



Institute for Catastrophic
Loss Reduction
Building resilient communities

Institut de prévention
des sinistres catastrophiques
Bâtir des communautés résilientes

SPA Risk LLC

An Impact Analysis for Mitigating Wildland-Urban Interface Fires – Overview

Prepared for The National Research Council of Canada



National Research
Council Canada

Conseil national de
recherches Canada

The National Research Council's *National Guide for Wildland-Urban Interface (WUI) Fires* (the Guide) recommends how to build and maintain wildfire-resilient buildings. It details how to build with noncombustible materials and to control surrounding vegetation. The impact analysis shows that satisfying the Guide's recommendations can cost less than \$5 per square foot for typical residential construction in WUI areas in Canada, and can save over \$30 per \$1 of added cost.

The Institute for Catastrophic Loss Reduction and SPA Risk LLC performed a benefit-cost analysis of the Guide. The analysis can help Canadians make better decisions about protecting themselves from fire in an era of climate change and growing fire risk.

BENEFIT-COST RATIO: *avoided future losses (benefits) divided by initial construction cost and maintenance cost.*

34:1

\$1 spent to make a new home fire-resistant

Owners, tenants and society saves up to \$34

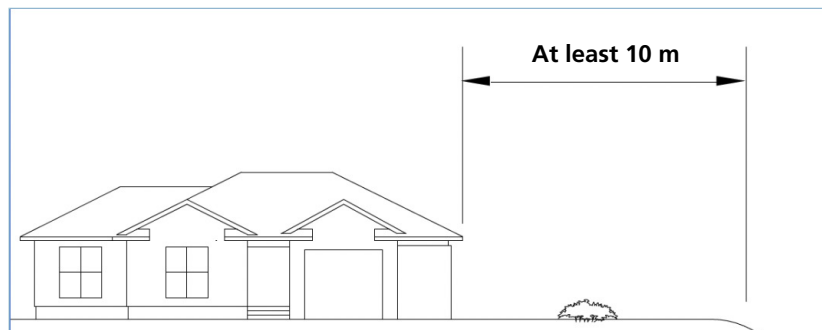
- \$1** added cost for new construction ultimately saves up to:
- \$10** in reduced fire damage to buildings
- \$8** worth of life safety and avoided cases of PTSD
- \$7** in reduced personal property damage
- \$7** in lower insurance premiums
- \$1** less dislocation cost ("additional living expense")
- \$1** less indirect business interruption and environmental impacts

Benefits are maximized and costs are minimized when the Guide is used for new construction.



Retrofit saves up to 14:1

The *Guide* makes financial sense for existing homes as well. To make an existing home follow the Guide with non-combustible cladding costs \$10 to \$20 per square foot – 2 to 4 times the extra cost for new construction – but retrofit can still be very cost-effective, avoiding up to \$14 in future losses for each \$1 of retrofit cost.



COOPERATION PAYS. Cooperating with neighbours to control vegetation around buildings reduces costs by $\frac{2}{3}$ compared with use of noncombustible cladding, and increases BCRs by three times.



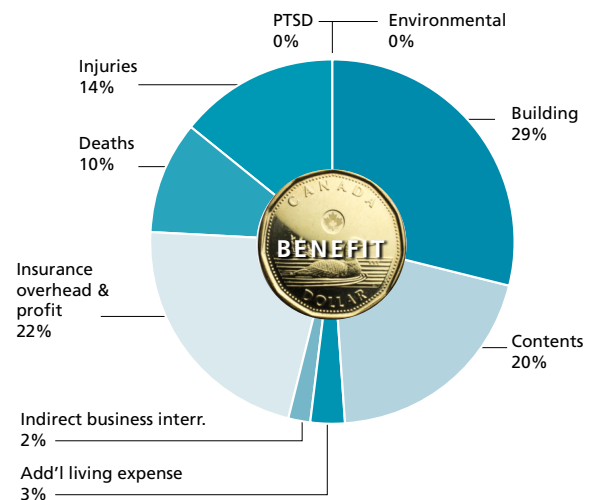
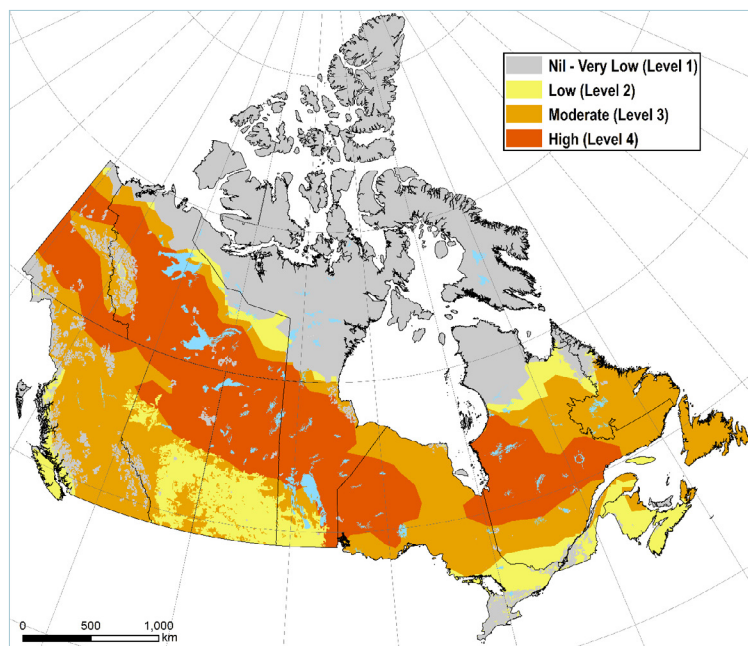
Methods

The analysis examined 102 buildings in nine communities of various sizes in low, moderate, and high-hazard locations across Canada. It estimated costs and benefits for four houses: two older houses and two newer ones.

The project used recent fire research to estimate the chance that a house would experience a wildfire. Data from CAL FIRE show how following the Guide changes the chance that a house will ignite in a fire. Knowing the cost of the house, its contents, occupants, and other values, the project estimated the monetary and safety losses if a house ignites. Loss with current practice minus loss with resilient construction gives the benefits of the Guide, accounting for all the probabilities.

Benefits come from reduced impacts to building and content repairs, deaths, nonfatal injuries, instances of post-traumatic stress disorder, insurance, and the cost of being displaced from one's home. Benefit divided by cost is called the benefit-cost ratio (BCR). A BCR greater than 1.0 indicates a desirable investment. The higher the BCR, the more desirable the investment. For new houses in high-hazard areas, the BCR can exceed 30:1, that is, \$1 of cost produces \$30 of benefit.

Following the Guide also reduces societal impacts: reducing WUI fires creates jobs, protects tax revenues, reduces environmental harm, reduces public costs, and makes Canada's economy more stable. Shared benefits come with shared costs: roads must be paved to support fire engines. Firefighters need enhanced water supply. Utilities have to trim vegetation around power lines. But communal cooperation brings economies of scale: shared vegetation control reduces costs by 2/3rds and increases the BCR by 3 times.



The Guide makes sense

National WUI Fire Hazard Map.

Source: National Guide for Wildland-Urban Interface Fires

The National Research Council Canada's National Guide for Wildland-Urban Interface Fires can save lives, protect homes and businesses, and reduce the long-term cost of owning property in the wildland-urban interface. It makes financial sense, and represents an effective way to live reasonably and safely within Canada's wildfire hazard areas. The top 10 lessons of this impact analysis are:



New houses built to satisfy Guide recommendations can save 30:1.



Retrofitting saves up to 14:1.



Communities save up to 14:1.



National use saves up to 4:1.



Nature-based solutions save even more.



Stakeholders working together can lower costs and increase benefits.



Climate change makes adaptation more urgent.



Municipalities and utilities share the cost burden.



The benefit estimates in this study of the Guide are conservatively low.



There is more to learn: about climate change, social issues, and other topics.

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ICLR was established by Canada's property and casualty (P&C) insurance industry as an independent, not-for-profit disaster risk reduction research institute affiliated with Western University. To learn more, see www.iclr.org. SPA Risk LLC is an applied-risk consultancy that helps corporations, communities, and nations improve their disaster resilience. To learn more, see www.sparisk.com. To learn more about the impact analysis, contact ICLR Director of Research Dan Sandink, dsandink@iclr.org, 416-364-8677. Download the full report at www.iclr.org.