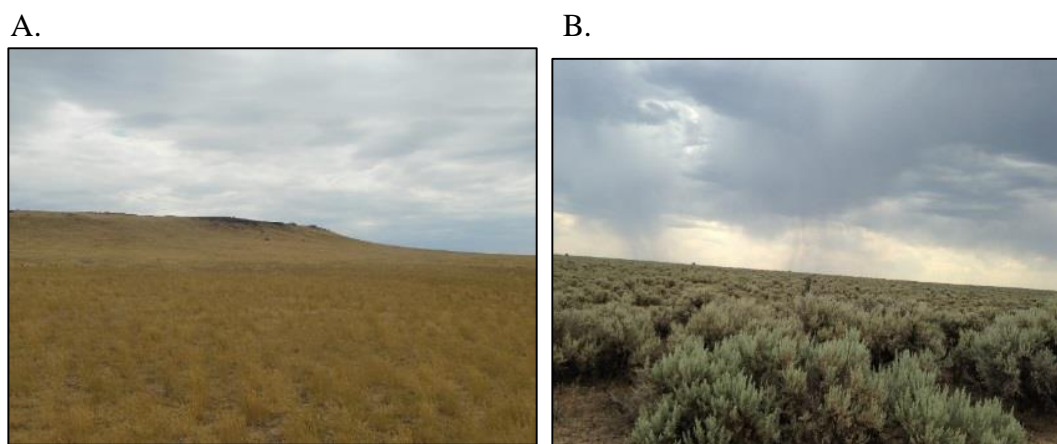
Figure 4: Examples of A. the northern portion and B. the southern portion of the Three Creek RFPA jurisdiction

We conducted a total of 44 semi-structured interviews with 52 individuals during the summer of 2015 as part of this study. Interviews were mostly conducted face-to-face, in teams of two, and lasted between 20 minutes and 2.5 hours. A combination of theoretical and snowball sampling was used to identify the individuals to interview (Charmaz, 2000; Bryman, 2012). Theoretical sampling is an inductive approach where key informants are selected based on their knowledge and expertise in a particular field or topic (Glaser & Strauss 1999; Lindlof & Taylor, 2002) and their ability to speak about topics that emerged during fieldwork. Key informants for this study included Three Creek RFPA leaders and agency liaisons who were contacted before the study to ensure that participants were interested in being interviewed. Subsequent interviewees were selected via snowball sampling, which utilizes referrals from key informants and other interviewees to find new individuals to include in the study (Biernacki & Waldorf, 1981, p. 141). Participants interviewed for the study included at least one RFPA member from all but one participating operation (i.e. farm, ranch, or company) and a variety of land or fire management professionals from agencies involved in local natural resource management, including:

BLM, IDL, Idaho Governor's Office of Species Conservation, the National Interagency Fire Center, the U.S. Fish and Wildlife Service, the environmental group Western Watersheds, and Idaho Department of Fish and Game.

We developed a semi-structured interview protocol covering RFPA and agency wildfire protection priorities and decision-making during a wildfire event, influences on personal and collective decisions to form or join the RFPA, and opinions about past fire suppression conflict and how agency-resident relationships have been influenced by the RFPA. The semi-structured nature of the protocol allowed us to modify or ask clarifying questions based on the specific knowledge set of the interviewee(s) and to create new questions when the interview introduced a new topic or idea (Bryman, 2012). Interviews were conducted until saturation was reached- we agreed that no new themes or information were emerging from additional interviews and that any further data would only confirm already identified themes (Morse, 1995; Flick, 2013).

Analysis

All interviews were audio recorded and transcribed word-for-word. Data analysis consisted of analytic induction and thematic analysis. Analytic induction is a systematic, iterative process for uncovering emergent themes from qualitative data and testing those themes against subsequent observations in order to uncover data patterns that can explain causal relationships (Ryan & Bernard, 2000). Thematic analysis is a coding strategy that provides a systematic method for associating data with a particular emergent theme (Boyatzis, 1998).

Patterns and relationships identified in initial interview notes were developed and tested against new observations during the interview process and statements from interview transcriptions, a process referred to as 'progressive falsification' (Strauss & Corbin, 1990). We compared and compiled preliminary observations from interviews into initial themes, which the first author defined and provided examples of in a codebook. We tested the codebook by individually coding random interview transcriptions and comparing how and why each author coded particular datum into a given theme. Variations and contradictions in the data were used to modify existing or create new themes. We used this process to assess the appropriateness of the initial themes for data categorization and to ensure that the coding process was standardized. The first author used the codebook and multiple stages of increasingly restrictive coding to analyze the remainder of the interview data into themes and selected the most representative quotations of the remaining themes to exemplify those understandings (Boyatzis, 1998). The final themes and quotations were checked and evaluated by the second author.

Results

Factors Influencing RFPA Establishment

Interviewees described a pre-existing commitment to aiding each other during hardships, including wildfires, as one basis for the successful establishment of the RFPA. This 'neighbors helping neighbors' mentality (now the slogan for RFPAs) is the outgrowth of the importance locals place on protecting individual and collective livelihoods, perpetuating personal grazing leases or croplands, and faith that neighbors would assist them in times of need. RFPA members and agency professionals both recalled pre-RFPA instances when locals initiated suppression response or were recruited by professionals to

engage in suppression on public lands. Residents described the tradition of responding to

local issues, including wildfire, as part of living in a remote area and a need for farmers and

ranchers to take care of problems themselves. As one RFPA member described:

> …for generations there wasn't a BLM coming out and fighting and it was the communities out in Three Creek, everybody had to get together and go... It's kind of been the history, put your fires out and keep on going.

Interviewees described back-to-back burn years and episodic large-scale wildfire

events in the 2000s (i.e., Murphy Complex 2007) as impetuses for establishing the RFPA.

Interviewees reported difficulties finding alternative livestock forage when public allotments

burned, especially following larger fire events. The abundance of public lands meant that

private lands were comparatively scarce and could not sustain an operation long-term. As

one RFPA member described:

> Most of the operations out here are totally dependent on public lands. We are like ninety percent public lands and so other places where you're like fifty or sixty percent public lands you can probably survive if you didn't have your BLM permit. But we are just pretty dependent on it.

Agency professionals described how the strong local interest in protecting forage on public

lands was important for RFPA establishment. As one stated:

> … there has to be a want. At the grassroots level, at the rancher/farmer level the rural land owner needs to want to start it. Because, the BLM can want it, the state can want it. If the folks on the ground don't want to form a group they're really not going to form one.

Some of the remote lands in Three Creek previously had little or no suppression

response capacity, which, when paired with rancher reliance on those lands for forage,

raised interest in a volunteer suppression program like the RFPA. Professionals and

residents both recognized that agency firefighting resources were spread too thin to deal

with the local wildfire problem alone. As one RFPA member described:

… somehow the Federal Agency decided that if we could get ranchers who knew the country, their country and the rest of the country and the water sources and everything better than anybody else that they could be a huge benefit.

Support for RFPA establishment also was motivated by the convergence of local and agency concerns about management of sage-grouse habitat in the southern portion of the jurisdiction. Interviewees noted that wildfire is considered one of the principle threats to sage-grouse habitat and that the potential listing of the sage-grouse under ESA in September 2015 was one point of unification between local and agency interests in enhancing local suppression capacity. As one rancher articulated: "Primary concern is, is sage-grouse habitat because they get listed and then who knows? You could be off... ranching might be over with out there." Although interviewees agreed that the RFPA would have formed in the absence of sage-grouse concerns, some suggested that policies and funding for protecting sage-grouse habitat from wildfire assisted in RFPA establishment.

Key individuals from the RFPA served as important connections to land management or firefighting agencies and for facilitating a shared set of guidelines and standards for how the RFPA would operate. Key individuals also helped identify mutual land management concerns and codify or coordinate interactions between locals and professionals responding to wildfires on public lands. Many RFPA leaders came from a long legacy of ranching or farming and families who had lived and worked in Three Creek for generations. They were often respected and trusted by their peers. They had political connections and experience representing their community through various platforms including the local Cattlemen's Association, which interviewees stated was an important space for discussing the RFPA idea with the larger ranching community. As one RFPA member described:

> That's been the community down here. They [cattlemen] all make things work because they've got that 71 livestock association that just gets everybody together and addresses issues for the region and discusses things. That's been the history for the region.

Interviewees also described key BLM or IDL professionals whose receptiveness to rancher concerns and collaborative suppression planning or willingness to assist locals with acquiring suppression response resources (i.e. grants, radios, equipment) were key to RFPA establishment. Many residents noted that these managers represented an important change when compared with the previous generations' approaches to local concerns, and which helped resolve historical tensions over wildfire management. Likewise, the more open dialogue between these key individuals and local landowners allowed the development of a partnership that met everyone's needs. As one RFPA member recalled:

> … this was an old timer [agency professional]. He said ... 'You don't want us on your land and we don't want you on ours,' and I said, 'Whoa!' I thought a minute, 'This is my land!' That one really put me in about-face. That generation since then has since gone on, they're retired out, and the new generation has got a whole different outlook.

Interviewees suggested that agency-local relationships had historically been positive in Three Creek and that this history contributed to the successful establishment of the RFPA. As one RFPA member described:

> One of the advantages we have out here is we actually have a very good relationship with the BLM. A lot of places are extremely confrontational…they'll just do everything they can to fight with the BLM. I don't think an RFPA works in that type of environment.

Influences on RFPA Functioning

Trained RFPA members reported that the mandatory BLM firefighter training was important for learning how to engage in suppression efforts within the ICS. Training was described as particularly important for understanding fire behavior and identifying unsafe

situations to avoid during suppression. The training clarified agency firefighting regulations and decision-making options, which helped assuage lingering hard feelings toward and mistrust of agency firefighters arising from past fire events. As one rancher described:

> …there's some tactics that a guy's got to go through to get around the fire and make it work and lots of things that go into it that a guy didn't think about before he took the class... I'm one to just run in and then all a sudden 'Oh, shit. Now what do I do?'… It's really helped my mind to realize how they fight it and how they go about it.

Participants mentioned that the training helped dissolve suspicion that agency firefighters were intentionally failing to take suppression actions because they would get paid more the longer they worked on a fire or because agencies wanted grazing off public lands. Interviewees suggested that the training and initial experiences suppressing fires together were important opportunities for agency professionals to learn about the knowledge, assets, and suppression skills locals possessed. They also allowed professionals to see that residents were serious about contributing to suppression efforts in a safe way. These experiences helped facilitate a strong collaborative partnership where locals and agency firefighters trusted each other to do their best to work towards common suppression goals. As one RFPA member described, "My personal feeling visiting with the actual BLM firefighters, they want us there about as bad as we want to be there to help."

Local participants and agency officials both described RFPA members' local knowledge—the location and condition of roads, water resources, and recently grazed areas that could provide fuel breaks—as particularly valuable for decreasing suppression response time and fostering a more effective suppression response. Many interviewees noted that maps were not reliable for determining the shortest and fastest route to a remote fire and nearby resources and that locals could be a better source of accurate information. In this

way, RFPA contributions could be broader than providing physical resources to the fire. As one agency professional described:

> I mean these guys are out on the desert every day and they know where they've got water right now and they know which water sources are going to last all day, filling engines and which ones aren't and they know the best way to get places.

RFPA members' presence across the remote jurisdiction provided a network for quickly reporting fire and smoke sightings directly to agency dispatch using RFPA radios. This quick detection and communication with dispatch could decrease the time from sighting to suppression response regardless of whether RFPA assets were able to respond before agency professionals. Likewise, the RFPA selected its Board of Directors so that RFPA leadership would be distributed throughout the jurisdiction. This would enable the Board to respond quickly or respond to multiple fires at once, as local weather events sometimes generated concurrent wildfire ignitions. As one director explained:

> We stayed up here. He [another director] went down and helped them out. He did whatever he needed to do down there. We stayed in this area instead of going to help in case something started up on this end. It's not that far but, it's far enough if something starts here we don't want to be down there.

Locals and professionals identified the RFPA's ability to contribute privately owned large equipment (i.e. dozers, discs, graders, water tanks) as particularly valuable to effective wildfire suppression in the local sagebrush-steppe and grasslands. Interviewees considered the involvement of local farmers in the RFPA as especially beneficial because farming operations commonly had such large equipment. As one fire professional described: "Instead of showing up in a cowboy hat and a pick up, these guys are showing up with huge tractors and discs and stuff and I'm like, yah!" RFPA members often had personal equipment stationed on their private lands and dispersed throughout the jurisdiction. This decreased the distance between a wildfire event and a suppression asset because agency

assets often needed to travel from a central station. The Three Creek RFPA and agency

collaborators worked together to stage private equipment closer to fire-prone areas (see

Figure 3) and were considering plans for establishing additional staging areas on public
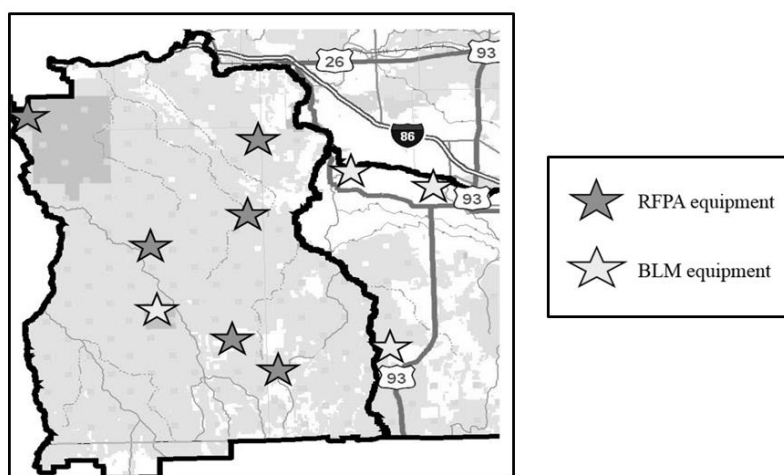
lands.

Figure 5: The location of staged BLM and Three Creek RFPA equipment
(Source: Anthony, 2016)

 RFPA members largely perceived their role in suppression as initial response before

or an additional asset to agency initial attack efforts and considered themselves "ranchers,

not firefighters." RFPA members respected the professional experience of BLM firefighters

and largely preferred that BLM professionals be responsible for decision-making during

collaborative suppression efforts. This perspective helped RFPA members, who were

accustomed to collaborating informally on wildfire suppression, assimilate into the formal

ICS. As one RFPA member described:

> If we're the first one on a fire, we're taking care of it until they [the BLM] shows
> up… I   put my 12 hours in, I got to go check water, "See you, bye!" I have a job to
> do also. I can go out and help as much as I can, but I also got to take care of [my
> farm].

Discussion

The purpose of this study was to better understand the local context that influenced the establishment of the Three Creek RFPA and guides its functioning. We found that intergenerational ties to "working the land," an existing culture of reciprocity among neighbors, place-based knowledge and experience, a culture of self-reliance, and informal social networks all contributed to the way the Three Creek RFPA formed or operates. Many of the social characteristics we identified as salient to local collective action were similar to those summarized in Paveglio et al.'s (2015) description of working landscape WUI communities, and extend its potential use to rangeland environments. Characteristics that could potentially discourage resident collaboration with land management agencies were largely overcome through the identification of common fire management goals and priorities. Common goals were the result of converging circumstances that encouraged both agencies and RFPA members to work together and better recognize the unique skills or resources they could each contribute to wildfire management. Broadly, our results mirror other studies suggesting that local characteristics and values influence the applicability of wildfire policy and mitigation actions among unique populations (Shindler, Brunson, & Stankey, 2002; Paveglio, Carroll, & Jakes, 2010). In the following paragraphs we expand on the above points and discuss additional research that can advance understandings about wildfire mitigation adaptations in working landscape communities.

The development of RFPAs in Idaho can be partially attributed to favorable timing and circumstances. A number of federal agency, state and local priorities regarding wildfire management on rangelands aligned to motivate new means for allowing private participation in wildfire suppression on public lands. For instance, the incidence of larger and more

damaging wildfire events, paired with agency directorates to moderate non-native species invasion (RFTF, 2015), made it necessary for both BLM professionals and locals to look for alternative means to quickly suppress wildfires in remote rangelands. Put another way, changing circumstances forced agencies and locals to realize that pre-RFPA suppression capacity could not keep pace with increasing fire risk, and that collaboration among stakeholders was needed to augment that suppression capacity. Likewise, state and local support for the development of RFPAs, influenced by concern over economic losses and pressure to manage critical sage-grouse habitat, helped open up the institutional and legal opportunities for RFPA formation.

Our results and the discussion above suggest that the local culture and context of populations in the Three Creek area were a critical part of the circumstances that continue to influence RFPA functioning. This reflects a growing recognition that fire mitigation must respond to local context when determining what types of partnerships will be most effective in promoting wildfire mitigation (Jakes et al., 2007, 2012; McGee 2011; McCaffrey, Toman, Stidham, & Shindler, 2013). For one, the threat wildfires pose to local livelihoods in the area were a powerful impetus for mobilizing collective action, which reflects existing work on the subject (Loomis & González-Cabán, 1994; Flint & Luloff, 2005; Paveglio et al., 2015). Local dependence on public lands for grazing necessitated resident collaboration with public land management agencies to mitigate risks to forage resources despite preferences to implement mitigation strategies themselves and to avoid government involvement in solving local problems (Jakes et al., 2007; Huntsinger, Forero, & Sulak, 2010; Paveglio et al., 2015; Paveglio, Carroll, Hall, & Brenkert-Smith, 2015). Similarly, agency fire professionals were willing to incorporate locals into suppression in order to enhance response efforts across the

remote jurisdiction and better meet their quick suppression response objectives. Back-to-back burn years in the Three Creek area and large-scale wildfire events challenged many locals to maintain viable operations without taking suppression actions. Similar findings are suggested in economic models linking how wildfire frequency and extent can lead to increases in ranching operation bankruptcy (Brunson &Tanaka, 2011; Gordon, 2012). The introduction of RFPA policies allowing citizen involvement in wildfire suppression response on public lands better reflected the local culture of independence and action. The RFPA was viewed favorably by local residents because they were able to take additional responsibility for protecting their livelihoods and private property on public lands. Agency support of resident concerns and interest in contributing to wildfire mitigations on public lands also influenced that perception.

Establishment of the RFPA and its operation in Three Creek provided a means to improve relationships between local residents and land or wildfire management agency professionals. Ranchers' and farmers' vital roles in supporting wildfire suppression, and agency professionals' opportunity to better understand or utilize local knowledge helped assuage anger over past wildfire suppression actions. It also helped both groups better appreciate the resources and skills their counterparts could bring to the table. For instance, the BLM firefighting training provided important opportunities for exchanging information about wildfire tactics and local conditions, and clarified fire management decision-making processes. These findings reflect overarching lessons from the fire literature outlining the importance of communication and trust among diverse stakeholders when facilitating mitigation programs across broader landscapes (Paveglio, Jakes, Carroll, & Williams, 2009; Olsen & Shindler, 2010; McCaffrey, Toman, Stidham, & Shindler, 2013). Trust and

collaboration were particularly important in this case because residents of working landscapes are more likely to protect their properties during fires rather than evacuate, may have informal experience suppressing fires (Brenkert-Smith, 2011) and are more likely to witness agency suppression response due to working the land. As a result, these residents can be critical of the timing and type of decisions fire managers make during wildfire suppression. The training and subsequent integration of local residents into wildland fire suppression helped clarify the regulations and limitations of agency suppression efforts. Similar initiatives and efforts may help mitigate conflict over wildfire management in other working-landscape contexts.

The formation of RFPAs like the one in Three Creek could be argued as a partial return to historic approaches to agency-citizen collaboration during wildfire suppression. Historic policy in many areas of the U.S. West was to employ or recruit local citizens in helping to suppress wildfires on public lands due to a lack of resources (Pyne, 1997). The advent of specific training standards for RFPA members and formal coordination with firefighting agencies through ICS help make the most of local resources while reducing any additional burdens (e.g. added safety concerns, the need to modify tactics) that firefighting professionals might encounter when citizens are present during an active fire.

We are not suggesting that RFPAs are a comprehensive solution to wildfire management in rangeland environments. RFPA establishment and functioning will likely vary across different local contexts and more work needs to be conducted to document how different local contexts might affect their operation. For example, the Three Creek RFPA collaborated primarily with the BLM, the dominant land 'owner' in the study area. We need to better understand how RFPAs will operate in a more complex environment where multiple

suppression entities are involved and may have different management priorities and limitations. RFPAs may also function differently in rangelands broken by exurban development, especially when there are more structures or civilian lives at risk. Local biophysical conditions, such as fuel type and terrain, and whether residents own large equipment may influence the role local volunteers can play in wildfire suppression activities. It is also important to note that the basis behind RFPA collaborations need not always be focused on suppression. Residents unable to engage in suppression may still be interested in forming an RFPA and taking the training in order to perform actions, such as access public allotments during a wildfire event to move livestock (Paveglio, Carroll, & Jakes, 2010) or contribute local knowledge to suppression or wildfire restoration logistics (Carroll, Higgins, Cohn, & Burchfield, 2006; Brunson & Peterson, 2007).

Our results do suggest that RFPAs have the capacity to augment fire management capabilities and build collaborative relationships in some systems, so long as resident and agency priorities prioritizing quick suppression continue to align. We do offer two cautions in thinking about the longer-term place of RFPAs in wildfire management. For one, it is conceivable that quick wildfire suppression might not be the primary management goal in some ecological systems. In these cases, negotiating the role of and obtaining support for RFPAs may be a very different endeavor. It is also conceivable that tremendous success at excluding wildfire in rangeland systems, bolstered in part by RFPA partnerships, will result in future wildfire management challenges. This was one historic lesson from wildfire management in forested systems, and while this situation may not result in the same issues (overstocked fuels), other unforeseen repercussions should be considered.

There are few collaboration 'success stories' in the Great Basin (Shindler, Gordon, Brunson, & Olsen, 2011) and existing social science research suggests that working landscape residents may be wary of government entities and prefer to conduct wildfire mitigation actions themselves (Jakes et al., 2007, Paveglio et al. 2015). Our study provides one example of a partnership between Great Basin residents and agencies that is seen by both groups as a positive advancement in land management. Likewise, the formation and utilization of RFPAs in southern Idaho is an example of one policy innovation that may enhance the survival of working landscape communities affected by accelerated wildfire cycles. Additional documentation of how RFPAs function, and best management practices associated with their functioning in various social, political or ecological contexts will help further develop this promising avenue for fostering personal responsibility for wildfire mitigations among one segment of the general public.

CHAPTER THREE: Future challenges for RFPAs

The previous chapter provided some insights about the applicability of the RFPA program to other working landscape communities in the U.S. West. This section expands on these thoughts by discussing some concerns about the continuation of the RFPA program. I will first discuss some trepidation relevant to the continued functioning of RFPAs in Idaho. I will then propose some factors that may influence establishment of additional RFPAs in Idaho and suggest how the program might grow in Idaho and other states. Finally, I discuss other needs and circumstances communities with RFPAs may have as they progress toward fire-adaption.

Many wildfire social science studies recognize key community leaders as important for motivating collective wildfire mitigation actions (Jakes et al., 2007; Paveglio, Carroll & Jakes, 2010; Paveglio et al., 2015). These leaders often "champion" wildfire mitigation efforts in a community by mobilizing residents and resources to address the local wildfire risk. Leaders can also be important role models for other community members; they may set the example of what a fire-safe property looks like in the community or model how to interact with agency liaisons. These key leaders often become the drivers of local wildfire mitigation initiatives, such as establishing and maintaining a community-based fire program effort (e.g., Firewise Communities/USA, RFPA) or convincing peers to participate in a fuel reduction project. However, community leaders can move out of a community, pass away, or retire from the leadership role. The loss of this community leader can derail or smother community-based wildfire mitigation efforts. The continuance of the program/initiative is often tied to whether a capable successor was identified before the initial leader(s) left or whether there is another interested individual willing to take on the leadership role.

Additionally, differences in leadership personalities, styles, and relationships with peers can influence how the program functions in the community. This loss of leadership or leadership fatigue has been noted as one reason some wildfire programs have dissolved over time (Steinberg, 2011).

Our results suggest that the loss of 'local champions' may be of similar concern for the longevity of the RFPA program. Leaders in our study were important recruiters and mentors, had experience with and connections to political networks (which made them valuable community liaisons to agencies), and were ardent about enhancing the capacity of the RFPA through various avenues (e.g., policy changes, new partnerships, grant money). Many interviewees stated that the personalities of the leaders were important for RFPA establishment and functioning; in other words, interviewees noticed and considered the way these individuals interacted with peers, agency liaisons, and politicians as important. These leaders also took on many of the responsibilities and formalities that other members did not have the time to address in addition to their occupations and other commitments. Rural communities, such as ranching or farming communities, may struggle to recruit leaders in comparison to other community archetypes discussed in Paveglio et al. (2015). Some suggest that difficulty recruiting leaders in rural areas may be linked to how leadership roles are perceived in urban and rural contexts. Pigg (1999) suggests that thinking of leadership as relationships (informal) rather than formal positions with titles and responsibilities could help motivate some rural residents to "get involved" or "be a leader". In our case study, some interviewees stated that RFPA leaders came from a family legacy of leaders who had championed local problems for the community in the past. However, many rural communities are experiencing demographic changes where the younger population is

leaving the rural community. Considering this trend, will RFPAs be able to recruit replacements for RFPA leadership and involvement long-term?

Some studies have shown that interest in wildfire mitigation programs can initially increase following a wildfire event because the event unifies the community and acts as a catalyst for action (Jakes et al., 2007). However, this reactionary interest may dissipate over time. Individuals may become less concerned with taking wildfire risk mitigation actions when they perceive that the action(s) will not be effective and/or worth the trade-offs (Steelman, 2008). Individuals who participate in RFPAs in Idaho are required to take wildland firefighter training and obtain annual re-certifications in order to engage in suppression efforts. RFPA members may not want to invest the time required to get recertified if they do not get the opportunity to engage in suppression efforts. In other words, the ability to engage in suppression efforts may not be perceived as worth the number of hours required for wildland firefighter training. However, areas that have RFPAs in Idaho may be less likely to experience this type of membership fatigue because wildfire events, especially large-scale wildfire events, tend to occur more frequently in southern Idaho than in other locations in the West. Some studies suggest that fire return intervals in the Great Basin Desert average at approximately every five years (Brooks et al., 2004). However, rangelands and their fire regimes are diverse and not every human community with an RFPA will experience wildfires at this interval. It is unclear how time between wildfire events influences RFPA member retention and whether volunteers will continue to participate in the wildland firefighter re-certification training if opportunities to apply that training to suppression do not materialize. Will RFPAs become a post-fire reaction in some

ranching communities and, like some other wildfire mitigation initiatives, decrease or disappear from a certain communities over time?

RFPA program growth in Idaho is a partial product of funding from the state. Idaho Code 38-104B mandates that the formation of a new RFPA in Idaho is contingent upon available state funding to help with the initial start-up costs (i.e., training, PPE, radios). The cost of establishing an RFPA in a given area is partially influenced by the number of participating members interested in receiving the training and participating in fire suppression, especially since the cost to train and equip one individual is approximately $1,000 for each member. If a 'bad' wildfire season prompts a large number of individuals to express interest in forming an RFPA, or multiple RFPAs in different locations, the state of Idaho may have to limit the number of individuals who can join RFPAs that year to remain within the limits of their budget. Funding for sage-grouse conservation efforts may provide additional funding sources for meeting RFPA needs, but this funding may not be available or relevant in all local contexts interested in RFPA formation. The presence or absence of sage-grouse habitat may influence the ability of a group to form an RFPA, especially in years when there is high interest in RFPA formation and insufficient monies in the state budget.

The longevity of existing RFPAs will likely also be dependent upon whether each RFPA can sustain its own funding long-term. The Three Creek RFPA sustained funding by collecting annual membership dues of approximately $250 from each member operation (i.e., ranch, farm, or company) to fund liability insurance, participate in grant-matching opportunities, and create a funding reserve from which individuals could be reimbursed for costs associated with operating personal equipment during RFPA suppression efforts.

However, if increases in wildfire size and frequency continue, it is plausible that RFPA

operation costs will increase and RFPAs may be pressured to come up with more capital.

Interviewees had mixed opinions about whether there was a point at which the membership

costs would become prohibitive to RFPA participation or membership, and few could

articulate a distinct monetary value at which they would cease to participate in the RFPA.

However, some RFPA members shared concerns that the monetary costs and time required

to actively participate in the RFPA were already nearing or surpassing a personal threshold.

They noted that this was particularly evident when they compared the resources at their

disposal (e.g., money, time, equipment) to other members who owned or were affiliated with

larger operations with more employees and financial resources.

RFPAs ideally enhance suppression efficacy and safety while also integrating the

knowledge, skills, and resources of local communities into agency wildfire management.

However, areas with RFPAs may still experience conflict between agencies and residents

over wildfire management. Existing wildfire social science research suggests that conflict

between local residents and fire professionals can have a long-term legacy and influence on

future wildfire management, particularly in agricultural or rural communities (Paveglio,

Carroll, Hall, & Brenkert-Smith, 2015). Documenting the legacy of past wildfire conflict

and any actions residents will likely take when a wildfire event occurs in an area may help

agency fire professionals anticipate how local residents will react to firefighter presence and

help managers anticipate actions locals may take that could prompt conflict or safety

concerns.

Areas with RFPAs are often affiliated with a history of conflict around wildfire

management due to both agency and resident concerns. Local grazing permittees and

farmers with croplands adjacent to public lands were frustrated with the inability to mitigate wildfire risks to their livelihoods by suppressing wildfires on public lands. Some locals had historically taken actions to suppress wildfires in the area, on private or public lands. These actions created liability concerns for fire managers who had to worry about the safety of agency firefighters untrained civilians on the fire line. These liability concerns resulted in policies that prohibited locals from responding to wildfire events on public lands, which at times needed to be enforced. The RFPA program helps mitigate conflict over wildfire management by meeting the involvement expectations of residents while considering the safety concerns of agency officials who interact with RFPA members on a local wildfire event.

Most BLM and IDL firefighters stationed in southern Idaho are aware of RFPAs and how to involve them in suppression efforts. The large-scale nature of wildfire events, which are occurring more frequently in the region, means that local capacity to deal with wildfire events are often exceeded. Consequently, extra-local IC teams may subsume jurisdiction on wildfire events where RFPAs exist and operate. One example of this is the Soda Fire, which occurred in August 2015 in southwestern Idaho where the Owyhee RFPA is established. It is unclear what role, if any, the Owyhee RFPA played in suppression efforts on the fire before or while the Type 1 and 2 IC teams were present, or if there was any conflict. Additionally, other states are progressing towards or considering adopting RFPAs as a mechanism for enhancing local suppression capacity (i.e., Nevada). The growth of the RFPA program and incidence of large-scale wildfire events increase the potential for RFPAs to interface with, and potentially clash with, extra-local entities that may be unaware of the existence of RFPAs. This highlights a need to ensure that the larger wildfire management community is

aware of RFPAs and the role they can play in wildfire management in Idaho, Oregon, and new states implementing the program.

A community that establishes an RFPA is not automatically 'fire-adapted.' RFPAs are designed primarily to enhance local capacity to respond to wildfire events. However, other elements of social adaptation to hazards include: (1) the ability anticipate and take actions to mitigate risks, (2) the capacity to utilize local networks to promote recovery following a disturbance event with minimal assistance from outside actors, and (3) the ability to continuously adapt actions, information, and networks to changing conditions (Wall and Marzall, 2006). Many RFPA members and fire professionals in our study mentioned that the RFPA program did not meet all of their wildfire concerns. Some were considering the ability of RFPAs to participate in extend attack, a situation where a wildfire cannot be contained by initial suppression forces within a certain amount of time. During extended attack, new or additional resources assume primary responsibility for the wildfire so initial responders can provide initial attack on other incidents. The involvement of RFPAs in extended attack would further motivate the interaction of Type 1 and 2 teams and RFPAs, although many interviewees stated that one of the motivations for forming the RFPA was to keep extra-local teams from subsuming jurisdiction. It is unclear what measures might be taken by agency fire professionals or local RFPA members to mediate potential conflict between the two entities. Future research efforts can investigate integrating RFPAs into extended attack and mitigating conflict between local RFPA members and extra-local IC teams.

Many individuals participating in this research expressed their interest in contributing to wildfire prevention efforts such as prescribed burns or fuel reduction

projects. Some Three Creek RFPA members had previously collaborated with state and federal land managers to implement prescribed burning projects by removing and replacing fence in advance of or in the wake of the prescribed fires. However, this is only one case. Integrating RFPA members into other wildfire mitigation projects may be alien to many managers and locals. Conversely, the relationships built during RFPA establishment and subsequent experiences suppressing wildfires together may provide a foundation from which to build these other partnerships.

RFPA integration into additional roles (e.g., prescribed burning, fuel reduction projects) may be difficult to realize or controversial. Apart from policy barriers or additional training requirements, some RFPA members may not consider some of the additional roles appropriate or within their abilities. For example, some RFPA members already feel they have less time to participate in RFPA activities than other members. Participating in additional RFPA activities could be difficult or impossible for these members. Additionally, the broadening of RFPA responsibilities could exceed what some members perceive as a common goal, which can result in the loss of collective interest and even decreases in membership. A study of CWPP development and implementation suggests that some stakeholders believed that linking the CWPP to other activities or plans would not be beneficial. For example, stakeholders in Oregon "were hesitant to link or embed the CWPP in other ongoing efforts for fear that the CWPP structure, goals and projects could be buried or lost within a broader framework," (Jakes et al., 2011, p. 356). RFPA members could have similar concerns about RFPA suppression goals or resources becoming lost or embedded in other projects. It may be beneficial for the RFPA to retain its primary focus as a

suppression-focused organization and for individuals interested in prevention or recovery-focused projects to form a separate organization to address those issues.

The RFPA represents a social adaptation to the frequent and large-scale wildfire events threatening local livelihoods in southern Idaho. It also represents a management adaptation for keeping wildfires smaller and protecting sage-grouse habitat. However, our study area, and much of the Great Basin, still faces the task of progressing towards long-term ecological and social adaptation to wildfire, often through wildfire prevention and recovery efforts. A hand-full of these potential efforts include mitigating juniper encroachment and invasive species spread, promoting sagebrush re-establishment post-fire, managing ex-urban development, and enhancing the ability of policies such as post-fire grazing restrictions and prescribed burning to adapt to local and often site-specific contexts. Rangeland communities, management agencies, and policymakers in southern Idaho may be able to assist progressing some communities toward 'fire-adaptation' by promoting RFPAs, but other organizations and initiatives will likely be needed to address longer-term natural resource issues and help populations address their wildfire risks.

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