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Exploring Wildfire-Prone Community Trust in Wildfire Management Agencies

Rebecca Rasch and Sarah McCaffrey

This research examines how trustworthy wildfire management agencies are perceived to be in five wildfire-prone communities. Trust was most often expressed in the context of agency abilities or competence (calculative trust), whereas distrust was framed in the context of intentions or the belief that the agency is not acting in the best interest of the community (relational trust). Five factors identified as closely tied to an individual's trust in wildfire agencies are: communication from the agency; perceived relations among different management agencies, as well as between agencies and the public; experiences with wildfire agencies, particularly during wildfire events; experience with prescribed burns; and values or preferences for management actions. Managers hoping to build, maintain, or restore trust with communities may need to work on building a reputation of both competence and intention to act in the best interest of the community. Results indicate that level of trust in agencies varies considerably, both across and within communities, but that applied at the right scale, the wildfire community archetype framework, a method for rapidly identifying the level of adaptive capacity in wildfire-prone communities appears to be a relatively good indicator of the level of trust community members have in an agency's abilities.

Keywords: wildland fire management, calculative trust, relational trust, wildland–urban interface, social diversity, hazards human dimensions of wildfire

Wildland fires are increasing in frequency and severity across the United States, and, as more structures are built near forest boundaries, more homes and communities are at risk. Given that effective fire-risk mitigation cannot stop at property lines, addressing this risk will require the involvement of a range of stakeholders from homeowners to federal fire managers and thus requires strong partnerships across land ownerships to identify common goals and desired outcomes for wildland fire management. Trust has been shown to be an essential element in building and maintaining partnerships and relations across agencies and communities (Winter et al. 2004, Borrie and Liljeblad 2006, Absher and Vaske 2011, Lachapelle and McCool 2012). Therefore, in order to be successful in their mission, agencies must give due consideration to how their actions foster and maintain public trust.

In social science literature, trust has been shown to be a complex social construct that can be defined in many ways. A common definition of trust includes three components: competence, benevolence, and honesty (Grimmelikhuijsen 2012). Competence describes how much people trust an agency to effectively complete specific actions. Benevolence is related to intentions, i.e., whether someone is acting for the good of others, as opposed to acting in their own best interest, or in the interest of a powerful few. Honesty relates to communication and transparency: whether someone is accurately representing themselves and/or their actions.

In the fire social science literature, Shindler et al. (2014) describe the components of trust as: ability, goodwill, and integrity. This framework closely mirrors the competence, benevolence, and honesty decomposition described earlier. Although integrity is framed as relating to how well one's behavior aligns with another's norms or values, it is demonstrated through transparent and honest actions. This component of trust is related to honesty (Grimmelikhuijsen 2012), but it is not synonymous. Earle (2010) draws on another trust framework, where the key distinction is between relational trust and calculative trust. The former deals with intentions, and the latter is more concerned with past experience and demonstrations of competence. Although each trust framework has its nuances, a uniting theme is the differentiation between ability and intentions. When considering how trustworthy someone is, it appears that people ask themselves two main questions:

- Can this person do the task well? (calculative trust, ability, competence)
- Will this person do the task that is in my best interest? (relational trust, benevolence)

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Affiliations: *Rebecca Rasch (rrasch@fs.fed.us), Social Scientist, USDA Forest Service, Northern Region, Building 26, Fort Missoula Road, Missoula, MT 59804. Sarah McCaffrey (smccaffrey@fs.fed.us), Research Social Scientist, USDA Forest Service, Rocky Mountain Research Station.*

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At a general level, lack of trust in government agencies, particularly the Forest Service, has been found to be a significant barrier to achieving land-management objectives through collaborative processes (Lachapelle and McCool 2012, Stern and Coleman 2015, Urgenson et al. 2017). Smith et al. (2013a) employed quantitative methods to study trust between communities and management agencies, drawing on a comprehensive scale and survey techniques to identify levels of trust. Interestingly, and counter to expectations, they found that trust was negatively associated with participation in comanagement processes (Smith et al. 2013b). Trust, however, has been positively linked to increased social acceptance of land management actions, which is often the primary goal of wildfire managers, as opposed to increased public participation in decisionmaking (Toman et al. 2011).

In the context of wildland fire management, social science research has explored both the relevance and predictors of trust. Trust between agencies and communities has been shown to provide fire managers with more flexibility in their choice of firefighting strategies and residents with more certainty during the stressful events of wildfire (Steelman and McCaffrey 2013a). Although Toman et al. (2011) found a significant association between trust in an agency overall and acceptability of fuels management efforts, confidence in a manager's abilities (i.e., competence) to implement a specific treatment was the only form of trust found to be a significant predictor of social acceptance of prescribed fire and forest thinning.

Researchers also have found that face-to-face communication is a means of building or maintaining trust before, during, and after wildfire events (Olsen and Sharp 2013). In a comparative analysis of wildland fire management across Canada, the United States, and Australia, researchers found that fieldtrips, small demonstration projects, and home assessments were all effective trust-building activities, as they included elements of face-to-face communication and opportunities for relationship building (Shindler et al. 2014). Lachapelle and McCool (2012), in their study examining community wildland fire protection planning in two Montana communities, found that the two elements most important for building trust within a collaborative planning context were transparency and effective leadership. Leahy et al. (2004) provide similar recommendations in their work addressing trust-building between local communities and land managers suggesting that trust-building requires both increased communication and opportunities for participation in decisionmaking processes.

Davenport et al. (2007), in their study of local communities near the Midewin National Tallgrass Prairie, found that shared values (integrity) were a key component for building trust. They find that greater interaction between the parties has the potential to build relational trust, but only in the event that the interactions are positive. As expected, they suggest that negative encounters can quickly degrade trust. Specific to fire, Olsen and Sharp (2013) also found that meaningful engagement is an important element in building trust: in both the United States and Australia when the public was provided with opportunities to provide input, and fire agencies were able to demonstrate how that input would be used, the public was more likely to develop trust in the agencies.

The presence of shared norms and values (integrity) has also been shown to predict trust in wildfire management agencies (Winter and Cvetkovich 2002, Liljeblad et al. 2009). Winter and Cvetkovich (2002) found that whereas the perception of shared values was a significant predictor of trust, the effect was moderated by consistency of action with values. If community members felt the Forest Service shared their values but did not see the organization acting according to those values, their trust in the agency decreased. The presence of nonlocal entities during wildfire events has also been shown to create social conflict and impede the ability of wildfire agencies to build trust with communities (Carroll et al. 2006).

Although wildfire social science research has begun to identify important dynamics shaping public trust of agency fire management efforts, a key question is how these variables might play out differently in different types of community. To begin to identify how social dynamics might vary by community types, Paveglio et al. (2015) conducted a meta-analysis of 18 case studies to categorize communities located in fire-prone landscapes and identified four distinct community archetypes conceptualized along a continuum of urbanization and development: from more formalized suburban WUI communities to high amenity, high resource to rural lifestyle to rural working landscape/resource-dependent communities. Formal communities are typically located close to larger urban areas and centrally planned (e.g., formal subdivisions with homeowner's associations). On the other end of the continuum, less formal communities typically contain low-density housing development and less expectation of government services such as road maintenance, and residents are more accustomed to managing independently (Paveglio et al. 2015).

The archetypes are distinguished based on 14 adaptive capacity characteristics, one of which is level of trust in government, which decreases down the continuum, with trust in government expected to be present more often in formalized, suburban communities, whereas less formal communities tend to be more distrustful of government. More formal communities are often more dependent on government institutions for a host of public services and, thus, may have a greater need to trust them (Liljeblad et al. 2009, Paveglio et al. 2015). People in less formal communities are typically more reliant on neighbors than institutions for support and, therefore, may be more likely to trust their neighbors than government agencies (Paveglio et al. 2015). Paveglio et al. (2018) suggest that the archetypes can be used as a means of exploring comanagement "pathways" for communities to adapt to wildfire. Managers can use

Management and Policy Implications

Experiences with prescribed burns were rarely related to expressions of trust, yet often noted in the context of distrust. Managers may have more success obtaining social acceptance of prescribed burns and other fire management activities by establishing credibility with community members before they commence the planned management action by highlighting their credentials, experience with fire management, and the factors that influenced their decisions including the goals of the project, the role nonlocal bureaucrats play (if any) in the decision, and how local knowledge has been incorporated into fire management planning. Trust was most often expressed in the context of agency abilities or competence, whereas distrust was framed in the context of intentions or the belief that the agency is not acting in the best interest of the community. Managers may need to work on building a reputation centered on both competence *and* the intention to act in the best interest of the community. Either element on its own is unlikely to be sufficient. Importantly, officials leading with an approach of shared values and pure intentions will not have success building trust without directly addressing the issue of competence.

the archetypes as a first step in assessing the likely local adaptive capacity characteristics, including trust, as a first step in tailoring management efforts to local conditions and needs.

Given the importance of trust in the wildfire management context, this research explores what factors influence trust or distrust of wildfire agencies in five distinct wildfire-prone communities. Drawing on focus group data from five wildfire-prone communities in the Western United States, this paper explores how trustworthy communities perceive wildfire agencies to be and the degree that key factors vary within and between communities. Finally, we assess how well the archetype expectations of how trust may vary by community fit our findings.

Methods

This study draws on transcripts from 15 focus groups conducted in the summer of 2014 in five fire-prone locations—San Bernardino, California; Boulder, Colorado; Flagstaff, Arizona; Reno, Nevada; and Hamilton, Montana. The focus-group work was a followup to a focus group study conducted in the same locations in 2004 (McCaffrey 2008). The five sites were originally selected in 2004 to obtain perspectives from a range of communities affected by fire—from more rural/resource-dependent to urban/recreational communities. History of wildfire, continuing risk of future wildfire events, and proximity to public lands were also taken into account.

Participants were recruited by a professional facilitator via phone calls using a sample list that geographically targeted WUI areas in each community. Three focus group sessions were conducted by the facilitator in each location. Overall, 153 wildfire-prone community residents participated in 15 focus groups, which contained a mean of 10 participants (minimum of five and maximum of 14) (Table 1). As the goal was to gather perceptions from the general public (i.e., the "less involved" or middle 80 percent of the public, rather than those with a clear interest in land or fire management), anyone with direct ties to fire management, air quality management, or the timber industry was excluded. Quotas for age groups, gender, and income were set to ensure that an appropriate mix of demographic groups was achieved in each location. Approximately one-third of the focus group participants in 2014 also were participants in the 2004 study. All sessions were recorded and transcribed verbatim.

Participants were asked to address a range of topics related to knowledge of and preferences for wildfire management and mitigation. The facilitator concluded each session by asking participants about their views of fire management agencies and provided them an opportunity to offer any advice to management agencies. Although some participants expressed their views of wildfire management agencies during other portions of the discussion, there was also a distinct section of the protocol designed to collect public perceptions of these agencies.

We used NVivo software to analyze the transcript data. The coding structure was developed jointly by the authors through conversation and discussion of relevant themes. Individual coding was then conducted by the authors separately and then reviewed in tandem to ensure consistency. Transcripts were coded according to the general themes of the topics discussed. The main themes were: fire-adapted communities, fire management, homeowner mitigation, participant place, protection, risk, views of agencies, communication, emotion, experience, knowledge, and relationships. After the initial round of coding, subcodes were developed based on emerging themes (Strauss and Corbin 1990). Of particular relevance to this paper was the theme of views of agencies, which was subdivided into "trust" or "don't trust."

Focus-group questions were directly targeted not at trust but around participant views about wildfire management in general, providing a unique opportunity to examine how trust arose in relation to different aspects of wildfire management. The focus group discussion guide included several key topics: risk, attitudes, and opinions regarding fire management, allowing naturally ignited fires to burn, fire protection expectations, fire-adapted communities, participants' homes and wildfire risk, defensible space, prescribed burning, wildlands stewardship, and agencies. The complete discussion guide is provided in Appendix 1.

Expressions of trust and distrust were examined in context to identify themes. In some cases, participants explicitly referred to trust. However, in many instances, trustworthiness was determined based on the context of the conversation. Participants were considered to trust agencies when they explicitly described agencies as competent, honest, or trustworthy. Participants were considered distrusting of agencies when they described agencies as incompetent, dishonest, or untrustworthy. As focus group participants varied in levels of participation, not all participants expressed their level of trust: overall, 61 percent of participants and the majority of participants in each location provided some comment related to trust.

Mentions of trust and distrust were then examined in the context of other themes to identify whether level of trust was associated with other topics. In a subsequent round of coding, we coded expressions of trust and distrust as relating to relational trust (intentions) or calculative trust (ability). In the Results section, we document the frequencies of expressions of trust or distrust by theme (e.g., of the total expressions of trust across all focus groups, 24 percent of expressions of trust were associated with experience with wildfire and wildfire-management agencies). The percentages cannot be inferred to be representative of the overall proportion of our focus groups that trusted or distrusted the agency. However, they can provide insight into the degree different factors come into play in shaping an individual's trust or distrust of a certain organization or activity. Expressions were then cross-referenced by the individual to identify whether any individuals within the groups expressed both trust and distrust. There were no cases where an individual was coded as expressing both trust and distrust.

Table 1. Focus-group participants by location.

Location	Mean group size	Total no. of participants	Community type
San Bernardino, California	11	34	Formalized suburban
Boulder, Colorado	12	36	High amenity, high resource
Flagstaff, Arizona	12	35	High amenity/high resource with some rural lifestyle
Reno, Nevada	6	19	Mix of high amenity/high resource with rural lifestyle
Hamilton, Montana	10	29	Transitioning from resource-dependent/working landscapes to rural lifestyle
Total	10	153	

Lastly, using NVivo queries, we analyzed themes by location to determine whether the level of trust predicted by the archetype framework matched participant expressions of trust. As the study sites were selected before the creation of the archetypes, the assessment is not as systematic as might be desirable, but we nevertheless felt there was enough difference between communities to provide a basic assessment of how well the model works in respect to the trust component. We first used professional judgment and familiarity with the areas sampled to make an initial determination as to which archetype best fit the overall area. We considered the population density of each community as well as the prevalence and type of subdivision development versus low-density, rural development (Paveglio et al. 2015). Next, we reviewed area demographics to refine our determination for which archetype best fit each location. Figure 1 compares the percent of the population, aged 16 years and older, who are employed in natural-resource-related industries and amenity-related industries in each location.

Population size and employment characteristics were identified as reasonable indicators for validating our initial archetype determinations, where larger populations indicate more developed communities, and higher proportions of employment in natural resource related industries denote working landscape/rural lifestyle communities. We then examined how wildfire agencies were viewed by community members within three different community types: suburban, high amenity/high resource, and rural lifestyle communities, testing the utility of the archetype framework as a predictor of a wildfire-prone community's levels of trust in wildfire agencies.

San Bernardino, CA was characterized as a formalized, suburban community given its population size, density, and proximity to the larger city of Riverside, CA. Boulder, CO, was classified as a high-amenity/high-resource community. Flagstaff, AZ and Reno, NV were also classified as high-amenity/high-resource communities but ones that had larger areas that could be considered more of a rural lifestyle community. The expectation was a relatively high level of trust in firefighting agencies across all four of these locations. Hamilton, MT was classified as in transition from resource-dependent to a rural lifestyles community. Thus, it was expected to have lower levels of trust, in comparison with the other four locations. Table 1 identifies which locations were considered to be more or less formal, in terms of where they fall on Paveglio et al.'s (2015) development continuum.

Results and Discussion

Overall, both trust and distrust were generally expressed in the context of competence or an agency's abilities (calculative trust). However, much more so than with expression of trust, distrust was mentioned in the context of intentions, i.e., a lack of benevolence or integrity (relational trust) (Figure 2). Three themes were most often referenced in relation to trust in all communities: experience with wildfire or a wildfire-management agency, communication with the public, and agency relationships with the public and with other agencies. Distrust was also commonly associated with these three themes as well as two additional themes: values or preferences for management and experience with prescribed burning. Figure 3 shows the themes most commonly associated with level of trust and distrust across the 15 focus groups.

Communication

Level of communication from the agencies was often linked with expressions of trust; with more open or frequent communication associated with trust and lack of communication associated with distrust. About one in five (21 percent) expressions of trust across the 15 focus groups was related to agency communication. For example, one Boulder resident described the positive experience he had with local communications efforts:

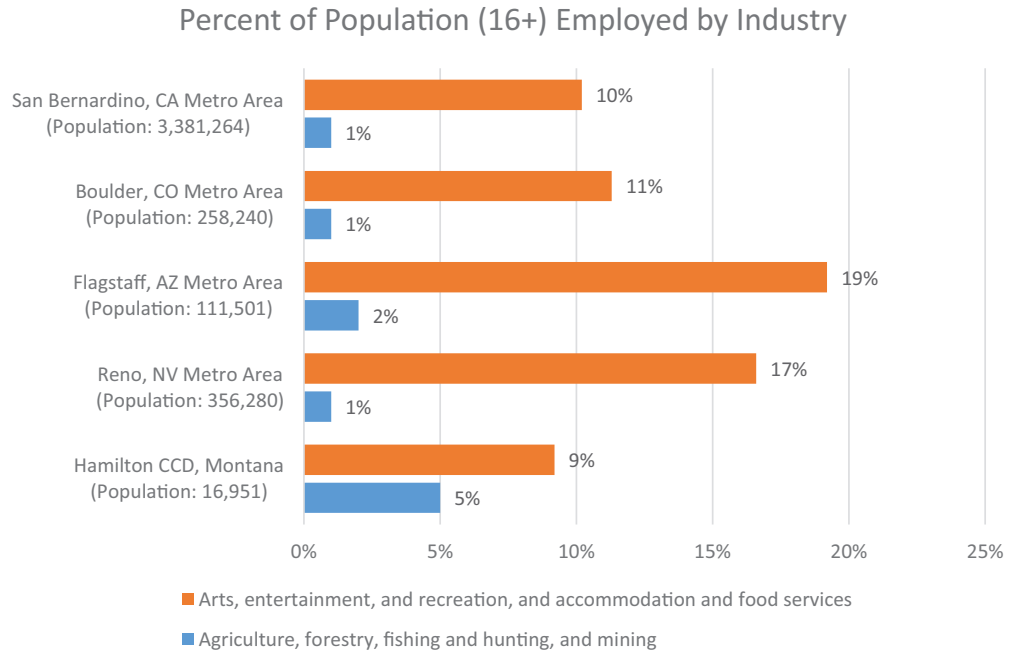

Figure 1. Population and employment by select industries in five wildfire-prone communities. Data source: American Community Survey, 2012–2016, 5-year estimates (US Census 2018).

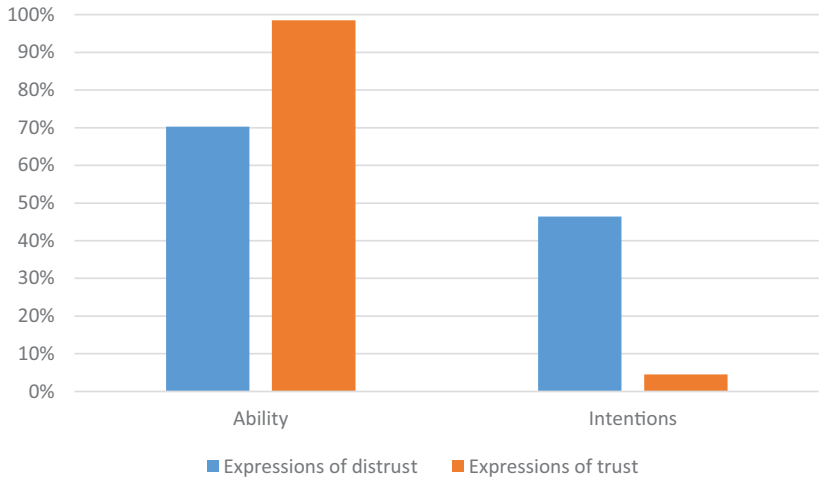

Figure 2. Type of trust by expressions of trust and distrust. Percentages are based on the total number of expressions of trust (n = 67) and distrust (n = 84) across the 15 focus groups. The percentages do not sum to 100 percent because some expressions of trust and distrust incorporated references to both ability and intentions.

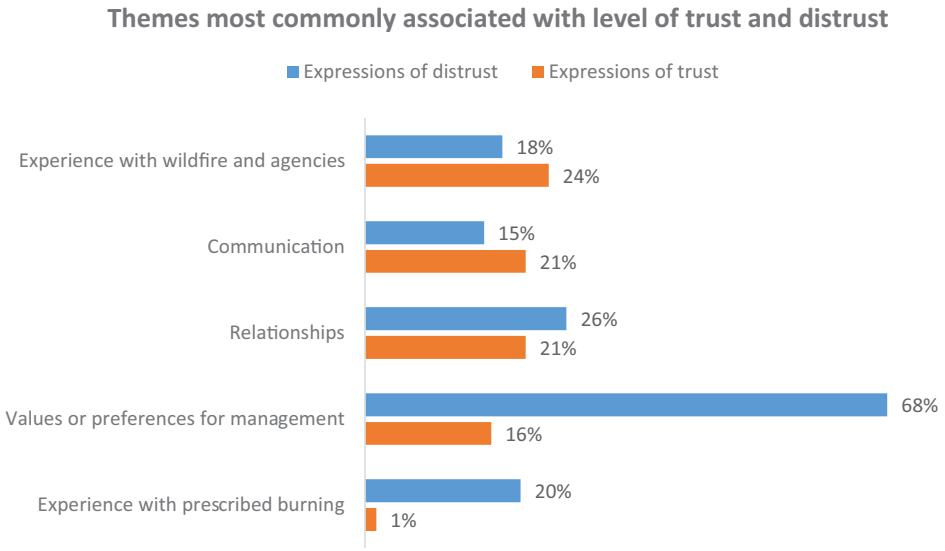

Figure 3. Themes most commonly associated with level of trust and distrust. Percentages are based on the total number of expressions of trust (n = 67) and distrust (n = 84) across the 15 focus groups. They do not sum to 100 percent because some expressions of trust and distrust were associated with more than one theme, and a small minority of expressions of trust and distrust related to other themes.

> I agree with the firefighters. They are very good at their job. I'm not sure, but it seems to me that getting a notification when there is a fire is good. We get phone calls right away.

Conversely, a Hamilton resident described a situation where a lack of communication led to distrust, specifically relational distrust, as the resident suggests that the Forest Service is not acting in the best interest of the community.

> This area also survives on tourism. Part of the forest problem is when they are burning and aren't notifying us. That destroys a lot of our tourism. (Facilitator: Are you talking about accidental fires or prescribed burns?) Prescribed burn. The USFS doesn't just come out and tell us, like they should. Under the USFS's contract with Montana, they are supposed to tell us a certain number of days in advance, before they burn. Yet they don't, and go ahead and burn anyway. They don't tell us, they smoke us out. Who wants to go jogging through a forest full of smoke?

Experience

Experience generally arose in relation to one of two categories: experience with wildfire management agencies during wildfire events and experience with prescribed burns.

Experience with wildfire management agencies during wildfire events

Participants in all five communities linked trust with positive personal experience with agencies during wildfire events. Twenty-four percent of expressions of trust across the 15 focus groups were related to past experiences with agencies during a wildfire and generally framed in relation to competence. For example, when asked how well society is doing at wildfire management, one Boulder respondent noted:

> I watch the wildfire management on the fires close to me. The firefighters do a fantastic job fighting the fires. They had a plan: letting the grassland burn while protecting the houses.

When asked about fire risk in the community, one Flagstaff participant felt the overall risk was low, explaining:

> Because of the Shultz fire and the incredible way the Forest Service got there quickly, there were no homes burned. I feel safe and real good about the way they handle it.

One Hamilton participant described his experience with a past wildfire:

> I was in the Totem Peak Fire, a long time ago. We were evacuated; we had done some clean-up, but not enough. I don't know what was happening up there in the forest. It seemed like there were people up there, building lines and doing what they do to fight the fire. The local fire departments were out helping threatened homeowners. Some fire department people stayed at our house overnight. I thought the whole thing went really well. I really appreciated the protection.

Past experience with wildfire also was commonly linked to expressions of distrust, in this case generally expressed in terms of lack of competence, although not as often as expressions of trust. Across the 15 focus groups, 18 percent of all expressions of distrust were linked with past experience with wildfire. One Hamilton participant described their negative experience with a wildfire event as follows:

> … they had a better commander here in 2000. The new one introduced himself in a town meeting and couldn't even pronounce the name of the valley the fire was in. Two days later, they changed him out, put someone else in there. Nobody knowing what the hell is going on. The firefighters and the strike force were sitting in their camps, digging holes in the ground and wanting to go fight fires. They lit the backfire that burned everything. It got out of control because of 35-mile-an-hour winds. It shows that they really don't know what the hell they're doing. You don't light a backfire in those types of conditions.

Experience with prescribed burning

Although it was rarely referenced in relation to positive trust, past prescribed burns experience was often associated with expressions of distrust. Twenty percent of expressions of distrust across communities related to negative experiences with prescribed burns. As part of a discussion around forest management, one Reno participant described how the agencies have been unsuccessful at managing prescribed burns:

> The Forest Service has tried to do this a number of times. They've been a big failure a number of times, because they've started fires that have gotten way out of control.

Other Reno participants agreed that prescribed burning had not been performed successfully and described distrust because of a lack of confidence in agency abilities:

> There's one thing, we talked about prescribed burns, controlled burns. I remember a few years ago up at Lake Tahoe they had Forest Service start a controlled or prescribed burn up there, and 250 houses disappeared. Somebody made a terrible decision. I'm assuming it's changes in weather they don't see coming.

It should be noted that we cannot make conclusions about causality, it may not always be that a bad experience leads to distrust, and it is also possible that existing distrust may lead to specific interpretations of an event. In the case of the above quote, the only fire in recent years where that many homes were lost was caused not by an escaped prescribed burn but by an abandoned campfire.

Of note is that when asked by the facilitator, "What percent of prescribed burns do you think get out of hand?," Hamilton participant responses ranged from 10 percent to 90 percent, and the mean estimate for the remaining groups was just under 18 percent. All numbers are much higher than actual escape rates, which are less than 2 percent. One Hamilton participant expressed distrust related to competence specifically in relation to lack of local knowledge:

> Things like prescribed burns would be more trusted if they were more locally controlled. People would know the plans are not coming from someone who knows nothing about the area.

Relationships

Both trust and distrust were expressed in relation to perceptions of how well wildfire agencies work together as well as how well they work with communities. Twenty-one percent of total expressions of trust and 26 percent of total expressions of distrust were linked to the perceived quality of wildfire agency relationships with each other and/or the public. Trust was commonly expressed in the context of visibly well-coordinated efforts. As one San Bernardino participant noted:

> I felt that in recent years that the firefighting agencies that work well together … We had a forest fire within a half a mile to our house, and they had several planes and helicopters on that all day long, and it burned two acres from lightning. They did a good job of keeping an eye on it, so I think the agencies jumping on the fires as fast and hard as they can in my perspective.

A Flagstaff participant expressed a similar sentiment, connecting agency coordination with competence (i.e., calculative trust).

> This year, there was good training a week before the Slide Fire and coordination between the different agencies. They had what was a mock experience where they had three different emergencies at the same time so they could work on communication between the agencies involved. I think they have done well in this area.

Trust was also expressed as a result of an agency working well with the community. A Boulder participant noted how an agency effort to build relationships with homeowners by going to their properties was very well received.

> The local fire departments are actually approaching homeowners on their land, making recommendations about where to improve things. That is really helpful.

However, it is of note that there were very few instances where trust was mentioned in the context of agencies working well with

communities; more often, when expressing trust, participants referred to the perceived relationships between agencies.

Perceptions of poor relationships among wildfire agencies came into play in discussions around distrust. When asked about wildfire risk in the area, one Reno participant explained that the lack of coordination across agencies led to a poor response:

> … the response has been so messed up. Some of the politics that you [Sam] were talking about as to which fire district's jurisdiction is it, who can come. The fire we had that wiped out many homes in my neighborhood, we didn't have a single city or county firefighter that was there until three of the houses completely burnt down because nobody knew whether it was an incorporated area or not. The first firefighter that arrived was from Tahoe or possibly all the way from California. It just seemed very poorly orchestrated.

Values or Preferences for Management

Notably, expressions of distrust, but rarely of trust, were framed around lack of shared values or preferences for forest management, i.e., that agencies were not managing fires and forests properly. Across the 15 focus groups, distrust was linked with disagreement about agency-management preferences 68 percent of the time. In some cases, expressions relating to a lack of shared values were framed in the context of local values versus Washington, DC. values. One Boulder participant described distrust in relational trust language, suggesting the agency was acting in its own interest to get the project done, rather than prioritizing the values of the community.

> I'm actually quite aware of what has been going on between Boulder County and Gilpin County in the mountains. There are several very large mitigation projects that are going on. To me, though, clear-cutting is extreme. They are taking it down to the far end of the spectrum. It's a little frightening what's happening to the forests around Nederland. The one project that I know of, the big project that goes from Gilpin through Nederland, has now been on the books for many, many years. Their excuses (lack of time and money) kind of led them to start taking more extreme actions.

One Hamilton participant commented on management decisions related to wilderness areas and the wildland–urban interface, suggesting that there was not enough differentiation in agency management of those two distinct landscapes.

> The owner of a ranch and the owner of a farm are going to manage their properties differently, though the land is about the same. The same principle applies to fire management: the approach must differentiate between the wilderness and areas near town. Managers must seek out input from the local fire department and residents. Management often attempts a one-size-fits-all approach. They're not in touch with the real nature of our forests.

When asked to provide advice to the US Forest Service, another Hamilton participant couched his feelings of distrust in relation to how the agency is currently managing the forest. His advice to the agency was:

> Put on a Smokey the Bear costume, and stand around telling the tourists a bunch of bologna. That's a good thing for them to be doing. They should leave the forest the hell alone.

Applying the Community Archetype Framework

Overall, mentions of trust and distrust fit what we expected with the archetype framework: with the two ends of the continuum, Hamilton and San Bernardino, expressing inverse proportions of distrust and trust (Figure 4). However, within each location, there was considerable individual variability in levels of trust and distrust.

San Bernardino, CA was categorized as a suburban community, which the archetype framework suggests would have high levels of trust in wildfire agencies. Generally, focus group participants expressed more trust than distrust, as the archetype suggests. Many participants noted that these agencies are doing a good job. One San Bernardino participant raved:

> I hear nothing but good things about the firefighters who go above and beyond the call of duty.

Boulder, CO was categorized as a high-amenity/high-resource community. Based on the framework, we expected also to find high levels of trust between Boulder community members and wildfire agencies. Overall, that was the case.

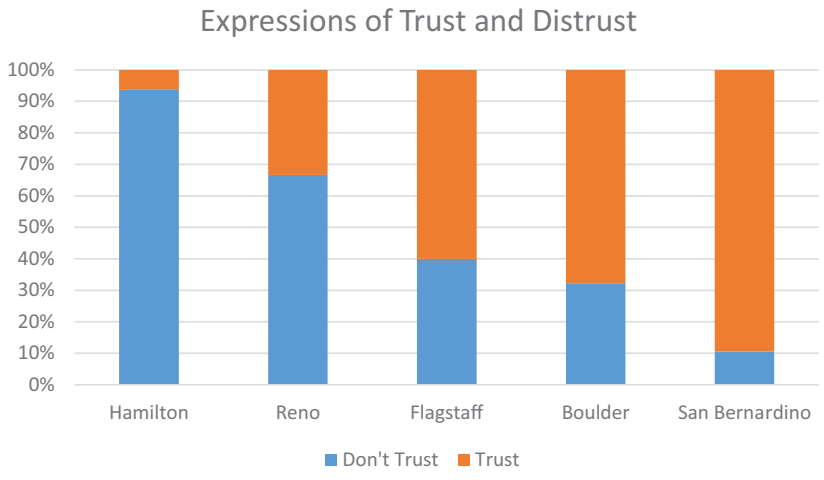

Figure 4. Expressions of trust by community.

Flagstaff was also categorized as a high-amenity/high-resource community, although with slightly fewer resources and so a bit further along the continuum toward a rural lifestyle community. Here, the expectation was once again that participants would primarily trust wildfire management agencies. Expressions of trust did outpace expression of distrust, but by a weak 10-percentage-point margin. Flagstaff participants had a more balanced split between expressions of trust and distrust than expected.

A rapidly developing area, Reno, NV was a mix of both high-amenity/high-resource and rural lifestyle community, which may explain why Reno participants conformed the least to the community archetype framework in terms of expected expressions of trust, compared to the other four communities. Participants, more often than not, expressed distrust of agencies. These expressions of distrust were often linked to past experience with prescribed fire and a lack of coordination across agencies during recent wildfire events.

Hamilton, MT was classified as reasonably far along in the process of transitioning from a resource-dependent to rural lifestyle community on the development spectrum; participants were expected to have lower levels of trust in wildfire agencies, than participants in the other four communities. Overall, expressions of trust and distrust from Hamilton participants followed the expected directions—distrust was far more commonly expressed than trust, generally related to lack of shared values. Although most Hamilton focus group conversations were dominated by expression of distrust, some participants had positive experiences with wildfire agencies during wildfire events, which appeared to build trust.

Summary and Conclusion

At a general level, expressions of trust and distrust generally conformed to the expectations of the archetypes model. Participants from the most formal, urbanized community of San Bernardino were most likely to trust wildfire agencies. Hamilton participants, residing in a less formal, rural lifestyle community, most commonly expressed distrust of wildfire agencies. These findings suggest that trust in wildfire agencies may be an extension of the trust residents have in formal community services, in general. It appears that more formal community members may be more prone to trust institutions and, by extension, wildfire agencies. Less formal community residents, instead, are accustomed to relying on and trusting themselves or each other, rather than external, government services. This sentiment is mirrored in their relationship with wildfire agencies.

Although our classifications, applied post data gathering rather than as part of the initial study design, are not ideal from a research perspective; they are more likely to reflect the process a manager might use in applying the archetypes as a first means of assessing likely community dynamics. While providing a sense that the archetypes work, our results suggest that applying such classifications too broadly could be problematic. In most cases, our sampling areas encompassed a fairly large geographic area, focused on areas with reasonable fire exposure, which could allow for a fair bit of social variability within the sampled area. Reno in particular was a sample area with a wide range of neighborhoods, with a number of more amenity-based subdivisions established over the past two decades along with more established working-landscape neighborhoods. This may explain the more varied trust levels we found in that location. In addition, whereas the archetypes may provide a useful starting point for preassessing potential community dynamics, it is important to note that the key themes did not vary significantly by community.

At the individual level, trust was moderated by many factors, such as past experiences with agencies, prescribed fire, and wildfire; perceived relationship between agencies and the public; communication from agencies; and individual values and preferences for management. In each community, all five themes were central to the discussions of trust and distrust. Our findings both support and provide additional nuance for existing social science literature, which has found that within WUI communities, interactions between agencies and community members, as well as unique personal experiences and circumstances, shape community member views of fire management agencies (Brunson and Shindler 2004, McCaffrey and Olsen 2012, Toman et al. 2013a, Paveglio et al. 2016).

The work also provides important new insights into the role of different types of trust in shaping public response: trust was most often expressed in the context of agency abilities or competence (calculative trust), whereas distrust was framed in the context of intentions or the belief that the agency is not acting in the best interest of the community (relational trust). When an agency is perceived as not acting in the public's best interest, regardless of the perceived abilities of the agency, public trust is compromised. In short, in many cases where there is distrust, the agency has a perceived values compatibility problem, not a perceived competency problem. Conversely, the perception that an agency is acting in their best interest is not sufficient to build public trust. The public must also feel an agency can do the job well.

Also of note is that expressions of distrust relating to negative experiences with prescribed burns and a lack of shared values were sometimes mentioned in the context of a lack of local knowledge and/or understanding of local social conditions. Nelson et al. (2004) find that homeowners in wildfire-prone areas are more likely to support prescribed burns when they feel land managers have a strong understanding of the local ecological context and fire regimes. Although a number of studies have highlighted the importance of wildfire management efforts taking local context and knowledge into consideration (McCaffrey 2015), our work suggests that whether local knowledge is used may be a proxy for assessing competence and thereby determining whether to trust or distrust an agency activity.

Scholars have found that demonstrating shared values can help build trust, but that this often requires an intimate understanding of local social conditions (Winter and Cvetkovich 2002, Carroll et al. 2006, Liljeblad et al. 2009). Davenport et al.'s (2007) findings around the importance of shared values and frequent social interactions suggest that embedding one's self in the social fabric of the community may be one strategy for both learning local values and demonstrating comprehension of local social and ecological conditions. This can be via being available or seeking out presentations and discussion opportunities at monthly meetings of various groups (homeowners associations, realtors, etc.), community events, or more informal daily interactions at coffee shops. As one of the above quotes, as well as other studies (Jakes and Langer 2012), also suggest, the "localness" of the firefighting team and degree that local concerns are taken into

account may also influence community trust. Although being embedded in the community is not always an option in this case, how clearly each fire management team chooses to include local stakeholders and concerns into their decision process likely could help address such issues.

Managers hoping to build, maintain, or restore trust with communities may need to work on building a reputation of both competence and demonstrating the intention to act in the best interest of the community, whether it is via daily interactions as a community member or ensuring overt consideration of local resources and concerns during a fire. Either element on its own is unlikely to be sufficient: officials focusing solely on shared values and good intentions will be unlikely to build trust without directly addressing the issue of competence. This finding unites Toman et al.'s (2011) conclusions that perceptions of competence are key in building trust, and Winter and Cvetkovich's (2002) findings that shared values and demonstration of actions in line with those values are essential for maintaining trust. Taken together, these arguments suggest that officials must demonstrate they are competent in carrying out actions that are at some level in accordance with community values.

Understanding the likely variables shaping trust or distrust in a community also is essential to shaping messaging (Monroe and Nelson 2004) around fire management, evacuation orders, and status updates. This work highlights the need for managers to be sensitive to people's personal history and preferences for management, as these elements will have likely colored their perception of the agency's ability to competently manage wildfire.

Another important consideration for managers is the role perceived coordination across agencies can play in building or eroding trust. Demonstrating a coordinated response may go a long way in building trust, whereas signs of poor coordination appear to erode trust. The role prescribed burns play in distrust of agencies is also worth noting. Experience with prescribed burns was rarely related to expressions of trust, yet often noted in the context of distrust. Researchers find that most wildfire-prone communities are in favor of active forest management (McCaffrey et al. 2012, Franklin et al. 2014), including prescribed burns (McCaffrey and Olsen 2012). Wildfire-prone communities may accept the concept of prescribed burns, but they may not blindly accept prescribed burns without a clear sense that those implementing them know what they are doing. Community members may need to hear the when, why, and how of each burn from fire managers before they are willing to accept the risks and consequences. Managers wishing to obtain social acceptance of prescribed burns may therefore have more success with a robust communications effort that helps establish their credibility with community members before they implement a management activity. This messaging could highlight their credentials and experience with fire management, as well as the factors that influenced their decisions including the goals of the project, the role nonlocal bureaucrats play (if any) in the decision, and how local knowledge has been incorporated into fire-management planning.

Finally, it is worth noting that individuals held a singular trust perspective on agencies. We did not find cases where an individual trusted an agency to fight a wildfire but not to do a prescribed burn, or vice versa. This highlights the importance of the temporal nature of fire-manager interactions with the public. If trust is eroded during a wildfire, managers hoping to engage in mitigation after the fire may find significant community resistance. Conversely, when trust is built or maintained, that trust may carry over to support for prescribed burning or thinning projects in the future.

Appendix 1: Wildfire Issues Listening Session

Discussion Guide—Draft Eight (Boulder After Monday)

July 26, 2014

An asterisk (*) denotes a topic possibly suitable for a quantitative response on a separate sheet of paper.

Introduction and Ground Rules

_____

_____

_____

_____

_____

_____

_____

_____

Risk

Just as a point of clarification, when I refer to this area, I am not referring to the immediate area surrounding this hotel; I am referring to the area around where you live.

In what ways is this area unique or special?

What are the best things about living around here?

What are the least desirable things about living around here?

≈Assuming that no dwelling lasts forever, what do you suppose would be the single most likely cause of your house not being there anymore?

What do wildfires in this area mean to you?

*Using a 10-point scale, with one meaning that it has no wildfire risk at all and 10 meaning a wildfire risk as great as anywhere in the US, what number along that scale would you use to rate the wildfire risk around here? (Sarah, we will have a handout for them to fill out)

What number did you give and for what reasons? (Go around table)

Is the risk higher or lower than 10 years ago?

What, if anything, should anyone be doing about wildfire risk in this area?

Are there other risks, besides wildfire, that deserve higher priority?

Evolution of Attitudes and Opinions Regarding Fire Management

(Note: Fire management, not firefighting)

Let's talk about wildfire management in general.

*As a society, how well are we doing at wildfire management? Please rate one to 10. (Go to handout)

What number did you give and for what reasons? (Go around table)

In terms of fire management overall, what, if anything, are we doing particularly well?

What, if anything, should we be doing differently?

What, if anything, should we be doing differently regarding reacting to fires as they occur?

Is the world of wildfire management about the same as it was 10 years ago, or has it changed?

In what ways has it changed?

What about your own perceptions and opinions regarding wildfire management? Have they stayed about the same or have they changed over the past 10 years?

In what ways have your opinions changed?

Managing for Resource Benefits/Let Burn

Sometimes, forest managers allow some naturally ignited fires to burn with limited human intervention. How do you feel about that?

On federal lands, a decision to allow a naturally occurring wildfire to burn is never made on the fly. The area has to have been previously evaluated as being an area where fire could be beneficial and have a formal fire-management plan in place that allows for such an action in appropriate conditions—wind, temperature, dryness, etc. These fires are always monitored. Assume for a moment that these fires might have an ecological benefit or could save money that would be used for other measures to improve overall forest health in your area,

What would you think of that?

What concerns might you have?

Fire Protection

What, if anything, should society be doing differently regarding advance measures to ensure that when forests catch fire, they do so in a way that is least harmful to the long-term interests of people and forest health?

What comes to your minds when you hear the phrase "responsible for fire protection"?

Protection of what? And when?

Did your mind go to proactive, preemptive fire-mitigation measures performed way in advance or did you first think of the things that individuals and communities do at the time there is already a fire burning?

Were you first thinking of fire protection as a whole community or fire protection of your own property?

Do different individuals or groups have protection responsibility for different things? At different points in time?

When a person elects to move out into an area that is surrounded by woods and wildlands, should they expect a quick response from a fire department to protect their home if a fire breaks out in or near their house?

Does a person who elects to live in an area that abuts or is surrounded by woods or wildlands have any special responsibility for the defense of their dwellings and property?

What is that special responsibility?

One woman in another group said that she told the USFS something like "I built my house up here in the woods, and it is my responsibility. If it is going to burn in a forest fire, then USFS should let it. It is USFS's job to protect the forest, so protect the forest." What do you think of that position?

Fire-Adapted Communities

If someone from an area roughly comparable to here—i.e., similar population density, climate, terrain, and types of wildlands—told you that they lived in a "Fire-Adapted Community," what would they be talking about?

Raise your hand if you have heard that term before.

Here is one definition I found: communities that have taken a range of actions to mitigate their fire risk so they can survive a wildfire with little or no assistance from firefighters. What do you think of that idea?

To what degree, if any, is your community fire-adapted?

Give me some examples of ways in which your community is fire-adapted.

What would have to take place here to make your community a Fire-Adapted Community?

Participants' Homes and Wildfire Risk

Using a 10-point scale, let's pretend that we have to assign a wildfire risk level to your home. With one meaning no realistic chance at all and 10 meaning that your home is totally poised to be engulfed in flames from a wildfire, what number along that scale would you use to assign the appropriate level of risk?

For what reasons did you give your home's wildfire risk that particular rating? (Go around table)

≈If your house were to catch fire, how would that happen? What would be the main cause?

What about if it caught fire from a wildfire? (embers or flame front)

To what degree is a home's wildfire risk just an inevitable function of living a rural lifestyle and to what degree does a homeowner have viable options for reducing that risk?

Defensible Space

How does one go about establishing a defensible space?

When you think of defensible space, do you primarily think of vegetation or structures?

What is the biggest barrier to you in decreasing the fire risk on your property?

≈When considering balancing defensible space with the other things that are important to you, what are your considerations, and what do you value?

Do you think it is okay for homeowners to stay to defend their home? Good idea or bad idea? Do you have any concerns about the idea?

Prescribed Burning

Should we be attempting to reduce the fuel loading in forests, or not?

How should we go about that?

What are your feelings about mechanical thinning of forests?

What are your experiences with prescribed burning in this area?

Do you view prescribed burning as something that can be a useful and appropriate forest stewardship tool, or not?

Are there any problems inherent in prescribed burning? (Allow any discussion about escape to evolve a bit)

*What percentage of USFS prescribed burns escape their boundaries?

*Do you believe that the practice of prescribed burning leads to overall more smoke, less smoke, or about the same levels of smoke

as you would have if there were no prescribed burning? (Go to handout)

*Should agencies conduct prescribed burning more, less, or about the same as currently? (Go to handout)

If you thought prescribed burning could be a useful stewardship tool in certain situations, would you be willing to tolerate the smoke from it, or not? What conditions would make the smoke more or less acceptable?

≈Do you generally see prescribed burning as something to be conducted in conjunction with thinning or as an alternative to thinning?

Wildlands Stewardship

What do we want the woods and wildlands in this area to look like 100 years from now?

Your 100-year vision: Is it achievable?

When we talk about wildland fire management and stewardship, we have to break it down by immediate measures, such as whether and how to suppress a fire that is happening right now, and longer-term activities such as reducing fuel loads with measures such as thinning, prescribed burns, and other items that can decrease risk such as building codes, and supporting other community adaptation activities.

(Note: There are limited budgets, and tradeoffs have to be made)

*On your sheet of paper, indicate what percentage of funds we should spend that shows how you would prioritize emphasis among various fire-management activities. (It needs to add to 100)

- suppression
- mechanical thinning
- prescribed burns
- supporting public fire-adaptation strategies (education, funds, etc.)

Did I miss anything? (Other options we should be emphasizing than listed above)

≈What, if anything, are the most acute measures that should be taken immediately?

Agencies

Tell me about agencies in this area that deal with wildfire:

- USFS
- State Forestry Agencies
- county agencies that deal with wildlands

How would you characterize the relationships between each agency mentioned? What about between each agency and the public?

(Note: If, with USFS questions, they bring up things that limit its activities, explore a little)

If you have a pretty good idea of who USFS is, and what they are supposed to be doing, please raise your hand.

What is USFS's approximate mission, and what are they charged to do?

How does that compare with what you think they should be charged to do?

Concluding Comments

If you could give the USFS one piece of advice, what would it be?

Moderator introduces Sarah.

Thank you and good night.

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