
INSURANCE AND WILDFIRE MITIGATION: WHAT DO WE KNOW?

James R. Meldrum, Chris Barth, Patricia A. Champ, Hannah Brenkert-Smith, Lilia Falk, and Travis Warziniack

There is much interest in the role of insurance in encouraging homeowners to mitigate wildfire risk to their properties. For example, the Fire Adapted Communities Coalition characterizes the insurance industry as a “nontraditional stakeholder” that “may reduce future wildfire-related insurance claims by educating homeowners on Firewise principles and providing incentives for policy holders completing the work” (Mowery and Prudhomme 2014). Indeed, the Insurance Institute for Business and Home Safety has contributed substantially to the science of wildfire risk mitigation. However, little is known about the relationship between insurance policies, communications from insurance companies, and wildfire risk mitigation on individual properties.

Homeowners insurance could relate to wildfire risk mitigation

James R. Meldrum is a research economist for the U.S. Geological Survey at the Fort Collins Science Center in Fort Collins, CO; (when preparing the article, he was an interdisciplinary environmental economist at the University of Colorado, Boulder, CO); Hannah Brenkert-Smith is an environmental sociologist at the University of Colorado, Boulder; Chris Barth is a fire mitigation and education specialist for the Bureau of Land Management, Montrose, CO; Patricia A. Champ and Travis Warziniack are research economists in the Human Dimensions Program at the Forest Service, Rocky Mountain Research Station, Fort Collins, CO; and Lilia Falk is the Director of the West Region Wildfire Council, Montrose, CO.

Research shows that homeowners are often unaware of the implications of potential hazards on their insurance options.

for many reasons. Most homeowners carry insurance on their residential property. If insurance premiums correspond to expected wildfire losses, properties facing high wildfire risks will be more expensive to insure than other properties, all else being equal. Homeowners can reduce their wildfire risk in many ways, including maintaining defensible space and using noncombustible building materials. Such activities lower expected wildfire losses, so the potential for reduced insurance premiums could encourage homeowners to invest in such activities. Insurance companies could also attach requirements for wildfire risk reduction to insurance coverage. Furthermore, they could raise awareness and influence behavior by denying coverage to high-risk properties.

However, if the effect of wildfire risk on homeowners insurance is to influence behavior, homeowners must be aware of that effect. In this article, we draw on survey data from numerous communities in Colorado to investigate the relationship between insurance and wildfire mitigation. We ask:

Are homeowners aware of any effect of wildfire risk on their insurance coverage? If so, does homeowner awareness of the effect of wildfire risk on insurance coverage relate to awareness and concern about wildfire risk? And most importantly, does homeowner awareness of the link between wildfire risk and insurance coverage relate to homeowners taking steps to reduce the risk of wildfire?

Data From Colorado Communities

We examined responses to household-level surveys in five different locations throughout Colorado. These surveys addressed homeowners' thoughts about wildfire risks on their property. As figure 1 shows, surveys occurred in different years: Colorado Springs in 2003, Boulder and Larimer Counties in 2010, the Log Hill Mesa community in Ouray County in 2012, and four out of five fire protection districts in Delta County in 2013. Table 1 provides details about the surveys and the study populations.

We examined responses to household-level surveys in five different locations and years: Colorado Springs in 2003, Boulder and Larimer Counties in 2010, the Log Hill Mesa community in Ouray County in 2012, and four out of five fire protection districts in Delta County in 2013.

As figure 1 depicts, the surveyed communities are distributed throughout Colorado.

All five surveys solicited homeowners' thoughts about wildfire risks on their properties and their knowledge about the relationship between their

homeowners insurance and wildfire risk. Table 1 gives further details about the surveys and the study populations. We focused in particular on the Delta County surveys in the wildland–urban interface (WUI), which are described in more detail in Meldrum and others (2015a).

Were homeowners aware of any effect of wildfire risk on their insurance coverage?

All five surveys asked about insurance coverage and how respondents thought wildfire risk affected their coverage. For example, figure 2 shows responses to a series of questions from the 2013 survey of Delta County WUI communities. The figure shows the type of relevant information collected, although the specific questions asked varied across the different surveys.

In the Delta County WUI survey, few respondents (18 percent) reported any known effect of wildfire risk on their homeowners

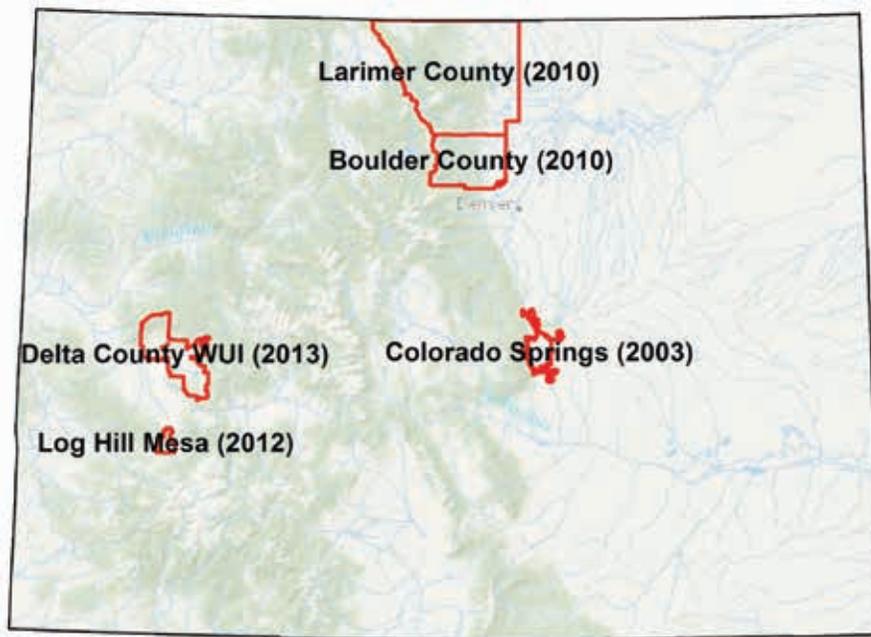


Figure 1—Survey data pertaining to communities located in the wildland–urban interface throughout Colorado, as shown in red on the map: Colorado Springs (2003), Boulder and Larimer Counties (2010), Ouray County (2012), and Delta County (2013).

Table 1—Details from five surveys on wildland–urban interface (WUI) homeowners' knowledge about the relationship between wildfire risk and their homeowners insurance, by location.

Data	Colorado Springs	Boulder County	Larimer County	Log Hill Mesa, Ouray County	Delta County
Survey year	2003	2010	2010	2012	2013
Number (response rate)	43 (52%)	259 (66%)	185 (62%)	291 (62%)	681 (58%)
Sample frame	Households in Colorado Springs WUI that sold from July 2002 to September 2004	Respondents to previous survey (2007, 36% response rate) of random sample in Boulder County's fire-prone areas	Respondents to previous survey (2007, 36% response rate) of random sample in Larimer County's fire-prone areas	All households in Log Hill Mesa community, Ouray County	All households in the WUI of Delta County

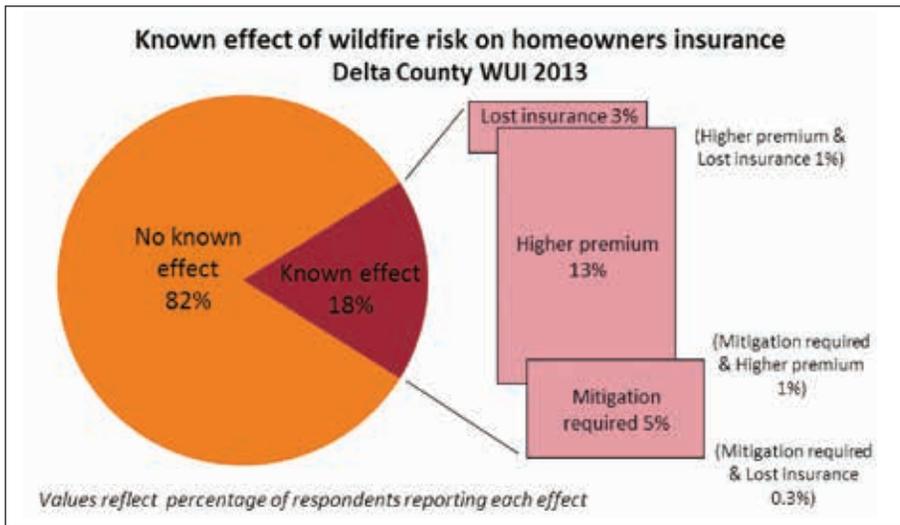


Figure 2—Survey responses regarding knowledge of wildfire risk on homeowners insurance coverage in the wildland–urban interface of Delta County, CO, in 2013. Most respondents were not aware of any effect of wildfire risk on their homeowners insurance. (Three percent of respondents noted multiple effects, so the subcategories of “Known effect” do not add up to the 18-percent total.)

insurance. The most commonly noted effect (13 percent of respondents) was facing a higher homeowners insurance premium because of wildfire risk. Anecdotes notwithstanding, few respondents (3 percent) noted that an insurance company had either canceled or refused to renew their policy because of wildfire risk. For another 5 percent of respondents, their homeowners insurance company required wildfire risk mitigation as a condition of issuing a policy. (Because a small set of respondents (3 percent) noted multiple effects, these categories do not add up to the 18 percent total.)

The remaining 82 percent of Delta County WUI respondents knew of no effect of wildfire risk on their homeowners insurance. As figure 3 shows, this general result is similar across the surveys. In all cases, most respondents—ranging from 72 percent in Boulder County to 95 percent in Log Hill Mesa—were not aware of any effect of wildfire risk on

their homeowners insurance. This might include people who correctly knew that there were no effects as well as people who were affected but did not know it. Either way, the widespread lack of awareness of any effects of wildfire risk on homeowners insurance undercuts any expectation that insurance played a role in homeowners’ decisions related to wildfire risks at the time of the survey.

The findings were despite circumstances that might have focused homeowner attention on wildfire risks:

- The Colorado Springs survey followed a comprehensive wildfire education campaign by the Colorado Springs Fire Department, which included online publication of parcel-level wildfire risk ratings;
- The Boulder and Larimer County surveys closely followed Boulder County’s Fourmile Canyon Fire in 2010, which destroyed 169 homes; and
- The Log Hill Mesa and Delta County surveys were part of efforts to engage the public in developing local community wildfire protection plans.

Under other circumstances, homeowner awareness of the impacts of wildfire risk on insurance might have been even lower.

Did awareness by homeowners that wildfire risk affected their insurance coverage relate to their awareness of and concern about wildfire risk?

Next, we focused on the relatively small group of respondents who

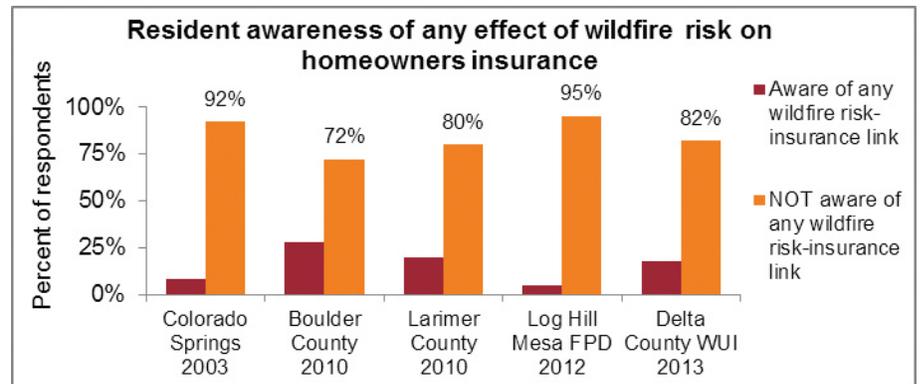


Figure 3—Percentage of homeowners aware of any effect of wildfire risk on their homeowners insurance in five surveys across Colorado, based on relevant questions asked in each survey. Across all five surveys, most respondents were not aware of any effect of wildfire risk on their homeowners insurance.

were aware of a link between wildfire risk and their insurance coverage. Did their perception of and concern about wildfire risks differ from those of respondents who were unaware of any connection?

Figure 4 compares the two groups of respondents to the Delta County WUI survey. Error bars show 95-percent confidence intervals, so nonoverlapping error bars indicate statistically significant differences between groups; in other words, when the error bars overlap, there might not be any meaningful difference between the average responses of the two groups.

The figure shows that awareness of a link between wildfire risk and insurance coverage was indeed associated with perceiving greater wildfire risks, but only in certain ways. Specifically, the respondents who were aware of an effect of wildfire risk on their homeowners insurance were more likely to believe there was a greater-than-50-percent chance that their home would be destroyed by a wildfire on their property. They also were more likely to rate their property's

Anecdotes notwithstanding, insurance coverage denials due to wildfire risks were not substantial in any of the surveyed communities.

overall wildfire risk as “high” or above, although that tendency was only weak. Perhaps not surprisingly, they also were more likely to state they were concerned about wildfire.

However, few respondents in either group believed that there was a greater-than-50-percent chance of a wildfire occurring on their property in the year following the survey. In other words, respondents who were aware of a link between wildfire risk and their insurance coverage were no more likely to think that a wildfire might affect their property, but they were more likely to think that there was a greater chance of adverse consequences if a fire did indeed occur.

Did awareness of an effect of wildfire risk on insurance coverage relate to wildfire risk reduction activities by homeowners?

Measured differences in risk perceptions and concern translated into few differences in wildfire risk-reduction actions. We saw this by linking the Delta County WUI survey data to parcel-level rapid wildfire risk assessments.

In the rapid assessments, a wildfire professional rated 10 property attributes related to wildfire risk, many of which can be influenced by homeowner actions. Each parcel was assigned an overall wildfire risk rating based on the 10 characteristics. Previously, we showed that survey respondents and the professional often assigned different ratings to the same properties (Meldrum and others 2015b). In particular, respondents often rated their properties' overall risk lower than the professional did. Here, we compare residents' knowledge of the insurance implications of wildfire risk with their properties' observed wildfire risk characteristics.

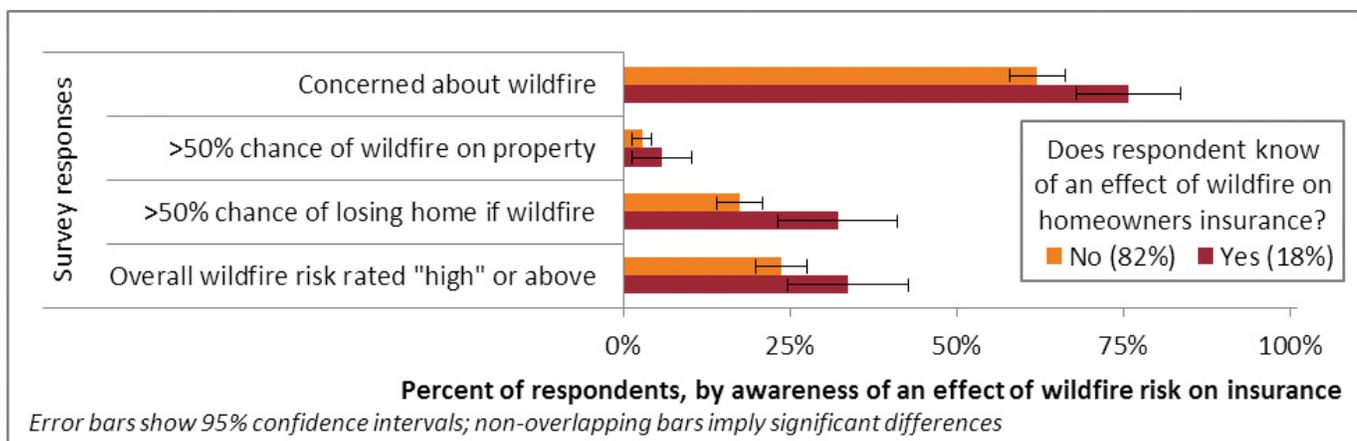


Figure 4—Comparison of select survey responses between survey respondents who were aware of an effect of wildfire risk on insurance coverage with those who were not, based on Delta County wildland–urban interface data. Risk perceptions and concern about wildfire differ between the two groups.

Figure 5 shows results for five of these attributes, comparing the same two groups of respondents as in figure 4. Notably, most attributes did not meaningfully differ between the two groups. Respondents in both groups were more likely than not to have their wildfire risk rated “high” or above. They also were more likely than not to have cleared at least 30 feet (9 m) of dense vegetation away from their homes. Respondents in both groups were also just as likely to have either a noncombustible deck or no deck at all. Similarly, the two groups did not differ with respect to other attributes not shown here.

Most respondents in all five surveys—up to 95 percent—were not aware of any effect of wildfire risk on their homeowners insurance.

Only two attributes significantly differed between the two groups. First, respondents aware of a link between wildfire risk and their insurance coverage were less likely to have combustible siding (such as vinyl or wood shake shingles). This might reflect a behavioral response to awareness of a link between wildfire risk and insurance coverage, or it could reflect other differences between the two groups.

Second, respondents aware of a link between wildfire risk and their insurance coverage were more often surrounded by higher risk background vegetation, such as dense trees and brush instead of grasses or light brush. Because this attribute pertains to vegetation beyond the respondents’ property lines, it does not reflect homeowner behavior. Instead, the difference could reflect differences in targeting by insurance companies or perhaps differences in the extent to which homeowners pay attention to information about wildfire risk and insurance.

Low Impact of Insurance on Behavior

Overall, our analysis leads to three main conclusions:

1. Few respondents in the surveyed communities were aware of any impacts that wildfire risks might have on their insurance. Therefore, insurance does not likely influence risk-related decisions for most people in these communities.
2. Awareness of a link between wildfire risk and insurance coverage is associated with greater concern about wildfire and a greater perceived risk of losing one’s home to a wildfire. This could mean that links between wildfire risk and homeowners insurance raise homeowner awareness about wildfire risks; but it also could mean that the more concerned residents are about wildfire, the more attention they pay to its potential impacts on their insurance. Either way, researchers have consistently found that homeowner

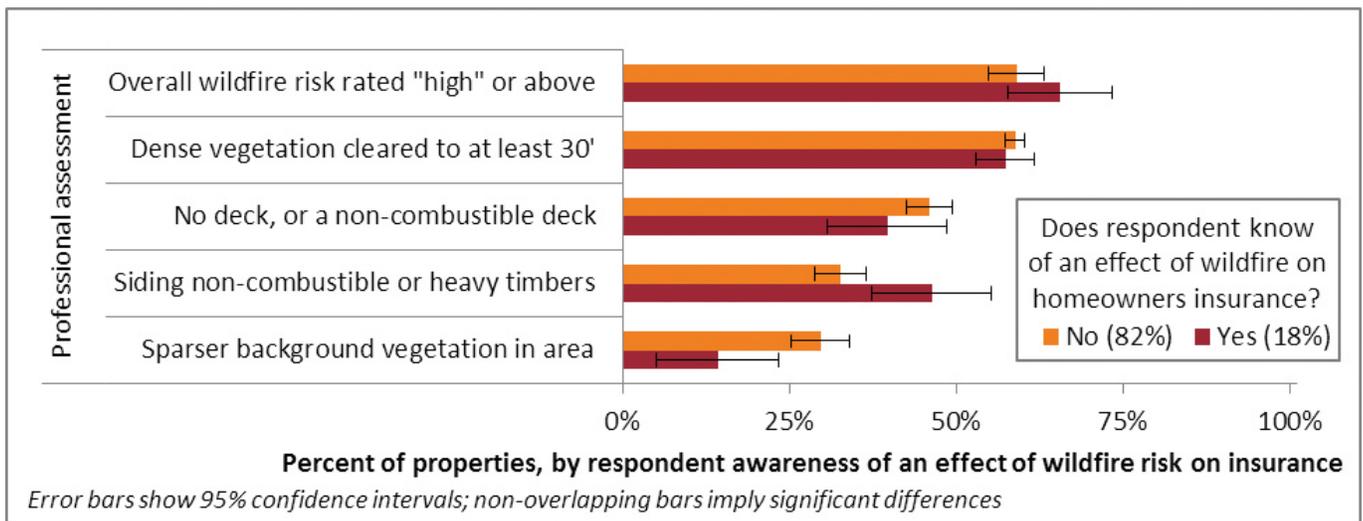


Figure 5—Comparison of select risk-related property attributes between properties belonging to survey respondents who were aware of an effect of wildfire risk on insurance coverage and properties belonging to those who were not, based on Delta County wildland–urban interface data. Most attributes were rated similarly between the two sets of properties.

concerns and risk perceptions related to wildfire do not alone suffice to generate risk reduction activities.

3. Accordingly, being aware of the potential impacts of wildfire risk on insurance does not lead to substantial wildfire risk reductions in the surveyed communities. Otherwise, we would expect to have seen differences in the assessed property characteristics, particularly those more easily and cheaply manipulated by homeowners. Instead, we found only limited evidence of such differences.

In short, our findings suggest limited to no change in behavior by homeowners who know that wildfire risk affects their homeowners insurance.

A few caveats and limitations apply. All communities surveyed were in Colorado, and Colorado has experienced significant

wildfires with record numbers of homes lost in recent years. The patterns observed might not be generalizable beyond the communities studied. Moreover, the parcel-level rapid wildfire assessments do not reflect a full inventory of a property's wildfire risks; rather, they focus on key characteristics related to a structure's potential defensibility and survivability during a wildfire event (see Meldrum (2015a)). That said, we find little evidence to suggest that signals about wildfire risk from the insurance industry affect homeowner behavior.

In conclusion, our findings suggest that insurance might be an effective mechanism for raising awareness about wildfire risks, at least among people who attend to the details of their insurance policies. However, they also suggest that additional steps—such as perhaps providing information about specific actions needed or offering resources to

overcome other barriers—are needed if homeowner awareness about wildfire risk is to translate into measurable risk reduction outcomes. Whether such steps are best taken by insurance companies or by other entities, such as community groups, regional wildfire risk programs, or government extension agents, remains an open question. ■

References

- Meldrum, J.R.; Barth, C.; Falk, L.C. [and others]. 2015a. Living with wildfire in Delta County, Colorado cross-community comparisons. RMRS–RN–67. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station.
- Meldrum, J.R.; Champ, P.A.; Brenkert-Smith, H. [and others]. 2015b. Understanding gaps between the risk perceptions of wildland–urban interface (WUI) residents and wildfire professionals. *Risk Analysis*. 35(9): 1146–1761.
- Mowery, M.; Prudhomme, C. 2014. Proactive protection: A community-wide approach to wildfire preparedness. *Fire Management Today*. 73(3): 9–12.