

FACTORS INFLUENCING ADHERENCE TO WILDFIRE EVACUATION ORDERS

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Background

As the number of people living in fire-vulnerable areas continues to increase and a changing climate extends and exacerbates wildland fire seasons, wildfire events continue to impact a growing number of households throughout the United States. On November 8, 2018, two wildfires ignited in Ventura County, California, that would eventually destroy over 1,600 structures and prompt the evacuation of 295,000 people, including approximately 75% of residents in Ventura's Conejo Valley. Interest in understanding how residents react to fire threats, such as deciding when and whether to follow evacuation orders, has grown. For instance, why some individuals decide to ignore or not fully comply with evacuation orders issued by public safety officials. Residents that decide either not to evacuate or to return before evacuation orders have been lifted often pose a significant safety risk, as the majority of fatalities occur during last-minute evacuations (McCaffrey & Rhodes, 2009).

Research on evacuations has largely concentrated on evacuation preparation and initial responses to disaster events, however, relatively little research has looked at the rationale and experience of residents who are issued evacuation orders. Due to the significant consequences evacuation decision making and behavior can have, understanding the factors that influence residents' evacuation responses is crucial to ensuring public safety policies and outreach efforts are strategic and maximally effective.

Research Goal

This study seeks to assess *what criteria influences resident's decisions to adhere to or disregard wildfire evacuation orders* for a sample of residents in Ventura County impacted by the Woolsey and Hill fires. As well as evaluate *what changes to public safety messaging and procedures can be implemented by public safety officials in order to increase compliance with evacuation orders.*

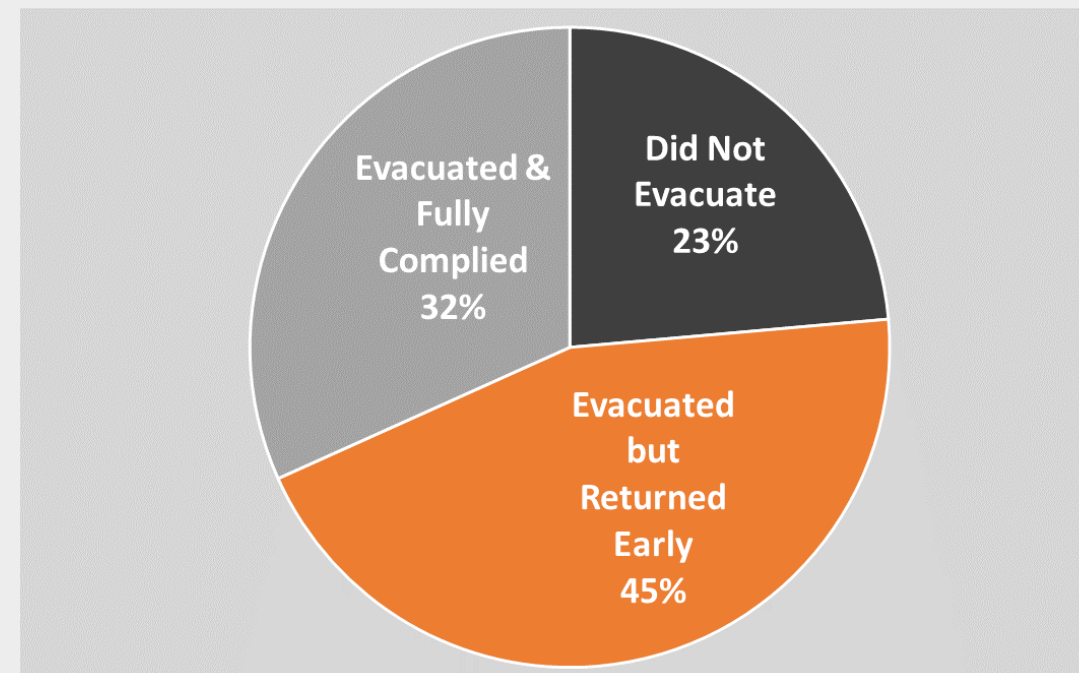
Methods

Participants were recruited through varied methods of distribution. Informational flyers with a link to an online survey were distributed to a subset of homes in the Woolsey and Hill fire evacuation zones. Flyers were posted at community centers, such as libraries and parks in order to collect information from a variety of residents. Finally, the survey was distributed on social media platforms such as Twitter through the accounts of local newspaper reporters as well as private emergency notification accounts.

Survey questions were developed based on existing literature in the field of emergency disaster evacuations. The work of Sarah McCaffrey (2017) provided model wildfire evacuation questions that could be adapted for the Woolsey and Hill Fires. The survey included a range of questions to assess: evacuation responses, factors and cues impacting decisions, information sources used during the fires, resident's household makeup, beliefs about the effectiveness of current evacuation notification systems, and future risk perception and attitude. The survey was administered as a conditional, branching questionnaire through the Google Forms application and was available online for four weeks.

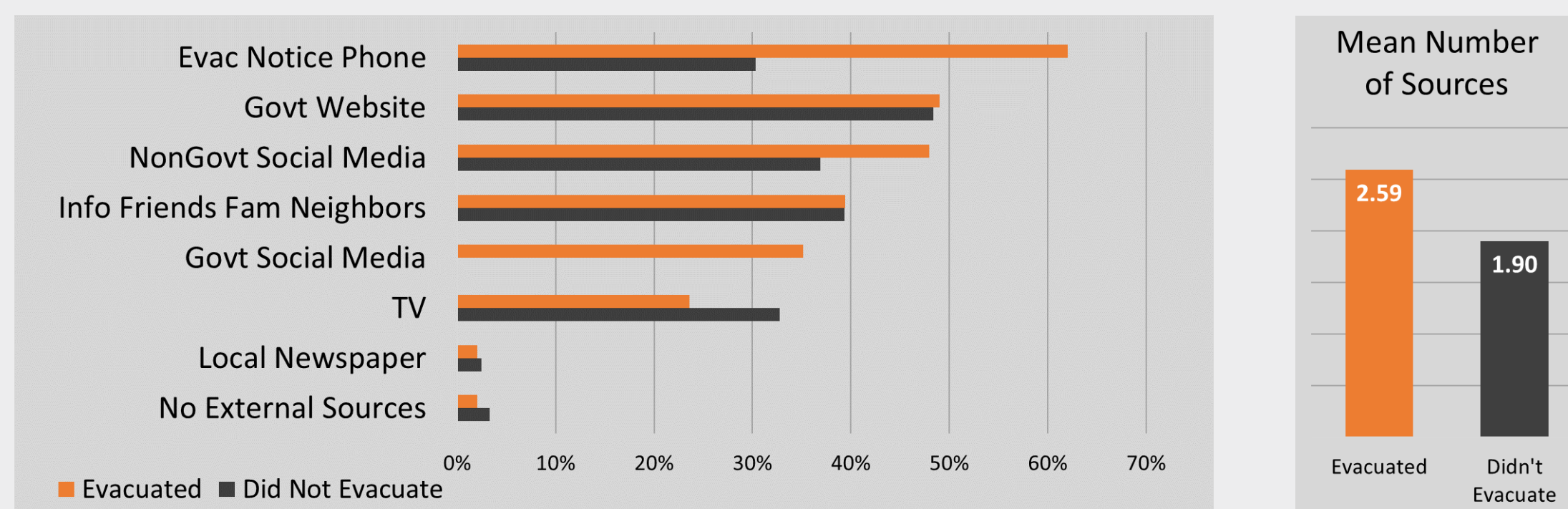
Figures and Results

Evacuation Compliance

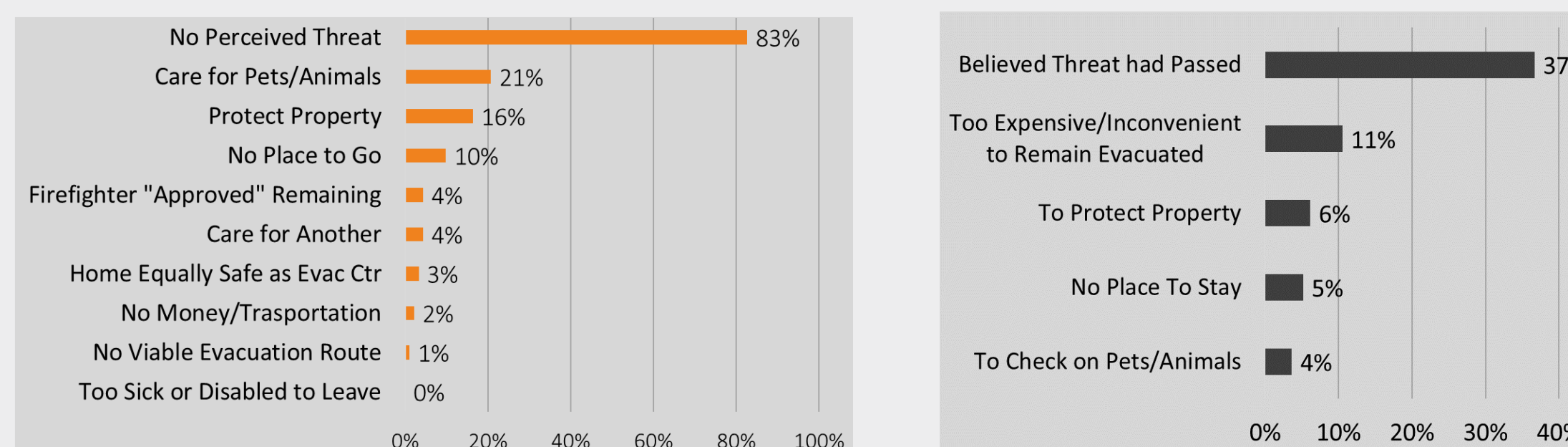


- 520 residents of Ventura County completed the survey
- 76.5 evacuated during the fires
- Of those who evacuated:
 - 25% left before mandatory order was issued
 - 57% left ASAP once they heard there was a mandatory evacuation order
 - 14% waited to see what happened but eventually left
 - 4% only left once they were personally told to leave by an authority
- 59.5% of those who initially evacuated returned home before orders were lifted

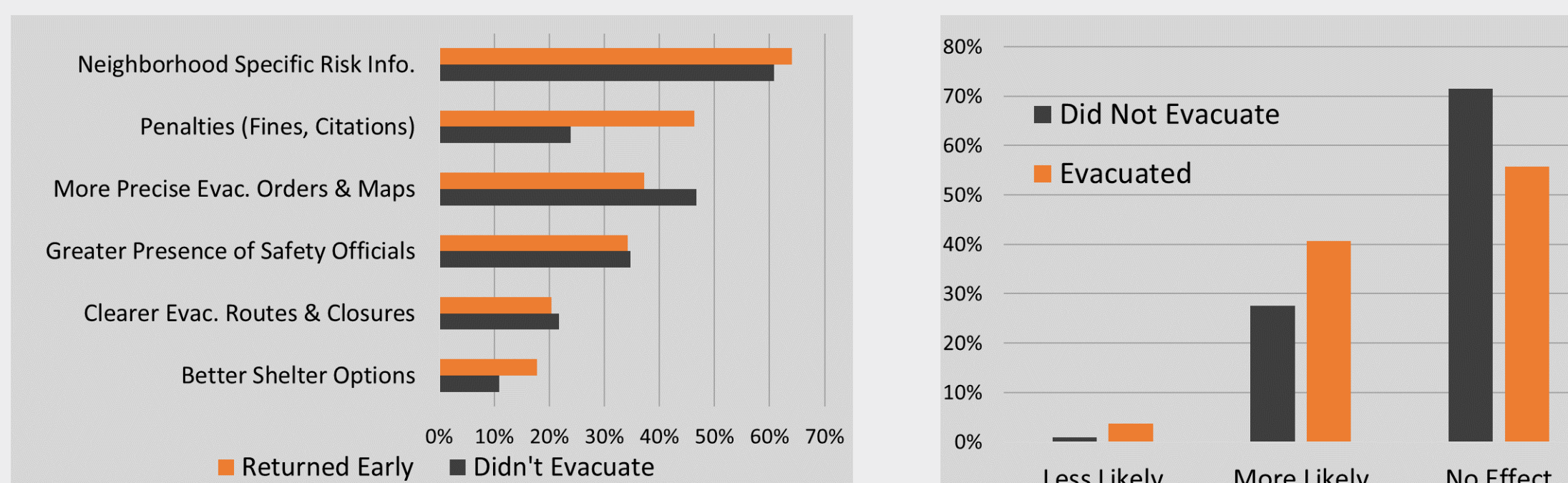
Information Sources



Non-Compliance Motives



Future Compliance



Discussion

Wildfire evacuation literature often suggests the influence of a desire to protect one's property in residents' decisions to not evacuate during a wildfire. However, the motives for decisions to not evacuate during the Woolsey and Hill fires were largely based on one factor, self-assessment. Although some respondents did mention they decided to not evacuate in order to protect their property or care for pets, the majority cited that they chose not to evacuate due to their own perception of the risk of the fires to their home and their own analysis of the situation, despite the warnings of fire officials. These findings were paralleled in the motives of residents who did not fully comply with mandatory evacuation orders by returning home early before repopulation notices had been issued (see Figure 5). Residents who returned early, after initially evacuating, largely did so as they believed the threat had passed, not due to remaining evacuated being too expensive or inconvenient. When information is limited, misrepresented, or misunderstood, people often resort to their own perceptions, which can be inaccurate and hazardous.

Problems with effective communication also apply to the structure of evacuation zones themselves and to residents receiving evacuation orders that are not applicable or strictly urgent. More granular zones can help to assure the risks identified by fire officials can be effectively communicated to the populations they apply to, as well as prevent unnecessary evacuations of those who are not at immediate risk. Finally, lifting evacuation orders promptly for areas that are no longer under threat is crucial to assure that some residents within an evacuation zone can safely return without having to wait for orders to be lifted for areas still under threat.

Conclusion

Information availability, quality, and distribution frequency is at the core of the evacuation process during complex wildfire events. This study identified one main factor for residents' decisions not to fully comply with evacuation orders during the Woolsey and Hill Fires: self-assessment. However, there are opportunities to increase future compliance during wildfire evacuations by effectively improving the systematic provision of information and illustrating the risks identified by public safety officials to residents. Actions can be taken to provide more granular and frequent information to residents, as well as limit unnecessary evacuation orders and lift orders more promptly, in order to encourage residents to follow the advice of fire officials. Although the factors and issues identified are applicable to various wildfire events, this study only looked at one community for a localized fire event, and thus a broader range of information from a variety of disaster events would help to provide a clearer picture of the evacuation process. Understanding the variety of factors that influence residents during unpredictable wildfire events can serve to increase evacuation compliance when necessary and assist officials in protecting the lives of residents.

References

McCaffrey, S., Wilson, R., & Konar, A. (2017). Should I stay or should I go now? Or should I wait and see? Influences on wildfire evacuation decisions. *Risk Analysis*, 38(7), 1390-1404. doi:10.1111/risa.12944