

# BULL FIRE RESEARCH FINDINGS SUMMARY

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## Overview

Effective communication and coordination are important to manage fires in the wildland urban interface (WUI). At present, little empirical work exists to document communication efficacy during a fire event and to identify effective management practices for establishing a coordinated response. In this research, we used surveys, interviews, and social network analysis to better understand communication and coordination processes for fire management. This study was guided by the following questions:

1. How well are Incident Management Teams (IMT), local Forest representatives, and local cooperators communicating with the broader public before and during the fire?
2. How well are IMTs, local Forest representatives, and local cooperators communicating among themselves?
3. What factors contribute to effective communication during wildfire responses?

## Methods

Data were collected from four WUI wildfires in NM (Tecolote Fire), AZ (Schultz Fire), CA (Bull Fire), and CO (Four Mile Canyon Fire) during the summer of 2010. This research took place in two phases. The first phase consisted of in-person interviews and social network data collection with IMT command staff and section chiefs, local Forest representatives, and local cooperators. Phase 2 consisted of a survey of residents. In CO we only conducted phase 2. This report describes the findings from the Bull Fire with a brief indication of how the results compare with results from other study sites<sup>1</sup>.

**Research Site:** The Bull Fire started on the Sequoia National Forest on July 26, 2010 with the California Interagency Incident Management Team 4 assuming command from July 27 until August 3. A full suppression strategy was utilized on the fire. Values at risk included structures in Riverkern and Kernville, historic sites, and campgrounds. The fire covered 16,442 acres and cost \$10.2 million to suppress. Twelve hundred residences were threatened. Eight residences were lost, along with six outbuildings. Highway 99 was closed for several days. At the peak of the incident, 2,399 personnel were on site.

Phase 1 interview data were collected from 34 individuals on the Bull fire, representing 97% of the key responder positions among the IMT, Forest, and local cooperators. In Fall 2010, we sent 1,000 surveys to a random sample of Kern County residents within fifteen miles of the Bull Fire perimeter to assess communication dynamics during and before the fire.

## Research Findings

### Communication with Residents

1) **During the Bull Fire, communication and information satisfaction were high among residents.**

- 74% of residents surveyed indicated they were “satisfied” or “very satisfied” with information they received during the fire.
- More than 74% of residents were “satisfied” or “very satisfied” with how the fire was managed. When asked what factors were most important to them when considering fire management decisions, residents indicated that community/resident safety (90%), fire fighter safety (87%), and protecting private property (77%) were “very important” to them. These were the top three factors on three of the four fires in our study
- Residents were most dissatisfied with information about why fire management choices were made.

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<sup>1</sup> See Nowell, et al. (2011) Communication and Coordination During Wildfire Incidents: 2010 Summary Brief of Lessons Learned for summary of findings across all fires.

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- Communication and information satisfaction on the Bull Fire was comparable to that on the other four fires.

### 2) Residents surveyed on the Bull were equally satisfied with the information they received before the fire as with the information they received during the fire.

- Before the fire, residents indicated an average score of 3.1 in terms of satisfaction with a variety of preparedness information (measured on a 1-4 scale, with 4 being the most satisfied). This was the highest average satisfaction score for before fire information of all fires studied.
- During the fire, residents indicated an average score of 2.9 in terms of satisfaction with a variety of information types (evacuation, road closure, how fire was fought and managed) and processes (how information was given, how easy it was to get, and who gave it).
- The differences in before fire and during fire averages were not statistically significant.
- Before the fire, residents indicated that they “very much” wanted information about fire hazards and concerns (63%), defensible space/FIREWISE (62%), and evacuation planning (51%).
- Residents were more interested in receiving evacuation planning information before the fire than on the other fires we studied.
- Residents surveyed on the Bull Fire were more satisfied with the evacuation information they received during the fire than the other fires we studied.
- Despite relatively high information satisfaction, results indicate more could be done to reach residents before the fire. One fifth to one half indicated that they were not receiving information that they “very much” wanted about the upcoming fire season, or it was not adequate for their purposes.

### 3) A significant gap exists between the information sources respondents actually used and those sources that respondents found most useful and most trustworthy.

Residents indicated that they used family/friends/neighbors (85%), television (80%), newspapers (69%), radio (67%), and maps (54%) as their primary sources of information during the fire. However, these did not tend to be the most useful or trusted information sources, which were more interactive and came from “official” sources. Sources deemed most useful included the local fire department (68%), conversations with a local Forest Service representative (65%), and maps (56%). Sources identified as most trustworthy were the local fire department (80%), maps (74%), and conversations with a local Forest Service

representative (67%). The disconnect between the most commonly used information sources not being the most useful or trustworthy was found at all four of our study sites. Finally, the information sources most used by residents before the fire tended to be the same sources most used during the fire.



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### Communication among “Responders”: IMT, Local Forest and Cooperators

#### 1) The communication network among responders showed high levels of cross-agency interaction.

*“...this has been a really robust relationship for 20-plus years between Kern County, BLM, Forest Service, CAL FIRE... People have been working very hard at making it a seamless operation.”*  
– Forest Representative

As part of the study, IMT command staff and section chiefs, key Sequoia National Forest personnel, and cooperators were asked how often they communicated directly with one another. Page five shows the social network of interaction during the Bull fire. Findings from these data indicate the following characteristics of the communication network:

- The IMT was well integrated with Sequoia National Forest and relatively well integrated with local cooperators.
- Overall, the most central actors in the network were: IMT Incident Commander (IC), Public Information Officer (PIO), and Operations, Kern County Fire Department, CA Highway Patrol (CHP), and the Kern River District Ranger.
- Interactions with the IMT were not centralized through just the PIOs

and Liaison Officer (LOFR). The IC, LOFR and Deputy IC had the greatest number of communication ties to cooperators. On average, key Forest personnel repeatedly interacted with six different IMT command staff/sections chiefs during the fire. Cooperators repeatedly interacted with, on average, 3.7 different IMT members. This was the lowest level of overall IMT integration with cooperators across the three fires. However, more cooperators reported repeatedly interacting with the IC and Deputy IC during the Bull fire relative to any other fire.

#### 2) Communication quality across stakeholders received mixed reviews.

- The majority of respondents (59%) noted at least “some” room for improvement on the quality and timeliness of the information they received. Compared to other fires, cooperators saw less room for improvement in their interactions between IMT, local forest and other cooperators.
- On average, information received by responders on 1) fire status and behavior, 2) evacuation and road closures, and 3) infrastructure affected by the fire (utilities, communications etc.) was rated as “quite” adequate.
- Findings from across all three fires indicate that communications with and among local government and cooperators have the greatest room for improvement.

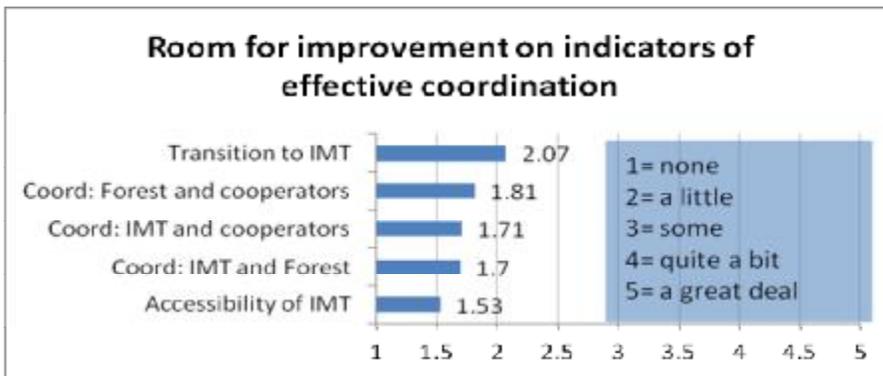
#### 3) The IMT received moderately high marks at identifying and using local information and resources.

- Over 85% of responders rated the IMT as having “little” to “no” room for improvement in 1) engaging and utilizing local community stakeholders in the response; and 2) identifying and protecting cultural and archaeological sites. These results fall between the Shultz fire, which had fewer indicating room for improvement, and the Bull fire which had higher percentage indicating “some” room for improvement.
- However, 17-25% of responders saw “some” room for improvement in the IMT’s efforts to 1) seek out and utilize information about the local area (weather, roads, trails) and 2) be sensitive to social and political issues.

*“...I thought [the IMT] did a very good job of seeking out local information all the way from the politics to the local weather patterns to everything else they need. I thought they did a very, very good job. They really went out of their way...Best team I’ve ever worked with....”*  
-Local Cooperator

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- 4) Responders reported very little need for improvement in coordination and integration between IMT, local Forest, and cooperators.



Responders were also asked to evaluate the coordination between the IMT, Forest, and cooperators, the accessibility of the IMT, and the transition from Forest to the IMT. Responders indicated only modest need for improvement with regard to effective coordination and integration between the IMT, Forest, and cooperators.

- 5) While overall performance was rated positively, some areas for improvement were identified.

- **Performance Feedback for the IMT:** Both the Forest and cooperators expressed appreciation for the accessibility of IMT members and the amount of information that was pro-actively disseminated. The IMT received praise for their attention and responsiveness to community concerns (e.g. impact to local economy and cultural resources). The cooperators' meetings, IMT briefings, Operations section meetings, and PIOs also received strong praise. Areas for improvement included sharing digitized maps and infrared data with cooperating agencies and making a greater effort to engage less responsive cooperators. Respondents noted that the IMT could have done even more to tap into alternative sources for information dissemination and use the extensive network of contacts developed by Kern County officials. Respondents also noted the need for IMT members and local Forest personnel to be more proactive in planning for the transition back to the Type III team to ensure a smooth transition.
- **Performance Feedback for the Forest:** Both cooperators and members of the IMT were appreciative of the level of detail and thoroughness of the in-brief package provided by Sequoia National Forest. Respondents were also complimentary of the Forest's effort in clearly communicating priorities for dealing with the public and the effort placed on keeping elected officials apprised of what was occurring. Identified areas for improvement included: need for better coordination, communication, and dissemination of information on road closures; better management and tracking of resources during initial stages of the incident, need for more up-to-date Incident Operating Guidelines and accurate accounting of resources early in the event to facilitate accurate cost share accounting; and greater specificity regarding the roles and responsibilities of Forest information staff. A number of respondents commented on problems associated with inaccurate or unverified information disseminated to media outlets and noted the need for greater integration and cooperation of Forest information personnel with IMT PIOs.
- **General Feedback (Forest and Cooperators):** The Kern River Valley Fire Safe Council's efforts repeatedly received high praise for facilitating coordination among cooperators and the Forest. Several respondents noted that previous fire experience in the community meant that community members and local cooperators had a better understanding of what was happening and a greater appreciation of the fire management priorities (safety first, resource protection second). A number of respondents were complimentary of the interagency agreements between cooperators, but respondents recommended that they should be more inclusive of a wider range of cooperators. Other areas for improvement included greater clarity regarding road closures and increased engagement and communication among cooperating agencies, including involvement of cooperators from adjacent counties. It was noted that cell phone coverage and unreliable internet connection made sending and receiving information more difficult and that there was a need to diversify the means of communication during fires. Respondents also noted the need for more regular communication with Tulare County in order to avoid confusion concerning road closures and evacuation at the county border.

# Bull Fire

•The IMT was well integrated with the Sequoia National Forest and relatively well integrated with local cooperators  
•The most central actors were the IMT IC, PIO and Ops, as well as Kern County Fire Department, CA Highway Patrol and the Kern River District Ranger

Red ● = IMT  
Green ■ = Local Forest  
Yellow ◆ = Local Government  
Blue ▲ = Cooperators

