Natural Resources Canada

RESEARCH HIGHLIGHT

The Pacific Forestry Centre

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GIVING COMMUNITIES THE POWER TO MAKE INFORMED DECISIONS ABOUT WILDFIRE MITIGATION

Wooden trestle in Myra Canyon near Kelowna, BC, six years after the 2003 wildfire.

Photo credit: Sandy McKellar

Climate change is increasing the frequency of hotter and drier weather conditions, while past successful wildfire suppression has created large swaths of fire deficit areas across Canada. At the same time, urban sprawl and out-migration is pushing more people and homes beyond city limits and into the transition zone of wildland areas.

Not surprisingly, as people, communities, and infrastructure move deeper into the natural areas, there is a greater risk of a wildfire disaster – driving evacuations when fires strike and dramatically increasing the human and financial losses. Recent wildfire seasons have highlighted what the future may look like, with the three worst wildfire years in terms of financial losses and total area burned occurring in the past decade.

The transition zone between communities and forests is officially called the Wildland Urban Interface (WUI). It is the area where homes or other burnable community structures meet with, or are interspersed within, wildland fuels. Along with residential structures, industrial structures, roads, and railways are also at risk. In total, Canada has a combined 152.6 million hectares of vulnerable fire interface land[1] (about 65 hectares for every hectare of urban area).

To better prepare for and respond to such risks, a team of research scientists at the Pacific Forestry Centre (PFC) in Victoria (one of seven research units of Natural Resources Canada's Canadian Forest Service) are evaluating wildfire mitigation options for communities in the WUI. Two researchers, Nirmal Subedi and Keldi Forbes — Wildfire Research Economists in the Forest Research Economics Group — are developing economic decision making support tools to aid in deciding when and where to implement wildfire suppression treatments crucial to the safety and viability of communities.

[1] Mapping Canadian wildland fire interface areas. 2018. Johnston, L.M.; Flannigan, M.D. International Journal of Wildland Fire 27:1-14. https://cfs.nrcan.gc.ca/publications?id=38282


Photo credit: Sandy McKellar

Considering the volume of at risk land across Canada, it is physically and environmentally impractical to implement mitigation treatments across every community facing a degree of risk. As such, Canada needs a comprehensive action plan that allows decision makers—at the local, provincial and national level—to predict, prepare for, and respond to weather-related emergencies and natural disasters. Wildfire risk reduction is a whole of society undertaking in which actions taken by everyone including individuals and property owners, industry, organisations, and all levels of government affect the outcome.

Specifically, Subedi and Forbes are researching and developing case study information to help decision makers balance mitigation needs with costs and "get the most bang for their buck". "It's important to emphasize that we'll never be able to get the risk to zero, so our focus is on reducing, not eliminating the risk," says Forbes.

To determine the cost effectiveness of specific mitigation treatments, PFC works with a community of researchers across academia, governments, First Nations, non-governmental organizations and industry to evaluate treated areas over time. When a treated area experiences a fire, the event provides an opportunity to gather data and determine treatment effectiveness, which can then be applied to areas that have not experienced a fire incident. For the program to be a success, it depends on networking and teamwork among many researchers across a broad range of jurisdictions and disciplines.

To assist in the interpretation of the data, Subedi is developing economic models to quantify wildfire related impacts on values and assets. Originally trained as a forester, Subedi recognized a gap in expertise in wildfire economics, an area that he believes requires multidisciplinary information. "We need to understand disaster economics from a risk perspective, but we have a limited understanding of what happens when a wildfire hits a WUI community," he explained. "With no central agency collecting economic data on the impacts of wildfires, past information came in bits and bytes, from different agencies and at different times".

Subedi approached the problem by developing a framework into which he could input data from a range of sources. For example, the insurance industry describes wildfire impacts in terms of damage to insured properties, provincial


Photo credit: Forest Enhancement Society of BC


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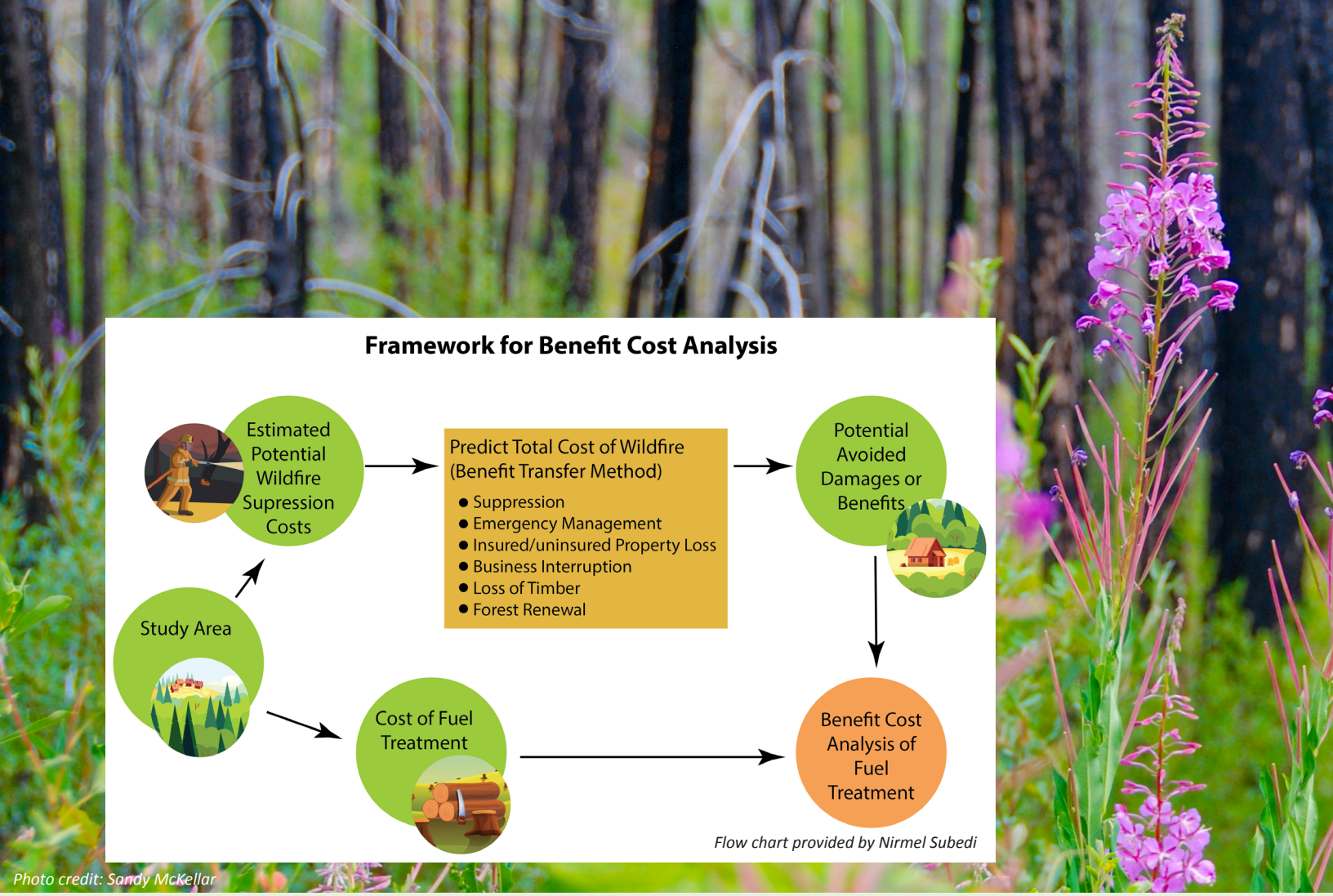
Wildfire risk mitigation work in Nazko and 100 Mile House, BC.



governments may focus on the cost of suppression and evacuations, while the healthcare sector measures health related impacts of fires. “We need a robust matrix to understand the scale of the impact of wildfire on communities,” said Subedi, “from a social, economic and environmental perspective”.

The goal is to determine the likelihood and type of fire that will come, how often, and ultimately, at what cost. Because the Canadian landscape is so heterogenous, with a range of populations sometimes coupled with limited road access, costs can vary significantly from one place to another. Aside from direct costs like damage and suppression, Subedi is developing ways to evaluate indirect costs such as business interruption costs to predict the overall economic impact of a fire.

The tools developed from the research will provide decision makers with assistance to evaluate choices between spending priorities, such as wildfire prevention or investing in other priorities. The work demonstrates the differences in expected wildfire costs if the prevention work is or isn’t done. “The best choices and options will no doubt differ from community to community”, said Forbes. “It depends on the local environment and that’s why the work of our physical wildfire scientist counterparts is so important for our economic research – their work and modelling allows us to understand the expected outcome of a treatment”.

The WUI is expanding in Canada, placing more people and infrastructure at risk. From a community stand point (where resources are always limited), creating an economic language to describe wildfire risk and a framework for evaluation gives community leaders the power to make informed decisions about mitigation.

For more information please visit: *https://www.nrcan.gc.ca/our-natural-resources/forests/wild-land-fires-insects-disturbances/forest-fires/13143*
Pacific Forestry Centre: *www.nrcan.gc.ca/science-data/research-centres-labs/forestry-research-centres/pacific-forestry-centre/13489*