

Residential Wildfire Mitigation in Alberta, Canada

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Abstract:

Much research on property owner participation in wildfire mitigation activities has been done in the USA and Australia but knowledge of Canadian property owner participation in wildfire mitigation activities is limited. This research aims to reduce this gap, by examining what mitigation activities wildland-urban interface residents in Alberta are adopting and factors that contribute to adoption.

A mail survey collected data from a random sample of residential property owners in six Alberta communities during 2007 ($n = 1,209$). The survey assessed respondents' wildfire risk perceptions and factors influencing their adoption of wildfire mitigation activities. The results were examined among communities with lower and higher levels of community wildfire management.

The results indicate that respondents were moderately aware of the risk from wildfires and that respondents from all communities had moderate levels of adoption. The most popular mitigation measures were those considered part of routine property maintenance. The implications of these results are discussed.

Keywords: wildfire, mitigation, adoption, residential, community wildfire management

The pattern of wildfire occurrence in Canada shows that over the twenty-first century, wildfires occurred at increasing intervals and climate change forecasts are predicting that in the future there will be an even greater increase in wildfire and severe wildfire occurrences (Flannigan et al., 2005; Peter et al., 2006; Running, 2006; Tymstra et al., 2007). This potential increase in wildfires is occurring alongside increasing human expansion into wildland areas (Peter et al., 2006). Coupled with the pattern of wildfire occurrence previously mentioned, an increase in population in wildland-urban interface¹ areas means that the risk from wildfires to humans has also increased.

While much research on property owner participation in wildfire mitigation has been completed in the USA and Australia, knowledge of Canadian property owner participation in wildfire mitigation activities is limited. Activities that homeowners can complete in order to reduce the risk to their property include structural measures (E.g. Roofing materials, siding materials) and landscaping actions (E.g. mowing and watering lawns, thinning shrubs and trees, landscaping with fire resistant materials). Canadian research published to date has primarily been qualitative (McGee et al., 2005; McFarlane et al., 2007a; McFarlane et al., 2007b; McGee & McFarlane, n.d.; McGee & McFarlane, n.d.). A quantitative study examined property owner wildfire mitigation in a larger urban center (McGee, 2005), and another examined differences

¹ Wildland-urban interfaces are any area where structures, particularly private homes, and other human developments meet or are intermingled with forest and other vegetative fuel types (Chisholm Fire Review Committee, 2001)

between experts and non-experts (Arvai et al., 2006; Zaksek & Arvai, 2004). To decrease the knowledge gap in Canadian literature a need remains to examine adoption of wildfire mitigation measures and the factors that influence decisions to mitigate for homeowners living in wildland-urban interface areas.

A quantitative survey was used to examine WUI property owner adoption of wildfire mitigation activities and factors that influence decisions to adopt these activities. A mail survey collected data from a random sample of residential property owners in six Alberta communities during 2007 ($n = 1,209$): Edson, Grande Cache, High Level, Hinton, Peace River and Whitecourt. Dillman's Tailored Design Method for Mail Surveys directed the survey protocol (Dillman, 2007). This method is designed to achieve a high response rate, by following proven techniques, such as survey design and wording and multiple, personalized contacts with the sample (Dillman, 2007). The survey asked questions about respondents' wildfire risk perceptions and factors influencing their adoption of wildfire mitigation activities. A 34% response rate was obtained.

The results suggest that overall study respondents are moderately prepared for a wildfire. Of the 13 activities respondents were asked about, on average, respondents had completed over half. The most frequently completed mitigation measures were those considered to be part of routine property maintenance, such as keeping grass short and watered, thinning bushes, clearing off roofs and gutters. There was no significant difference between communities in the number of wildfire mitigation activities adopted. These findings are consistent with recent research from Canada, the US and Australia which indicates that the same landscaping and structural activities are generally completed around the world (Brenkert-Smith, 2006; Bushnell et al., 2006; McGee & McFarlane, n.d.; McGee & McFarlane, n.d.; McGee et al., 2005; McGee, 2005). Constraints that may potentially limit the mitigation activities respondents completed on their properties were also examined. Overall, the greatest constraints on adoption were: Perceived cost, social approval (whether or not family or neighbours would approve of the mitigation measures), significance of the threat, information about the activities and priorities. These results were consistent with other research which found that study participants identified similar factors, such as cost and time, as a constraint on adoption (McGee et al., 2005; McGee, 2005).

Some of the results, though, were inconsistent with other human dimensions of wildfire research. This study found that removing shrubs, trees and fallen branches close to homes was a measure completed by the majority of property owners. A study of urban residents in Edmonton, Alberta found, in contrast, that this activity was completed by the smallest percentage of people (McGee et al., 2005). This difference may be a result of differences in preferences for landscaping between property owners in larger and smaller urban centres.

Factors that encourage the adoption of wildfire mitigation activities were also examined. OLS regression was used to test the relationships between adoption of mitigation activities and a wide variety of factors identified during a literature review, including risk perception, demographic and social and psychological factors. Age, perceived acceptability and controllability of wildfire impacts, significance of the threat, implementing mitigation measures as a priority, and response efficacy were found to significantly influence adoption. Older respondents had a higher level of adoption of mitigation activities. The more acceptable and controllable a respondent perceived the impacts from wildfires to be, the greater their adoption of mitigation activities. Similarly if the threat from wildfires was perceived as significant enough to warrant adoption, and implementing mitigation activities was a priority for respondents, the greater the adoption of mitigation measures. Response efficacy is the perception of the resources,

such as money, skills and time, available to complete an activity and the more resources respondents perceived there to be the higher their adoption.

Of these factors, response efficacy was the only one identified in other human dimensions of wildfire research as directly influencing adoption (Martin et al., 2008; Paton, 2003). Paton (2003) and Martin et al. (2008) found that the greater the response efficacy the greater the adoption of mitigation measures. The influence of age on adoption of hazard reduction measures is inconsistent in hazard reduction literature, with some studies finding that age significantly influences adoption and others finding that it does not (Lindell & Perry, 2000).

The results from this study contribute to the growing literature on human dimensions of wildfires and help reduce the knowledge gap by (1) identifying factors influencing property owner adoption of wildfire mitigation activities, and (2) confirming other Canadian research findings; particularly that there is a moderate level of adoption of wildfire mitigation activities by property owners and that the most popular mitigation measures are those considered part of normal property maintenance.

There are also management implications from this study. The study results indicate that public education programs should be detailed, not just providing a list of risk reduction activities but also including information about the benefits of these activities, because just knowing about wildfire mitigation activities does not necessarily translate into adoption. Also, since the most popular mitigation measures are those that are part of routine property maintenance, unpopular measures, such as landscaping with fire resistant materials and vegetation should be encouraged by focusing on other benefits of these measures (E.g. easier maintenance). It is hoped that overall the conclusions of this study will inform programs aimed at encouraging participation in wildfire mitigation activities.

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