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## Understanding Homeowner Preparation and Intended Actions when Threatened by a Wildfire

By Sarah McCaffrey and Greg Winter  
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This paper presents preliminary findings from a study in three locations in the United States (California, Florida, Montana) designed to assess homeowners' mitigation actions before a fire and their planned course of action should their property be threatened by a fire. How many homeowners intend to leave before they are directly told to leave and how many do not intend to leave? Do individuals understand what actions put their lives and property at most or least risk? Better understanding of the intended actions of homeowners before and during a fire can help fire agencies design outreach programs that provide the information needed to ensure homeowners fully understand the nature of the risks and take appropriate actions in response to a wildfire.

A self-administered, mail questionnaire was sent to randomly selected homeowner households in high-risk wildfire areas in Ventura County, California (Oct–Dec 2009), Alachua County, Florida (Oct–Dec 2009); and around Helena, Montana (Feb–Apr 2010). The three study sites are diverse in population demographics, mix of land use and ownership, and regulatory nature of homeowner wildland fire mitigation guidelines. Of the three sites, Ventura County is the most densely populated, most affluent, and has the most actively enforced regulations that require regular vegetation management by private homeowners. The Helena area comprises the least densely populated of the three sites and has the highest proportion of seasonal homes. In terms of socioeconomic factors, Alachua County, Florida had the lowest median income (more than 20% of the population are below the federal poverty level) and the lowest proportion of land in public ownership. Following are selected general findings from the questionnaire, although we note some differences between communities, this will be examined in more detail in subsequent papers.

### Mitigation actions Taken

Overall the vast majority of respondents are taking steps to mitigate their risk with 89 percent indicating they had modified their vegetation a great deal (58%) or to some degree (32%) and 76 percent indicating they had taken a great deal (38%) or some degree of action (38%) to make their house more fire resistant. Ventura County was most active, particularly in terms of vegetation management—77 percent of respondents indicated they had done a great deal of work and 21 percent had done some work.

In terms of home fire-resistance, for almost half of the homes, structural elements (fire resistant roof, covered vent openings, etc.) were already in place upon purchase or were not applicable. In homes where the homeowner had taken action since purchase, roughly equal proportions undertook the action primarily for fire or primarily for reasons other than fire. While only half of the 10 percent of homes without a fire resistant roof had no plans to change their roof, almost 30 percent of respondents without boxed



*Ventura County, CA has some of the most actively enforced vegetation management regulations (for reduction of fire risk) in the country. Credit: Sarah McCaffrey*

eaves, enclosed decks, or exterior walls with fire resistant materials indicated they did not plan to put them in place in the future.

Respondents were also asked about their view of the relative importance of vegetation

management activities compared to actions to make their house more fire-resistant. Although in general respondents indicated that the two categories were equally important (55%) there is a clear weighting towards vegetation management being more important with 35 percent indicating that it was more important or all that was needed. When asked who they felt was most responsible for protecting private property from wildfire the clear weighting was toward individual homeowners: only 18 percent put most or all of the responsibility on firefighters and 24 percent saw it as an equal responsibility between homeowners and firefighters. By contrast, over half put all (23%) or more (35%) of the responsibility on individual homeowners.

### **Action during a Fire**

Overall, only 38 percent of respondents indicated they had a household disaster plan in case of a wildfire, with the largest proportion in Ventura County (48%), followed by Montana (35%) and Alachua County (30%). Thirty eight percent of respondents indicated they had at some point been threatened by a wildfire, with the highest proportion in Ventura County (52%), followed by Montana (40%) and Alachua County (21%). When respondents who had been threatened were asked how they had responded for the most recent fire, less than half (38%) indicated their response was based on evacuation orders or authorities' instructions while a slightly smaller proportion waited to see what would happen before they decided to stay (30%) or leave (3%). Notably 17% indicated that they stayed throughout the fire and tried to protect their property.

All respondents were asked to indicate what they would most likely do in the future if they were at home when a wildfire was in the area. Only one-third would leave early or when authorities indicated they should leave (such as a mandatory evacuation order) while eleven percent said they would stay throughout the duration of the fire to protect their property. Although we had expected that a larger percentage of respondents in Montana would plan to stay, the numbers were comparable to those of the other two sites (10% vs. 13%). Most notably half of our respondents indicated they would do what they could to protect their house and leave if imminently threatened by the fire. The question we hope to explore in further analysis is what "imminently" may mean for our respondents.

Finally, we asked two questions assessing perceptions of how lives were put at risk during a fire. When asked how common they thought various causes of death were it is clear that inability to breathe is seen as the primary cause of death as 80% felt smoke inhalation was a very common cause followed by 60% seeing lack of oxygen as a very common cause. Radiant heat, which in Australia is generally seen as the main cause of death (Haynes et al 2008), was seen as very common to only 48% of respondents. We also asked how safe different actions were in protecting life if the respondent could not evacuate safely.

Although few people saw any action as very safe, half felt that lying down in a ditch, swimming pool, or open area was a reasonably safe course of action followed by leaving the area on foot or bike (22%). Around half of respondents viewed going inside the house as a very unsafe action, while driving through the flames or taking refuge in a car were the least safe options (67 and 70% respectively).

## **Discussion/Conclusions**

Our findings indicate that the vast majority of WUI homeowners are taking action to reduce their risk from wildfire. There is evidence that homeowners understand that mitigation measures apply both to their vegetation and to the home itself, although there is a sense that vegetation management is more important. There appears to be a fairly small proportion of the population for whom many structural modifications are relevant—either because their property already had them at time of purchase or because they do not apply to the particular structure. Also notable was that structural elements are put in place as often for non-fire reasons as for fire reasons. It therefore may be useful for managers who want to encourage certain actions to understand and promote the non-fire reasons as well as fire reasons for implementing a practice. Finally, responses indicate that most homeowners see protecting their property from wildfire as predominantly their responsibility.

In terms of actions during fire only one-third to half of our respondents had prepared a disaster plan, suggesting that homeowners are spending more energy on mitigation actions than consideration of what they will do during a fire. This is noteworthy given the fact that, depending on the location, one-fifth to half of respondents had at some point felt threatened by a wildfire. Results support anecdotal evidence that a number of homeowners do not evacuate but stay to protect their property. They also suggest that many do not evacuate based on official evacuation orders and advice but instead wait to see conditions and make their own decision about the risk. This raises questions about whether homeowners have the knowledge to accurately assess conditions and what will put them at risk. Although there is surprisingly little information documenting cause of civilian death during wildfires in the United States, studies from Australia suggest that radiant heat is the primary cause and that being outside, particularly on foot, is more dangerous than being inside a structure (Haynes et al, 2008). The fact that smoke inhalation was rated as the most common cause of death by our respondents and that being outside was clearly seen as safer than being inside raises questions as to whether people have the knowledge to make the safest decision should they, for whatever reason, be faced with direct exposure to a fire front.

Overall our findings show that most people are thinking about fire risk, have a sense of responsibility for doing something to mitigate their risk, and are taking action. While some plan to follow official instructions, a fair proportion wait to see before they make the decision of when and whether they will leave, and a small but not minor proportion intends to stay and protect their property. This paints a picture of a reasonably engaged population, however, it only touches on possible reasons for the actions people take. Our next step will be to examine these underlying reasons—what specific factors, such as cost and perceived effectiveness affect mitigation actions, what considerations shape planned actions during a fire, and whether there are links between level of preparedness and planned course of action during a wildfire.

### **Literature Cited:**

Haynes, Katherine; Tibbits, Amalie; Coates, Lucinda; Ganewatta, Gaminda; Handmer, John; McAneney, John. 2008. 100 years of Australian civilian bushfire fatalities: exploring the trends in relation to the 'stay or go policy.' Report for Bushfire CRC, Melbourne, Australia, November 2008 available at: [http://www.bushfirecrc.com/research/downloads/Fatality-Report\\_final\\_new.pdf](http://www.bushfirecrc.com/research/downloads/Fatality-Report_final_new.pdf)

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