

Intended Evacuation Behaviors During Wildfire

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Key Findings

- Residents may change their plans during wildfire events depending on cues such as their perceptions of the fire's behavior, evacuation orders, or the behavior of their neighbors.
- There is a need to educate and inform at-risk residents to better prepare them to make proactive, informed decisions based on their household's level of wildfire preparation, and self-efficacy related to fire mitigation on their properties.
- These findings confirm that how long residents will 'wait and see' is variable, so future efforts should explore whether their waiting times would still provide sufficient opportunity to enact their evacuation plans safely.

Keywords. Disaster management, wildfire: risk, wildfire: evacuation, wildfire: stay and defend, wildfire: shelter in place, risk communication, science communication, fire management, event-based cues

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Evacuation is considered [by many to be the safest action](#) for residents to take when threatened by a wildfire. However, not all residents agree and evacuate in the face of an approaching wildfire, instead preferring to [stay and defend](#) their properties or else wait and see how the threat evolves before making a decision. There exists a lack of understanding among agencies, fire professionals, and residents themselves as to what action, if any, residents intend to take when wildfire approaches their property, and what role event-based cues and pre-fire actions play in predicting these actions. [Researchers at the University of Idaho](#) addressed this gap by exploring the influence of pre-fire preparation efforts and event-based cues on intended behavior during wildfire among residents in and around [McCall, Idaho](#), an area at high risk from wildfire that has not been subject to an evacuation in a long time, meaning that intended behaviors are not biased by recent experiences.

The researchers collected and analyzed data from 1,349 completed household surveys in the area concerning stated evacuation behavior, private property wildfire mitigations, cues that might prompt evacuation decisions, and perspectives about wildfire management. Three categories of intended behavior during wildfire events emerged: 1) [Evacuate](#), 2) [Stay and defend](#), and 3) [Don't know/shelter in place](#). Residents in all three

categories displayed different intended evacuation behaviors, and were varyingly influenced by the advice of fire management professionals and the behavior of their neighbors.

Intended evacuation behaviors

More than half of all respondents either moderately or strongly agreed that they would [stay and defend](#) their property during a fire. However, over 58% of respondents moderately or strongly agreed that they would [evacuate](#) when authorities told them to do so. A third of respondents indicated that they would [evacuate](#) immediately after hearing that fire threatened their property. Male respondents were more likely than females to [stay and defend](#) when compared to [evacuation](#) while holding all other variables constant. Part-time respondents were significantly more likely to [evacuate](#) than the [stay and defend](#).

[Stay and defend](#) respondents displayed higher levels of agreement with the following intended actions:

- Remaining at home to defend their property by putting out spot fires.
- Travelling back to their property as quickly as possible to defend it.
- Working with neighbors to stay and defend their properties.
- Some household members would evacuate while others remain to defend the property.
- Waiting to see how bad the fire is; and evacuate if they think it is too dangerous.

[Shelter in place](#) respondents indicated that they were most likely to *not know what to do during a fire*. They also gave greater consideration to remaining in place during a fire and safely sheltering without having to put out spot fires.

Preparing for a fire

Comparison across the three evacuation preference groups revealed significant differences in evacuation planning prior to wildfire events (Figure 1). Respondents in the [evacuation](#) group



What influences residents' decisions to evacuate or stay and defend their homes? Decisions may sometimes be influenced by actions residents have taken to prepare their homes and surrounding areas, such as removing low branches that can act as ladder fuels. Photo: John O'Connor/Oregon Department of Forestry, under CC BY 2.0.

were significantly more likely to have planned somewhere to stay during a long-term evacuation than any other group; more likely to have placed important documents in an easy-to-reach place than *shelter in place* respondents; more likely to have discussed evacuation plans with neighbours than *stay and defend* respondents; and were more likely to have removed tree branches lower than 10 feet from the ground on

their property than the *don't know/shelter in place* group. Meanwhile, those in the *don't know/shelter in place* category were significantly less likely to have planned an evacuation route compared to any other group. Those who were likely to *stay and defend* their property were more likely to have cleared or maintained 30 feet of green space around their property, and placed trees or shrubs at least 10 feet apart than

any other group. Furthermore, *stay and defend* respondents were more likely to have planted fire-resistant vegetation than the evacuation group.

Influences on intended evacuation

Respondents in the three categories were influenced to varying degrees by different actions and information sources when determining their intended evacuation behavior. When making their evacuation decision, *stay and defend* residents were more likely to indicate that pre-fire mitigations—such as clearing fuel and branches from their properties—influenced their evacuation decision-making more than other groups. They were, however, *less* likely to consider their neighbors' decision than other groups, and less likely than *evacuate* respondents to factor formal evacuation notices into their decision. Meanwhile, *shelter in place* respondents were more likely to consider fire professionals' ability to prevent damage to their property when making their evacuation decision, but less likely to consider in-person evacuation notices.

Management Implications

These findings suggest that planning for different evacuation outcomes at the community and county levels is complex and should address a range of intended behaviors, rather than assuming that all residents will evacuate. By acknowledging these differences in perceptions and behavior, fire management and emergency response professionals can identify strategic locations for evacuation centers or road closures and develop tailored messaging about evacuation and safe actions during wildfire. These data can also support the development of decision support tools to assist residents and professionals in making informed decisions about evacuation or its alternatives and when to safely implement these actions.

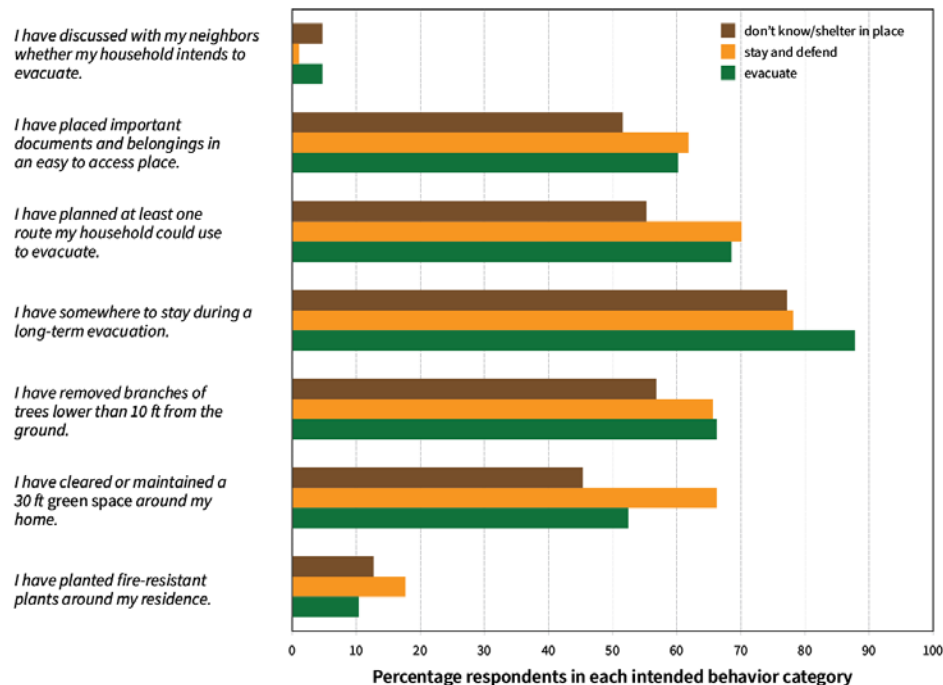


Figure 1. Preparing for a fire. Comparison across the three evacuation preference groups—*evacuate* (green), *stay and defend* (orange), and *don't know/shelter in place* (brown)—revealed significant differences in evacuation planning prior to wildfire events. Data obtained from Table 3 in Edgeley & Paveglia (2019).

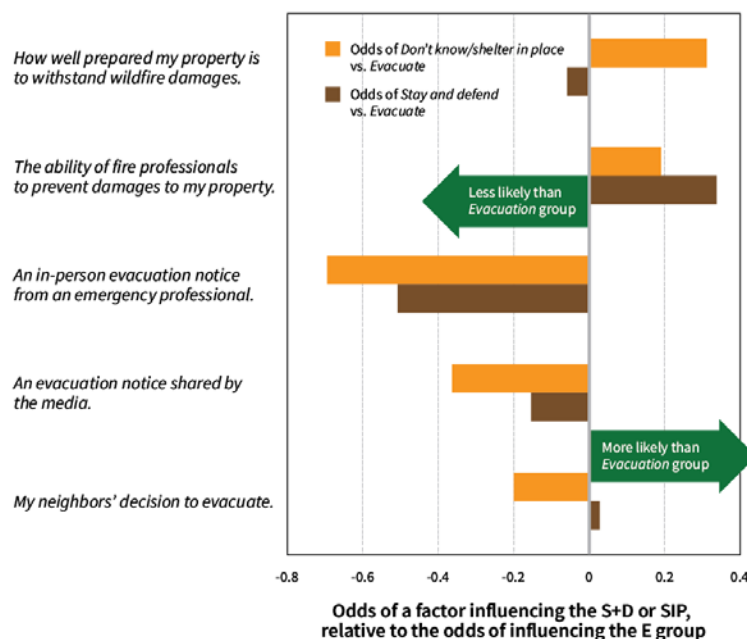


Figure 2. How influential or uninfluential are different preparation-based and event-based factors in each group's decision to evacuate? Responses are presented as the odds of a factor being influential in the *stay and defend* group's decision (S+D, orange) or in the *shelter in place/don't know* group's decision (SIP, brown), relative to the *evacuate* group (E). Bars to the left of zero (shown in the gray vertical line) show that factor being less influential on this group than on the *evacuate* group; bars to the right show that factor being more influential on this group than on the *evacuate* group. Data obtained from Table 4 in Edgeley & Paveglia (2019).

Foundational Publication

Edgeley, C.M. & Paveglia, T.B. (2019). *Exploring influences on intended evacuation behaviors during wildfire: What roles for pre-fire actions and event-based cues?* International Journal of Disaster Risk Reduction, 37, 101182. <https://doi.org/10.1016/j.ijdrr.2019.101182>