

# IMPROVING AN INHERENTLY STRESSFUL SITUATION: THE ROLE OF COMMUNICATION DURING WILDFIRE EVACUATIONS

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**Abstract.**—Wildfire evacuations are inherently stressful and homeowners have reported in previous studies that uncertainty over what is happening is perhaps one of the most stressful aspects. Although many difficult elements of evacuation cannot be mitigated and lives will certainly be disrupted, fire-management agencies can significantly reduce residents' uncertainty with frequent, open, and detailed communication. We illustrate this point with two case studies. In one community, there was little communication between fire-management professionals and residents before, during, and after a wildfire evacuation while in the other there was regular communication throughout the event. Where agency communication was lacking, the media filled the information gap with conflicting and often inaccurate reports. Two years after the fire, residents from this community recalled the event in vivid detail and many still expressed fear of wildfire and lack of trust in fire-management agencies. Conversely, residents of the community that received abundant, timely information had largely positive comments about how the fire was managed and expressed trust and confidence in the fire-managing agency. These experiences reinforce the notion that agency communication during a fire can

help reduce the stress of evacuation and help maintain positive long-term relationships between residents and fire-management agencies.

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## 1.0 INTRODUCTION

Evacuation from one's home during a wildfire is inherently stressful because of the disruption to daily life and the uncertainty about what will happen (Cohn et al. 2006). Indeed, evacuees have cited a lack of current information about fire activity and fire impacts as one of the greatest challenges of evacuation (Kent et al. 2003, Sutton et al. 2008). Although individuals vary in their responses, evacuations often elicit strong negative emotions that can have a lasting impact (e.g., post-traumatic stress, anxiety, health problems, lack of trust) on both the individual and the community (Hodgson 2007).

While fire managers cannot completely eliminate the stress experienced by evacuees, reducing uncertainty by providing frequent, accurate, and detailed fire information has been found to significantly reduce the intensity of the negative emotions resulting from the evacuation, thereby reducing lasting negative impacts (Hodgson 2007). As McCool et al. (2006) note, the "significance of quality information during an emergency cannot be overstated" (p. 448). In addition, Kumagai et al. (2004) found that evacuated residents who believed they had received adequate information during the fire were less likely to blame fire management agencies for their losses and were more likely to attribute fire damages to "nature."

When people encounter such unfamiliar situations as a wildfire, they develop explanatory theories to make sense of what is happening and reduce uncertainty (Hodgson 2007). This sense-making is social in nature as people process and share information with each other. People often seek information first from official

sources, but if their needs are not met through these channels, they will turn to other sources (Sutton et al. 2008). The absence of credible information also does not cause theory-making to cease; the consistency and validity of people's explanatory theories can be severely impacted when they rely on less credible information-providers (Hodgson 2007), possibly resulting in inaccurate and negative public perceptions of the fire and fire-management agencies.

This is not to say that communication during a wildfire is easy; the high stakes increase both the complexity and significance of the communication process (McCool et al. 2006). During a large wildland fire, federal fire managers are required to provide daily updates that include the size of the fire and the extent of resources dedicated to suppression. While useful to some, this type of information often fails to meet the specific needs of evacuated community members who want to know whether their homes are being threatened or have burned (Cohn et al. 2006, Taylor et al. 2007).

Despite the importance of real-time, specific information, there are few official incentives for agencies to provide it. Agency concerns about providing inaccurate or unsubstantiated information can lead to a cautious communication style at odds with public demands. Fire management agencies generally have an immediate focus on containment and suppression of the fire and may not provide adequate communication resources for their on-the-ground personnel. Ultimately, the content and extent of agency communication with the public are usually at the discretion of those managing the fire and individual agency personnel.

Moreover, it is important to note that fire events and associated communication efforts occur within a larger context. Although the fire itself may be a relatively discrete incident, pre-fire preparations, decisions and experiences during an event, and post-fire decision-making and recovery are all linked. Relationships, interactions, and decisions made at each stage will influence subsequent stages. While specific

information needs vary, citizen-agency communication is important at each stage. Agency personnel and community members who have a history of working together prior to a fire event are likely to find communication easier if a fire does occur (McCool et al. 2006).

To date, few studies have examined the temporal connectivity of fire issues. Insights about how current actions and choices can influence future events could be useful to agency managers. This paper uses interview data to examine the experiences of residents from two communities in the western United States that recently evacuated during wildfires. These communities had substantially different interactions with agency personnel before and during the fire event, which is reflected in the very different ways they recount their experiences. The interviews suggest that building strong citizen-agency relationships prior to a fire event and providing frequent, current, and detailed information during a wildfire can contribute to reduced stress during the evacuation, and improved community recovery afterward.

## 2.0 METHODS

The data reported here are a subset from a larger study of wildland-urban interface residents' perspectives on wildfire risk and mitigation. While this larger study did not focus on evacuation, two of the six study communities had experienced wildfire evacuations and many participants described their evacuation experiences in great detail. Because few studies have documented wildfire evacuation from the evacuees' perspective, and in light of the dramatically different impressions the experiences left on the two communities, these accounts warrant reporting.

Data were collected in 2007 in Oregon and Utah. Interviews followed a structured format; in addition to recording responses to fixed questions, interviewers took detailed notes on the interview conversation, including participants' recollections of being evacuated. These notes were typed up immediately following the interview; verbatim quotes that were recorded formed an abbreviated transcript of the

interview (Kvale 1996). As part of the larger study, participants were selected based on their association with a community that was actively preparing for wildfire (Babbie 2001, Rubin and Rubin 2005). The two communities varied in the number of properties, and thus number of study participants (Table 1). At each site, we continued sampling until data saturation occurred; we feel confident that the resulting samples are representative of the study communities. All participants are given a pseudonym here to protect their identities.

## 2.1 Site Descriptions

The Oregon study community (Table 1) is a planned community surrounded on all sides by the Deschutes National Forest. It is situated on the east side of the Cascade Mountains in a transition zone between ponderosa pine and juniper- and bitterbrush-dominated ecosystems. Ponderosa pine forests in and around the community historically experienced frequent, low-intensity wildfires; this fire regime has been altered by human activities over the last century, increasing the risk of an uncharacteristically large and severe wildfire (Noss et al. 2006). The neighborhood has 200 forested lots, approximately 1 acre each, and the majority has buildings on them. Community governance is structured around a homeowners' association, which has been diligent about providing residents with fire safety information and encouraging the creation and maintenance of defensible space. The association has historically had a good working relationship with the local U.S. Forest Service office. Forest Service personnel have worked closely with association board members to improve community fire safety, including

conducting site assessments of local properties and participating in the annual homeowners' meeting. In the past 5 years, several large fires have occurred nearby, but the community has been evacuated only once.

The Utah community (Table 1) shares one border with the Dixie National Forest in southern Utah and is at the base of the Pine Valley Mountains in the transition zone between pinyon-juniper/hardwood and sage-steppe ecotones. Pinyon-juniper forests historically experienced frequent fire (Bradley et al. 1992). The neighborhood has 33 forested lots, ranging in size from 2 to 3 acres each. Approximately half of the lots have homes on them. There is no formal community governance and, before the fire, individuals implemented preparation and defensible-space activities without community coordination. Historically, residents here had limited contact with fire-management agency personnel. While several fires had erupted in the region over the past 5 years, only one had caused the community to evacuate at the time of the study.

## 3.0 RESULTS

### 3.1 Oregon Case Study

In 2006, the Black Crater fire caused the evacuation of several Oregon communities, including the one in this study. A lightning strike ignited a fire in the Three Sisters Wilderness upslope from the community. While residents were aware of the fire start and knew they might need to evacuate, the speed of the fire spread was unexpected. Typically, a pre-evacuation notice

**Table 1.—Study site characteristics.**

	Oregon	Utah
Forest Type	ponderosa pine	pinyon-juniper/ hardwood
Parcel Size (acres)	1	2-3
Number of Properties in Community	200	33
Number of Study Participants	40	9
Duration of Evacuation	~ 4 days	~ 24 hours
Name of Wildfire (year)	Black Crater (2006)	Blue Springs (2005)
Size of Fire (acres)	9,407	12,286
Wildfire Entered Community?	No	Yes

would encourage residents to prepare themselves and their homes for an evacuation. In this case, however, there was no time for a pre-evacuation notice and residents were told to evacuate immediately through reverse-911 calls and a truck with a siren and loudspeaker that came through the neighborhood. Residents evacuated for 4 days, during which the fire was contained about a quarter mile from the southwestern edge of the neighborhood.

During the evacuation, the Forest Service held two daily community meetings at the local high school (also the evacuation shelter), providing up-to-date information and displaying current fire maps. A fire information officer was onsite from 8 a.m. to 5 p.m. each day to answer questions. The following quotes describe local residents' experience with the fire, their perceptions of how it was managed, and their interactions with Forest Service personnel. These quotes were chosen to tell the story of each community's evacuation experience in its own words. While this is a slightly unorthodox approach to presenting qualitative data, it is particularly useful here because of the difference in the manner in which the communities as a whole related their experiences. During the interviews themselves, there were palpable differences in emotion: in Oregon, where residents were interviewed 1 year after the fire, accounts were largely matter-of-fact with little lingering emotion. In contrast, residents in Utah recounted events using vivid imagery and great detail as if they had just happened, even though the fire had occurred 2 years before the interviews.

### 3.1.1. Oregon Evacuation

*"[The District Ranger] and [Fire Chief] worked in concert; we were very informed . . . We didn't get a warning call, only got the 'evacuate now' call. The fire moved too fast—I was surprised at how quickly the fire moved and got serious."*  
~ Allison

*"We got a call to leave immediately and meet at the high school."* ~ Betsy

*"We were evacuated for 5 days and nights. Weird. We did not believe we would be evacuated and that the fire would get that close. Disconcerting."* ~ Denise

*"I was convinced for a time that we would lose the house—our home was closest to the fire—but the wind died and the fire went out."* ~ Frank

*"Not too worried about the house, have always tried to meet the standards for fire safety and we knew there was a fire truck at every corner. It was more of an inconvenience than anything."*  
~ Braden

### 3.1.2. Oregon Information Activities

*"[We were] evacuated on a Thursday, had two meetings a day."* ~ Frank

*"After the fire started we were able to stay at the school and got lots of up-to-date information. That was very reassuring—they need to be commended for that."* ~ Jessica

*"We learned a lot from the meetings during the fire."* ~ Kevin

### 3.1.3. Oregon Post-fire Sense-making

*"[I] can't say enough good things about the firemen. [They] had 21 trucks in here last year and they did a lot of extra things to make sure our properties were safe."* ~ Trisha

*"Fire is not a bad thing, but last year the fire could have been contained earlier if they'd have had enough resources."* ~ Allison

*"Last year they let it get out of hand before they attacked [the fire]. [It is] government policy that your fire has to get so big before they will bring in planes, and other fires were bigger first."*  
~ David

Residents reported the fire's making a run at the community and their having to suddenly evacuate. Several participants indicated that ash and embers were falling in their neighborhoods as they were

evacuating. When they got the “evacuate now” call, they were told to meet at the high school for further information. Many of the residents reported that they were grateful to receive up-to-date information at the twice-daily meetings with fire officials.

While residents with homes closest to the fire front recalled concern that they would lose their home, most residents did not. Post-fire sense-making left most residents grateful for the firefighters’ efforts. Shortly after the fire was contained, the community sponsored an event to honor and express gratitude to the firefighters. News reports quoted firefighters saying they had never experienced a comparable display of gratitude from a community before (Springer 2006).

A couple of residents expressed frustration that the fire had not been contained earlier, but they were consistent in their explanation that limited resources were the reason. No residents expressed theories that the fires were being intentionally mismanaged, nor did they say they would not evacuate in the future.

## 3.2 Utah Case Study

### 3.2.1 Utah Evacuation

*“We were suddenly evacuated when we showed up for an evacuation meeting; we drove back to the community to pick up our cars and were chased out by the fire. Firefighters were evacuated at the same time. The fire came right through the neighborhood... We were evacuated overnight and when we came back we had to keep putting out embers. The fire melted the siding on one side of my house... I wouldn’t leave if there was another fire—I’d stay and fight it.” ~ Harlan*

*“We were getting ready to go to a fire meeting, went outside and the fire was so loud, sounded like a roar, and we just knew we had to get out now... During the fire, there was a 40-foot wall of flames—the firefighters had to leave, but there was one helicopter that kept on the fire all night bringing load after load of water and dumping it on the neighborhood. Just as the fire was getting to the neighborhood the wind shifted and pushed back at the fire; there were also two rain storms*

*right over the neighborhood that night when there wasn’t any other rain anywhere else in SW Utah—it really seemed like an act of Providence that saved the neighborhood.” ~ Stewart and Debbie*

*“The fire really was an amazing occurrence. We saw the wall of flames coming down the hill and had about 5 minutes to get out. We grabbed our cats and dogs and left. Thought for sure we were going to lose the house. The closest we could be was the gas station down by the freeway and a bunch of neighbors gathered there to watch. It was dark by that time, so we couldn’t really see what was going on. Every once in a while we could see a big puff of flames, assumed it was a propane tank exploding or an outbuilding going up in flames. Someone who was up in the neighborhood reported an outbuilding being lost. We just thought we’d lost it all.” ~ Steve*

### 3.2.2 Utah Information Activities

*“The evening news and local officials offered conflicting reports—two houses destroyed, no houses destroyed, but three threatened, one house destroyed. We went to sleep not knowing if we had a home.” ~ Marvin*

*“One thing that was a real failure was the communication... There were 19 homes in the neighborhood at that time and there were news reports that 1 had burned, then that 19 had burned, then that none had burned.” ~ Stewart and Debbie*

### 3.2.3 Utah Post-fire Sense-making

*“The fire came within 50 ft of the house—the helicopter drops saved our house. We are now scared to go on vacation during the summer because we can see how quickly things can happen and we won’t be here to protect our home from fire.” ~ Rebecca*

*“The fire could have been stopped days before it reached us when it hunkered down—not sure if it wasn’t an attempt to extend firefighting income or from lack of resources.” ~ Keith*

*“The people fighting the fire made a colossal mistake. For two days prior to the evacuation we heard the air tanker flying over our home to drop water on the fire, but then on Monday morning, the day of the evacuation, there were no flights. When I asked at the fire meeting after the evacuation... the fire manager gave these really weird excuses, the planes needed maintenance, the pilots needed rest, stuff like that—it just didn’t sound right at the time. Well a few days later a co-worker [who] is friends with a manager at the airport for tankers [told me] that maintenance was always done on the planes at night and that there had been an argument that morning about the planes. Apparently the fire manager wanted to pull the tankers from that fire and put them on another fire... [but] some of the pilots said the fire would pick up that afternoon and threaten the community. The tankers ended up being called off, and the wind did indeed pick up, and then we were evacuated that evening. I’m not angry or anything, I think he made the best decision he could with the information he had at the time, but it was an unfortunate decision. However, we did not like not being told the truth at the meeting, the way we were treated with that story was disrespectful and we wouldn’t have been nearly as upset if we had been told the truth.” ~ Stewart and Debbie*

As the above quotes illustrate, residents in Utah used vivid imagery and extensive detail in their recollections of the fire. Perhaps what is most interesting is in the post-fire sense-making. While one resident had no negative things to say, two others proposed separate conspiracy-type theories to explain why firefighters had been called off the fire the morning of the evacuation. Many residents expressed lingering negative emotions, some even reporting that they would not evacuate in the future, or that they were frightened to go on vacations during fire season.

#### **4.0 DISCUSSION**

Some of the differences in the evacuation experiences of these two communities were likely caused by the

specific circumstances of their evacuation. The Utah neighborhood had completed few fire preparations; in fact, only a couple of property owners had taken any preparatory actions at all. With no community evacuation plan in place, residents did not know what to expect or how to obtain accurate information. In contrast, the neighborhood in Oregon was collectively very well prepared for fire and had an evacuation plan in place. Through their preparations, the local homeowners’ association had developed a strong, long-standing relationship and regular communication with Forest Service personnel. These communication channels were utilized during the evacuation; with the evacuation call, residents received information on where they could meet with fire personnel for further information. Throughout the evacuation, residents received up-to-date, detailed information from the Forest Service. Many residents reported that the information both taught them about fire behavior and provided them with a sense of reassurance. Conversely, Utah residents received no information during their evacuation other than conflicting news reports, and most spoke of going to sleep that night not knowing whether they had a home. These findings corroborate previous research that has reported that uncertainty about what is happening can be one of the most stressful aspects of an evacuation.

How residents perceived fire management activities also varied between the two communities. Overall, the Oregon residents were positive in their reporting of the evacuation experience and felt confident in fire-management agencies. Many mentioned the effort by the Forest Service to provide them with timely, accurate information, both at the twice-daily fire information meetings and when they called or spoke to the fire information officer stationed at the evacuation shelter. On the other hand, while Utah residents universally appreciated firefighters’ efforts, several commented on the mismanagement of the fire and blamed fire managers for fire damages. In addition, some Utah residents suggested that managers were not entirely truthful in their explanations about management decisions.

Ultimately, residents in both locations tried to make sense of their situations. The difference between the sites is that in Oregon this process was informed by direct information from the Forest Service on fire behavior, impacts, and management efforts while in Utah, residents were left to develop their own stories based on information provided by media and peers with limited direct access to the fire. These differences resulted in largely consistent theories in Oregon (i.e., delays in fire management activities were because of lack of resources and/or another wildfire start) whereas a variety of theories were offered in Utah.

Several Utah interviewees proposed conspiracy-type theories about why fire resources were diverted the morning of the evacuation. One person proposed that this reallocation was done to increase firefighters' salaries. One couple developed an alternate theory; they believed the fire manager was lying when he said at a post-fire meeting that firefighting planes had been grounded for maintenance. From a friend of a friend, the couple heard a different story (about the diversion of the planes to other fires), which they perceived to be more credible than the official version. Because they thought they had been lied to, this couple retained feelings of mistrust and discontent toward the fire manager 2 years after the fire. In previous work, Hodgson (2007) hypothesized that when fire-management agencies are not open with information, the public may perceive that there is something to hide, leading to persistent rumors that may or may not contain elements of truth. These findings appear consistent with that hypothesis and provide additional support for the importance of open, honest communication.

## 5.0 CONCLUSIONS

This paper examined the evacuation experiences and post-fire sense-making of two communities in the western United States. There were substantial differences between these communities in levels of pre-fire preparation and citizen-agency relationships that appeared to contribute to the quality of communication during the fire event. In turn, higher-quality communication during the fire appeared to

contribute to reduced stress during the evacuation and, based on the responses and descriptions offered during the interviews, a more complete recovery afterwards.

More research is warranted; this study did not set out to analyze the long-term effects of evacuation and the results cannot be generalized to other communities and other fire events. However, these experiences support previous research that has found both short- and long-term benefits from providing residents with up-to-date, detailed information for the entire duration of a wildfire evacuation event. When information is not available, this situation should be openly and honestly communicated to residents to prevent conspiracy-type theories from developing.

It appears to be vitally important that agencies build relationships with local communities long before a wildfire starts. In central Oregon, the local Forest Service has made it a priority to build and maintain relationships with neighboring communities; their communication strategy during the fire can be seen as an extension of that relationship. The time and effort spent on that relationship seems to have "paid off," not only in relatively positive perceptions of the fire's management, but also in general community preparedness for fire. Both of these aspects played an important role in decreasing residents' anxiety during and after the fire. Given the increasing trends in fire prevalence and intensity, the number of communities directly impacted by wildfire is likely to increase in the future; developing positive citizen-agency relationships before and during a fire event will be vital in helping communities prepare for and cope with future wildfire events.

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