



**Forest
Practices
Board**

Fuel Management in the Wildland Urban Interface – Update

Special Investigation

FPB/SIR/43

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Board Commentary

Prevention of wildland urban interface fires is essential to the security of communities in BC. Although programs to prevent and reduce the intensity of interface fires have been developed, and progress has been made since 2004, this investigation found that most communities in BC remain vulnerable to catastrophic wildfire.

Some excellent work has been done. The province established the Strategic Wildfire Prevention Initiative to provide funding to communities to treat hazardous fuels within the wildland urban interface. It promoted the FireSmart program, which provides resources for residents to protect their homes from wildfire. When not fighting wildfires, fire crews are increasingly being used to treat forest fuels, and the ecosystem restoration program and the forest industry also play a role. Today, Kelowna is an example of what can be done to minimize the risk and impact of wildfire.

Unfortunately, over the past 10 years, only 10 percent or less of hazardous forest fuels have been treated. Funding to protect at-risk communities in BC by removing interface fuel sources is inadequate. The cost of treatment is excessive and now stands at \$10,000 per hectare. Treatment costs have not been controlled, while effective and less expensive actions such as the use of prescribed burning are severely restricted. A house or business premises is an important asset. Its protection is a major priority for the owner and a shared responsibility with the local community. FireSmart principles, however, have typically been ignored by residents in at-risk communities.

Wildfire Management Branch has warned that, in the event of a mega fire, residents cannot rely on BC's suppression resources to protect communities and resources.

In 2003, a wildfire placed the City of Kelowna at risk of burning up, forcing the evacuation of tens of thousands of Kelowna residents and 239 homes were burnt to the ground. Such fires will happen again, and can be expected more frequently. For over 10 years, the Board has looked at what the public and various levels of government are doing in reducing the risk of wildfire damage to communities. Strategies have been developed, but the priority to implement them in a timely manner has been slowly lost since the fires of 2003.

Already in 2015 we have had one major wildfire that is threatening people's properties and the season is only just beginning. Will 2015 be the fire season that brings this issue back into the public eye? We have a choice. We can accept the loss of homes (and possibly life) and the disruption of businesses, livelihoods and community infrastructure such as schools, or we can be proactive and take personal responsibility for our communities.

- *We can protect our homes by implementing FireSmart principles.*
- *We can ask our politicians, local fire departments, and the Provincial Emergency Program about the risk to our communities and what they are doing about it.*
- *We can support the return of fire to the landscape through prescribed burning.*
- *We can leverage the value of partners in government, First Nations, community organizations, small business, industry, tourism, guiding, ranching, and recreation.*
- *We can seek funding from diverse complementary programs.*

Prevention is always more productive and cost-effective than responding afterwards. Prevention must become a priority and that will only happen if BC residents push from the bottom up.

Executive Summary

Fire has been a natural part of many ecosystems in BC. Lightning-caused fires periodically reduced the build-up of forest fuels, replaced older stands of trees and created a patchwork of different ages and forest types across the landscape. First Nations also used fire to create wildlife habitat, improve the growth of plants, and to protect settlements. But for the past century, humans have done a good job of excluding fire from the landscape and hazardous forest fuels have built up.

Many BC communities lie within areas that have burned in the past and will burn again in the future. The area where forests meet human development is called the wildland urban interface. The provincial government estimates that there are about 6850 square kilometres of forests at high risk and 9700 square kilometres at moderate risk of sending embers into BC communities during a wildfire. Experience has shown that embers pose the greatest risk to structures in a community.

As the climate changes, wildfire managers expect that the fire season will start earlier and end later in the year, and wildfires will be larger and more severe. These managers have also warned that, in a busy fire season with large “mega fires,” resources may be overwhelmed and the public may not be able to count on them to protect communities or natural resource values.

That may be disturbing, but there are things citizens and all levels of government can do to protect our communities. We can manage forest fuels by changing the structure and amount of forest fuels through common techniques such as thinning, pruning, cleaning up debris from the forest floor and creating fuel breaks. These practices help to change fire behaviour and make it more manageable. We can also plan development to minimize the risk of interface fires. At the homeowner level, residents can take steps to reduce the risk of wildfire to their home by following FireSmart principles. For example, firewood can be moved away from a home and decks can be screened in to prevent embers from igniting flammable material.

The 2003 fire season, and the Okanagan Mountain Park fire in particular, spurred BC into action. Since 2004, the provincial government, in cooperation with local governments, the Union of BC Municipalities and the First Nations Emergency Services Society have worked together to manage hazardous forest fuels around communities. Forest fire-fighters are increasingly being used to treat hazardous areas to protect communities and harvesting by the forest industry and ecosystem restoration activities have also had beneficial fuel management effects.

There are many excellent examples of communities planning and proactively managing forest fuels, as well as fire crew, forest industry and ecosystem restoration work. A handful of communities have even been recognized by the FireSmart program for their efforts.

Unfortunately, all of these programs combined are not addressing the hazard in a meaningful way. Only about 10 percent of high risk forests around communities have received a fuel management treatment over the past decade, and this number may be inflated. Furthermore, once an area is treated, it may need additional treatment to address regrowth. Adoption of FireSmart principles is not widespread and private land is also a huge issue as there are currently no incentives for private landowners to treat hazardous fuels on their property.

The Board identified a number of issues that may be limiting fuel management in BC:

- Treating the identified hazard at the current average cost is unaffordable.
- Some local governments and First Nations are not treating areas identified in community wildfire protection plans.
- To date the forest industry has not played a major role in managing forest fuels in the interface.
- Not all of the technical tools that prescribing professionals and government officials need to do their jobs exist (e.g., best management practices).

The Board encourages government to review its approach to fuel management and consider these opportunities for improvement:

1. Provide sustainable and adequate funding.
2. Treat more area effectively and at a lower cost.
3. Redefine the role of local government.
4. Reduce the hazard in all new interface areas during the development phase.
5. Convince or compel at-risk private landowners to participate in the FireSmart program.

This report provides several ideas to get the conversation started, but the Board expects consultation with practitioners, local governments, First Nations, the Union of BC Municipalities, First Nations Emergency Services Society and others will be necessary.

Introduction

Devastating wildfires during the summers of 1998 and 2003 caused significant loss of homes and structures in British Columbia. Formal reviews after both fire seasons led to specific recommendations regarding forest fuel management in the wildland urban interface.¹ As part of its response, government set up a strategic fuel management initiative in 2004 to provide funding to communities to plan and conduct fuel management treatments.

In 2009, the Board examined the progress made in interface fuel management. Its February 2010 report, *Managing Forest Fuels in the Wildland Urban Interface*,² highlighted communities that had risen to the fuel management challenge and passed along the lessons they had learned to encourage more communities to consider fuel management as an urgent priority. It noted that good progress had been made, but much work remained to be done. The Board recognized that fuel management was new to local governments and that it would take some time to build knowledge and expertise.

The Board made recommendations about discouraging the creation of more interface area without considering mitigation, making it easier for local governments to manage fuels, and the development of best management practices for debris disposal.

Now that five years have passed since the initial report, the Board has decided that it is time to review the progress made.

Objectives

The Board reviewed the progress made in the past five years in managing fuel in the interface and set out to determine if the current approach to fuel management is working and to identify any opportunities for improvement.



Figure 1. Dead trees and ladder fuels have been removed at Gallagher's Canyon, near Kelowna.

¹ The wildland urban interface is the area where human development meets or is intermingled with forests and grasslands.

² Available at <http://www.bcfpb.ca/reports-publications/reports/managing-forest-fuels-wildland-urban-interface>.

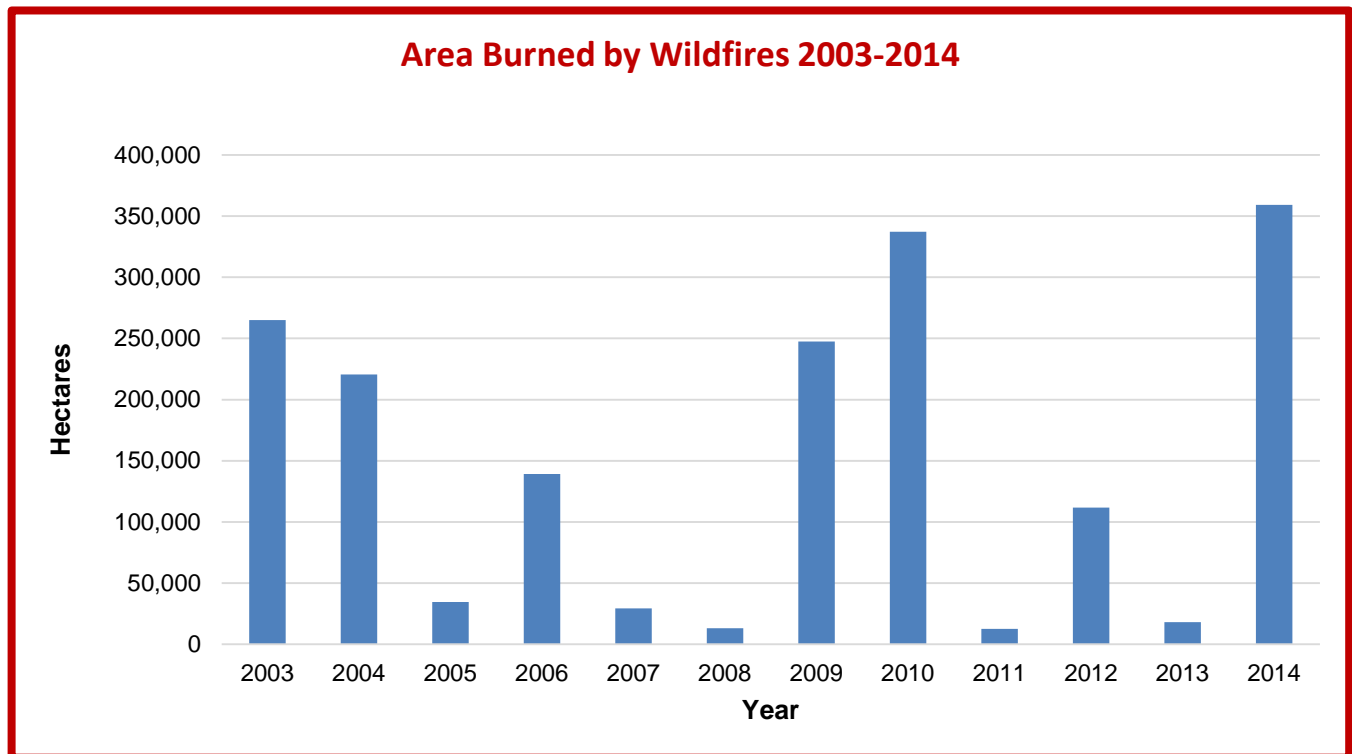
Background

The Problem

Fire has been a natural part of many of British Columbia's ecosystems. Lightning-caused fires periodically reduced the build-up of forest fuels, replaced older stands of trees and created a patchwork of different ages and forest types across the landscape. First Nations recognized the benefits of fire and purposely used it to create wildlife habitat, improve growth and yield of plants, and to protect settlements from wildfire.

With the arrival of Europeans came the sentiment that fire is bad and it must be prevented. BC's Wildfire Management Branch estimates that, before Europeans arrived, an average of 500 000 hectares of forest burned each year. However, only about 50 000 hectares³ have burned each year on average since the advent of modern fire suppression techniques.

Wildfire Management Branch expects the costs and damages associated with wildfires to increase with climate change.⁴ It also expects larger and more severe fires and fire seasons that start earlier and end later in the year. Recent figures seem to support this—an average of 140 000 hectares burned each year between 2003 and 2013.⁵ In 2014, 359 034 hectares burned and \$298 million was spent on direct fire suppression.



³ BC Wildland Fire Management Strategy available at <http://bcwildfire.ca/prevention/PrescribedFire/docs/BCWFMS.pdf>

⁴ Draft Climate Change Adaption Action Plan for Wildfire Management 2014-2024.

⁵ <http://bcwildfire.ca/History/average.htm>

Meanwhile, the number of people who want the amenities that living in a natural setting provides is growing, private land development on the outskirts of cities and towns continues and more homes and people are potentially being put at risk. The combination of effective fire suppression, climate change, insect infestations, and increasing and uncoordinated development across the forested landscape has created ideal conditions for catastrophic wildfires affecting tens of thousands of people.

To understand the scale of the problem, in 2004, government commissioned a high-level analysis of forest stands that could pose a risk to wildland-urban interface areas. The analysis is known as the provincial strategic threat assessment (PSTA). Wildfire managers know that, under certain conditions, sparks and firebrands from wildfires can travel up to 2 kilometres from a fire—this is called *spotting*. Experience in Canada also shows that the most significant structure losses from wildfires are caused by spotting and not direct flame contact. Thus the analysis identified forest stands within two kilometres of wildland interface areas and assigned a risk category to those stands based on the spotting potential.

The PSTA identified approximately 1.7 million hectares of forest within 2 kilometres of the interface—685 000 hectares are considered high risk and 970 000 hectares are considered moderate risk. Work is currently underway to update this figure.

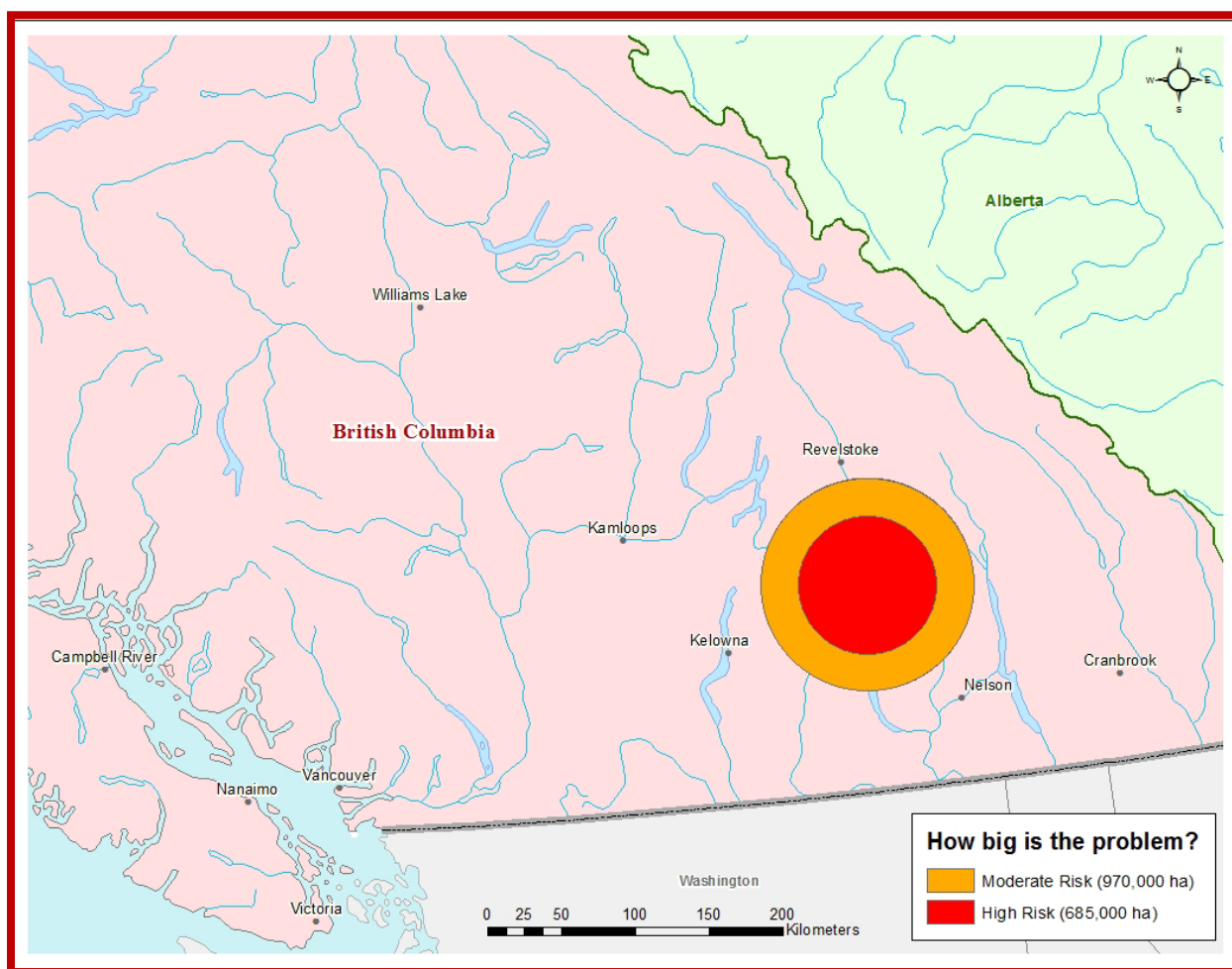


Figure 2. The Provincial Strategic Threat Assessment identified a total of 1.628 million hectares of moderate and high risk stands. This map is intended to show the size of the problem in relation to southern BC, and is not the actual location of moderate and high risk stands.

Fuel Management as Part of the Solution

Fire behaviour is influenced by the availability of fuel to burn, topography, and weather. Of those, fuel is the only factor we can affect. Fuel management refers to changing the structure and composition of a forest to reduce the fuel available to burn in a wildfire. Effective fuel management should result in less intense and severe wildfires, greater public and firefighter safety, and faster recovery for forests.

Common fuel management practices include thinning, pruning, cleaning up debris from the forest floor and creating fuel breaks. Planned fire, or prescribed burning, was the traditional tool of fuel management; it can be inexpensive, effective and environmentally appropriate. But concerns about escaping fires, lack of burning expertise, local bylaws, and regulation of burning to protect air quality and human health have severely limited the use of planned fire in recent years, particularly in interface areas. In its 2006 report, *Managing Forest Fuels*,⁶ the Board recommended that government address public and stakeholder concerns with the increased use of prescribed fire so it can be returned to the landscape.



Pruning and burning pine branches near Lytton, October 2014.

BC's Fuel Management Approach

The Firestorm 2003 Provincial Review,⁷ led by the Honourable Gary Filmon, (the Filmon report) stated that all levels of government and private individuals share the responsibility for protecting communities from wildfire. The current provincial fuel management approach is multi-pronged and based on that model of shared responsibility.

⁶ Available at <http://www.bcfpb.ca/reports-publications/reports/managing-forest-fuels>

⁷ <http://bcwildfire.ca/History/ReportsandReviews/2003/FirestormReport.pdf>

The strategic wildfire prevention initiative

After the devastating 2003 fire season, the Filmon report recommended that the province lead the development of a strategic plan in cooperation with local governments to mitigate the impact of wildfire in the interface through fuel management. In response, government created the strategic wildfire prevention initiative in 2004. The program was structured so that local governments took the lead in planning and executing fuel management treatments, with financial and technical support from the provincial government.

Strategic wildfire protection initiative funds are available for community wildfire protection planning, professionally prepared prescriptions, fuel management treatments, and demonstration projects. A Provincial Fuel Management Working Group, made up of staff from Wildfire Management Branch, First Nations' Emergency Services Society and the Union of BC Municipalities (UBCM), oversees the strategic wildfire prevention initiative. UBCM administers the program, which provides funding to local governments and First Nations on a cost-shared basis. Two hundred and nine distinct local governments or First Nation have applied for strategic wildfire prevention initiative funding since the program's inception.

The first step towards successful fuel management is the completion of a community wildfire protection plan. This plan identifies the areas in a community at risk of interface fires, suggests measures to reduce those risks, and also provides a plan of action. Fuel management treatments, consistent with the community wildfire protection plan, can then be planned and completed.



Figure 3. Fuel management treatment in Whistler funded by strategic wildfire prevention initiative - July 2014.

Industrial harvesting

Timber on Crown land surrounding communities is generally eligible to be harvested by licensees and could be removed to reduce fuel hazards. However, it can be very difficult to get public support for harvesting so close to communities. It may also be uneconomical to harvest the wood based on tree size, quality, and the stumpage fees that must be paid to government. Another complication is the requirement to reforest an area after harvesting, which may not be consistent with fuel management objectives. This issue can, however, be addressed if a district manager approves modified stocking standards to meet a fuel management objective. In light of these issues, some licensees may choose to log elsewhere.

Government introduced a new licence-to-cut in 2006 aimed at protecting communities from wildfire. This fuel reduction licence-to-cut has enabled smaller licensees to manage fuel around communities. Government timber sales have also been used to remove hazardous forest fuels.

The Vanderhoof Resource District is at the forefront of bringing together the forest industry, utilities and other partners to cooperatively manage hazardous fuels (see *Appendix 1* for details).

Wildfire Management Branch crew work

When fire crews are not busy suppressing wildfires, they are increasingly being employed to complete fuel management projects on Crown land. This work is funded by Wildfire Management Branch's budget, and helps crew members to maintain competency in power saw use and prescribed fire.

Ecosystem restoration

In the 1970s, ranchers and hunters in the East Kootenays noticed that forage for wildlife and cattle was disappearing as forests began to infill and encroach on open grasslands due to fire exclusion. In 1998, an ecosystem restoration committee was formed to plan and deliver a fire-maintained ecosystem restoration program in the Rocky Mountain Trench. The Trench program brings together 30 partners in government and hunting, guiding, ranching, wildlife, and environmental groups, and uses various funding sources to restore grasslands and open up forests.

More than 90 percent of the high-priority areas requiring fuel management in the Regional District of East Kootenay community wildfire protection plan are within the ecosystem restoration program area.⁸ With some modification, ecosystem restoration and fuel management projects can complement each other.

The ecosystem restoration program has also expanded to other areas of the province.



Figure 4. Ecosystem restoration at Kikomun Creek Provincial Park. Untreated fuel on the left. The area on the right was thinned and burned.

⁸ Rocky Mountain Trench Ecosystem Restoration Program Blueprint for Action 2013 available at http://trench-er.com/images/uploads/Blueprint2013_booklet_web.pdf

The FireSmart Canada Program⁹

The FireSmart Canada program (FireSmart) promotes the idea that preparing for wildfire is a shared responsibility between homeowners, industry, First Nations and governments. The program provides resources for planning for and mitigating the risk of fire in the interface, with an emphasis on increasing the wildfire resistance of private lands and structures. Local governments and Wildfire Management Branch have distributed the FireSmart manual across the province and are relying on the program to encourage homeowners and private landowners to take steps to reduce the wildfire risk to their own life and property.

A key part of being FireSmart is designating zones around buildings and facilities. For example, the area within 10 metres of the building, called priority zone one, should not be able to support fire. In this zone, FireSmart recommends that grass should be mowed and watered, ground litter and dead material should be removed annually, bushes and shrubs should be removed and combustibles such as firewood should not be present. Zone 2 extends out another 20 metres and fuel there should be reduced by thinning and pruning trees. Zone 3 extends a further 70 metres and the objective is to thin the area so that fires will be lower intensity.

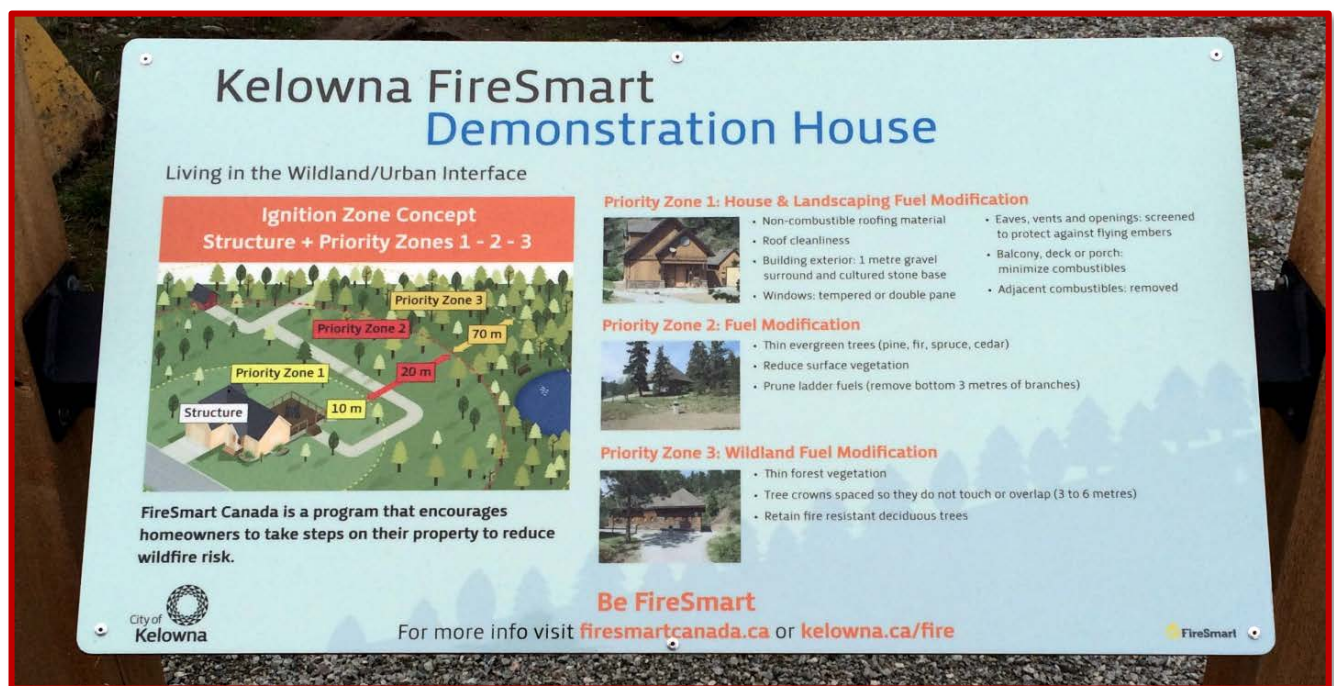


Figure 5. Interpretive sign at Kelowna's FireSmart demonstration house at Knox Mountain Park.

⁹ <https://www.firesmartcanada.ca/>

Part 1 – Progress

Since 2010, there has been progress on a number of fronts to better protect communities from wildfire.

The Strategic Wildfire Prevention Initiative

Since the program start in 2004, government has allocated \$67 million to the strategic wildfire prevention initiative. This includes \$5 million announced in March 2015. In January 2013, the funding ratio and maximum payable for operational fuel treatments were improved to encourage community participation. Strategic wildfire protection initiative now pays 90 percent of eligible project costs; the amount available to regional districts was increased from \$400,000 to \$600,000 per year, and \$400,000 is available for municipalities and First Nations.

Other strategic wildfire prevention initiative improvements made since 2010 include:

- updates to the provincial strategic threat analysis (2012 and 2015);
- an improved project evaluation process to ensure funding goes to where it is most needed (2014);
- development of a fuel management prescription template (2015);
- improved geospatial standards to provide better and more consistent data to inform land use planning and wildfire suppression operations (2013); and
- updated threat assessment documentation (2015).

Good progress has been made in community wildfire protection planning. From 2011 to 2015, 195 plans have been completed or updated and 33 are in progress. There are currently 279 community wildfire protection plans in the province.

Almost 3000 hectares of strategic wildfire prevention initiative-funded fuel treatments were carried out between 2010 and March 2015.



Figure 6. A fuel management treatment at McDougall Road in West Kelowna.

Wildfire Management Branch Crews

Fire crews reported treating over 5000 hectares of hazardous fuels since 2010. According to Wildfire Management Branch, a cultural shift is underway to encourage more fuel management when fire crews are not actively suppressing wildfires. Although it wasn't always the case in the past, professionally prepared fuel management prescriptions are now required to guide crew work. While the area treated each year can fluctuate depending on wildfire activity, the area treated in the past five years is notably more than strategic wildfire prevention initiative funded projects.

Ecosystem Restoration

Professionals familiar with ecosystem restoration activities in the Rocky Mountain trench estimate that 33 600 hectares of ecosystem restoration treatments have also contributed to the reduction of forest fuel. However, this amount is tracked as ecosystem restoration treatments and not fuel management treatments.



Figure 7. An ecosystem restoration project near Fort Steele. The area to the left was treated with a masticator. The area to the right is untreated.

Industrial Harvesting

A government geographic information system analysis revealed that almost 26 000 hectares have been 'disturbed' within 2 kilometres of communities since 2010. This figure includes 2540 hectares harvested under the authority of fuel reduction licences to cut. It is important to note that 'disturbance' does not necessarily mean that trees were removed for fuel management purposes. For example, a disturbance could be a harvested cutblock that is required to be regenerated.

FireSmart Canada

There is currently no record kept of individual homeowner participation in the FireSmart Canada program. However, the program recognizes communities when a local FireSmart representative works with a neighbourhood to assess the wildfire hazard and implement local solutions. Ten communities, including eight First Nations, have been recognized by FireSmart Canada for their work.¹⁰

As one example of a proactive community, the Whistler Fire Rescue Service provides free home assessments to property owners. The assessments are an opportunity for fire fighters to speak to homeowners about wildfire risk and provide a list of recommendations to reduce hazards. The provincial fuel management working group is working with FireSmart Canada to deliver FireSmart representative workshops across BC. The two-day workshops are provided free of charge to local government and first nation emergency preparedness and response staff and/or elected officials to provide participants with the knowledge, skills and tools to help protect their communities from wildfires. Three workshops have been held so far and three more are planned in 2015.

Reconciling the Hectares

By the close of 2009, government reported that approximately 35,000 hectares of land had been treated by local governments under the strategic wildfire prevention initiative, the forest industry, and Wildfire Management Branch fire crews. A March 2015 government news release¹¹ reported that 68,883 hectares had received fuel treatments and risk reduction efforts. This suggests that 33,883 hectares has been treated in the past five years. It is important to know how this number was calculated.

PROGRAM	HECTARES TREATED 2010-14	NOTES
Strategic Wildfire Protection Initiative	3 000	Provided by Wildfire Management Branch.
Wildfire Management Branch Crews	5 000	Provided by Wildfire Management Branch.
Forestry Industry	25 883	Computed by government using a GIS analysis of harvesting disturbance within 2 kilometres of communities. 'Disturbance' does not necessarily mean fuel management. 2540 hectares of the amount was harvested under the licence to cut tenure for community protection.
TOTAL	33 883	

In summary, the 34 000 hectares treated over the past five years is quite similar to the previous five-year period where about 35 000 hectares were treated. However, the 2010-14 figures must be viewed with caution because the amount attributed to the forest industry may not reflect fuel management treatments. UBCM is confident that the amounts funded by the strategic wildfire prevention initiative are accurate and Wildfire Management Branch is confident that the amount treated by its crews is accurate.

¹⁰ The communities are Bridge River Band, Cayoose Creek Indian Band; Coldwater Indian Band; Nooaitch Indian Band; Shackan Indian Band; T'it'q'et First Nation; Ts'kw'aylaxw First Nation; Whispering Pines/Clinnton; Logan Lake; and Anarchist Mountain.

¹¹ Available at <http://www.newsroom.gov.bc.ca/2015/03/bc-adds-5-million-to-wildfire-protection-program.html>

THE FUTURE – LANDSCAPE LEVEL FIRE MANAGEMENT PLANNING

After the 2003 wildfire season, government's main focus was on the protection of communities through the strategic wildfire prevention initiative. However, subsequent fire seasons demonstrated to wildfire managers that, in addition to promoting FireSmart on private lands and conducting fuel treatments in the wildland urban interface, other measures were required to prevent high intensity wildfires from reaching communities. A coordinated approach at a larger scale on the provincial forest land base was necessary. In 2010, the idea of landscape level fire management was adopted through the BC Wildland Fire Management Strategy. This supported government's shift in philosophy from fire suppression (response) to proactively reducing wildfire risks by creating fire-resilient communities and landscapes (proactive management.)

Landscape fire management planning maps the wildfire threat and then prioritizes the values at risk from wildfire to guide on-the-ground activities to mitigate the hazard. Landscape fire management planning is a process to coordinate the activities of government, the forest industry, First Nations, utilities, communities and other commercial and industrial activities on the complete landscape. Harvesting, silviculture, ecological restoration, prescribed burning, road construction and other development can be coordinated through landscape fire management planning to reduce the risk to values. For example, road right-of-ways several kilometres upwind of a community could be widened to create landscape level linear fuel breaks to stop running crown fires and provide critical wildfire suppression anchor points. Other practices that can modify fire behaviour include targeted harvesting, the creation of shaded fuel breaks, fuel hazard abatement, modified stocking standards, and regeneration of less flammable tree species.

As part of the process, specific on-the-ground activities are scheduled and prioritized in a five-year tactical plan and a one-year operating plan. These will include treatments identified in community wildfire protection plans, prescribed fire, and industry activities. Landscape fire management plans are approved by both the fire centre manager and the natural resource district manager to integrate resource management with wildfire response, and preventative treatment measures.

Progress

Landscape fire management planning began in 2012 with three pilot projects. The best features of each plan were incorporated into a provincial template that will be used to prepare future plans. A summary of the progress made to date appears below.

PLANNING STAGE	ITEM	STATUS
Risk Assessment and Values Identification	Provincial planning priorities Determine where in BC landscape fire management planning efforts should be focused first?	In 2014, natural resource districts were prioritized based on wildfire threat.
	Provincial Strategic Threat Assessment (PSTA) Determine which communities are at risk from wildfire.	PSTA was updated in 2015. Maps showing the wildfire threat level throughout BC are currently being finalized for public release. A wildland urban interface prioritization project is underway to provide more direction on which communities are at most risk.
	Identifying values	Wildfire Management Branch maintains a corporate database (Fire Management Planning Information Viewing Framework) of all identified values that can be affected by wildfire. This framework consolidates all available information relevant to wildfire response.

PLANNING STAGE	ITEM	STATUS
Plan Development	Pilot Landscape Fire Management Plans In 2012, pilot projects began to test various approaches. This led to the creation of a provincial template.	Pilot landscape fire management plans for Stuart-Nechako and Sea to Sky natural resource districts to be upgraded to the new standards in 2015.
	New Landscape Fire Management Plans	Planning began in 2014 for the Rocky Mountain, Nadina, Quesnel, Central Cariboo-Chilcotin, and 100 Mile House natural resource districts. Final plans are anticipated in the spring of 2016.
Implementation	Operational activities	Five-year tactical plans for Sea to Sky and Stuart Nechako are expected to be completed in 2015. Five-year tactical plans for the new landscape fire management plans will be developed concurrent with the plans, and should be available in the spring of 2016. Annual plans are developed by assembling the treatment activities that proponent leads plan to implement for the next year.

How does fuel management in the interface fit into landscape fire management planning?

Local governments will be invited to participate in the landscape fire management planning process. Existing community wildfire protection plans will be integrated into landscape fire management planning processes. All local government representatives will be invited to participate at the planning table, along with the other stakeholders. Their input into the five-year tactical plan and the annual operating plan will be encouraged.

Two of the benefits of including local governments at the planning table are: increasing awareness and knowledge of wildfire risk and mitigation activities, and developing partnerships. Communities will better understand the risk of wildfire, and be able to communicate this to residents. The communities will become aware of the other proactive preventative measures that are being planned for, and conducted, on the broader landscape to increase fire resiliency and reduce risk. They will also have the opportunity to become aware of the issues faced by adjacent communities. The objective is to identify projects and encourage stakeholders to engage in the process. Opportunities for partnerships will increase. For example, a local government could consult with its citizens and pave the way for a forest licensee to use mechanized equipment to implement a fuel management treatment adjacent to their community at no cost to the Crown.

Part 2 – Is the Current Fuel Management Approach Working?

A considerable amount of effort and provincial funding has been invested in fuel management and it is important to look at how the program has been delivered to gauge success, identify potential improvements and to avoid practices that have not been successful.

Gauging Success

How do we measure success? The Filmon report did not identify specific success measures; however its recommendations specific to fuel management provide insight into what the review panel envisioned. It recommended:

The provincial government should lead the development of a strategic plan, in cooperation with local governments, to improve fire prevention in the interface through fuel management.

The plan should:

- Focus on identification of those areas of the province where communities, infrastructure, and watersheds have the greatest potential to be impacted by large-scale fires.
- Identify and assign fuel management priorities based on threats to human life, property and resource values.
- Require a community protection plan in those communities with a high probability and consequence of fire in the interface zone.
- Be cost shared with local governments.
- Give priority for funding, fire management planning, fuels mitigation, and protection to these areas

It also recommended that communities adopt FireSmart principles:

Municipalities within fire prone areas should formally adopt the FireSmart (Partners in Protection 2003) standard for community protection both for private and public property. At a minimum, this standard should be applied to all new subdivision developments.

Based on these recommendations, our view is that the current approach will only be successful if:

- Hazardous fuel types in the interface have been identified, prioritized for treatment, and effectively treated.
- There has been widespread adoption of FireSmart standards by municipalities and private landowners and new development is not approved unless the wildfire hazard has been mitigated.

Identifying and Effectively Treating Hazardous Fuels

Identification of the Hazard

The 2012 Provincial Strategic Threat Analysis (PSTA) identified 685 000 hectares of forest with a high risk of spotting into a community. The PSTA is considered coarse, province-level data and it must be verified on the ground, usually as part of the community wildfire protection plan process. Although the figure may not be completely accurate, it is the number most commonly referenced by government and it is the best estimate available at this time. A 2015 PSTA update will be available soon.

Each community wildfire protection plan builds on the threat analysis by confirming the local hazard and identifying priorities for treatments. There are 415 municipalities, regional districts and First Nation bands in BC and over 300 community wildfire protection plans have been completed, updated, or are in progress. This suggests a high level of participation, and a corresponding recognition of the hazard. There is no information available however to determine what percentage of the highest risk areas is covered by a community wildfire protection plan.

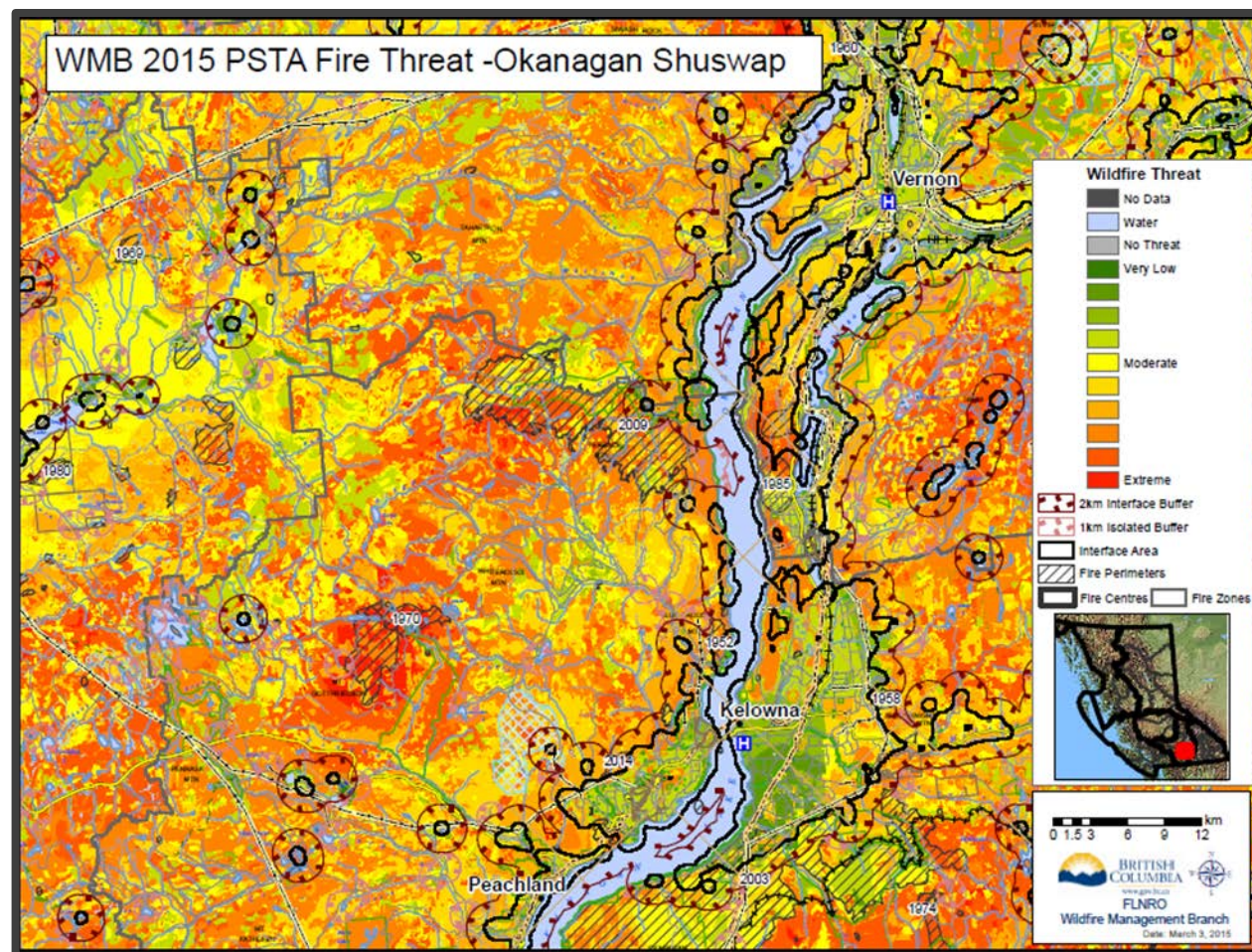


Figure 8. The 2015 PSTA for the Okanagan Shuswap. Interface areas are outlined in black and are surrounded by a two-kilometre interface buffer. Moderate, high and extreme wildfire threat is coloured yellow, orange and red respectively.

Treating the Hazard

Information available from government indicates that about 11 percent of high-risk forests have been treated, or roughly one percent per year since 2004. However, due to the quality and accuracy of available records, the percentage treated is likely significantly lower. Meanwhile, fuel treatments require maintenance over time as vegetation grows back, and it is likely that older, previously treated areas require retreatment.

Given the enormity of the problem and the small area treated each year, progress has been slow. As an example, in 2013, the Regional District of Central Kootenay calculated that, under the protection initiative program at current funding levels, it would take 45 years to treat the highest priority sites identified in its community wildfire protection plan.

The major factors inhibiting progress are discussed below.

Lack of sustainable funding

Strategic wildfire protection initiative funding has been provided by the provincial government at its discretion and there is no guarantee that funds will be available each year. Several resolutions have been passed at the UBCM convention regarding funding. The most recent, in 2014, resolved that the province increase the funding to ensure continued sustainability of the strategic wildfire prevention initiative program.

For First Nations communities, the lack of funding at the federal level has contributed to a situation known as “the doughnut.” Up until 2010, Federal funding was available to First Nations to manage hazardous fuels on developed areas of Indian reserves. Many communities also took advantage of strategic wildfire prevention initiative funding to treat Crown land surrounding the reserve. With no Federal funding currently available to manage fuel on reserve lands, there can be an untreated doughnut of fuel between the developed portion of the reserve and the surrounding Crown land.

Lack of capacity

This was a major issue raised in the Board’s 2010 report—most communities do not have the capacity to manage a fuel management program. Local government representatives often told us they were doing fuel management “off the side of their desk.” The consulting community has stepped up and most communities rely on consultants to plan and implement treatments. The exceptions are larger communities, such as Kelowna, who employ professional staff who carry out a large proportion of work in-house (see Appendix 2).

Eighty communities have completed a community wildfire protection plan but have not completed a fuel management treatment on the ground. Some of these communities are, however, in the process of developing fuel management prescriptions. This may be due to the lack of capacity or funding, a focus on other priorities, or the fact that the community wildfire protection plan was only recently completed. The occurrence of few disruptive interface fires over the last few years may also be contributing to a lack of urgency.

High treatment cost

With limited funding available, the cost of treating each hectare of problem fuels affects the total number of hectares that can be treated. While the cost of fuel management varies with the site, size, complexity and type of treatment, the Board found that, in 2009, the average treatment cost under the

strategic wildfire prevention initiative program was about \$10,000 per hectare. Government and the Board expected that the average cost would go down over time as crews gained experience, and as prescriptions and practices were refined. Surprisingly, the average unit cost in 2014 has not changed since 2009.

Our interviews with senior operational staff and our field visits have suggested the following reasons for the ongoing high treatment cost:

- There is no requirement for local governments to award treatment contracts through a competitive process.
- There do not appear to be any incentives or penalties within the award process to contain costs, although proposals that far exceed average costs have been rejected.
- There has been little or no guidance from government on when and where various practices could best be applied, or on an appropriate range of treatment costs.
- As a result of perceived local resistance to logging and other mechanical treatments adjacent to communities, many prescriptions have defaulted to more expensive hand treatments.
- There are ongoing legal and policy barriers to subsidizing treatments through log sales.

These factors have all contributed to some degree to the ongoing high unit cost and the resulting limited area treated.

Limited forest industry involvement

The forest industry has the expertise and equipment to manage fuel on a larger scale, but is not currently a major partner in managing fuel in the interface. The Vanderhoof area is a notable exception. The forest industry may take on a larger role as government implements landscape level fuel management.

No incentives to treat private or federal land

Wildfire behaviour is not affected by administrative boundaries and the effectiveness of fuel treatments can be compromised if adjacent hazardous fuels (e.g., those on private land) are not treated. With few exceptions (such as the Kelowna example in Appendix 2), there are no incentives for private landowners to treat hazardous fuels. First Nation reserves and other federal lands are also not eligible for treatments under the strategic wildfire prevention initiative.

In Revelstoke, the city has treated both of its high risk sites and has come to the conclusion that the majority of private land will never be treated to FireSmart standards by owners. As a result, it is now focusing on creating community level fuel breaks within two kilometres of the city.

Unresolved weakness in the 'Grass Roots' model

The Kootenay Interface Steering Team and the Thompson-Okanagan Interface Committee are two examples of collaboration to successfully promote FireSmart and community safety. Composed of representatives from Wildfire Management Branch, the Provincial Fire Marshal, and Emergency Management BC, they work closely with fire chiefs and emergency program coordinators to raise public awareness and to promote the program. Despite their good work, however, there are still many communities in these areas that are either unwilling or unable to engage in this program. It is not clear to us whether this is a result of the bottom-up model being inherently unworkable, or whether government efforts to assist communities are insufficient.

In summary, the hazard has been identified and much good work has been done under the current fuel management program. However, considering the scale of the problem, the current model is not treating enough area to address the hazard in a meaningful way.

Effectiveness

Lack of guidance on what constitutes an effective treatment

Government and communities rely on forest professionals to prepare fuel management prescriptions, but the pool of qualified professionals is very small and there is no simple path to become qualified. As post-secondary institutions don't include this subject in their curricula, the only ways to become qualified are to work one-on-one with a qualified practitioner or to learn by trial and error.

To its credit, government provided local governments and practitioners with templates for community wildfire protection plans and fuel management site plans to ensure that these documents include necessary information. Unfortunately, there is not similar guidance on what constitutes a successful treatment or how that treatment could best be accomplished—in other words, there is no 'best management practice' to assist in completion of the plans and prescriptions or to assess the quality and completeness of project work as it is carried out. Operational staff tell us that lack of best practices has resulted in wide variation in cost estimates and treatment recommendations for similar sites, and that oversight of projects is constrained to determining whether the prescription was complied with, rather than whether the prescription was appropriate or whether the treatment was successful.

As part of the operational reporting requirements under the strategic wildfire prevention initiative, there is a section for recording lessons learned. However, these lessons have not been made available to the prescribing foresters or local governments. This is a lost opportunity for improving best practices and avoiding unnecessary costs and negative impacts of treatments. In the absence of best management practice and a database of completed projects, it is unlikely that practices will improve over time.

When practitioners in Revelstoke decided to develop a series of fuel breaks around their community, they were concerned about brush response and in-growth creating a future fire hazard. Fuel breaks are not commonly implemented in BC, and there was no management guidance available to them. Fortunately the province is now developing guidance for fuel breaks.

Finally, there are no assessment criteria and no program currently in place to assess treatment effectiveness after a wildfire burns through a treated area. Wildfire Management Branch reports that a national fuels management team is currently working on a database to record fuel treatment sites affected by wildfire and to assess effectiveness.



Figure 9. A fuel management treatment in the Botanie Valley near Lytton. A wildfire burned through the treated area in 2014. An adjacent stand, shown below, was not treated.



FireSmart Adoption

Homeowners and Private Landowners

At Anarchist Mountain near Osoyoos, homeowners are acutely aware of the wildfire hazard and have taken effective action to address it (see Appendix 2). However, in general, homeowners in at-risk communities across the province have not applied FireSmart standards to their properties and, as a consequence, problem fuels immediately adjacent to homes is common. The FireSmart program provides excellent advice and resources, but if residents don't know about it or do not take meaningful action, government cannot rely on the program to effectively reduce the wildfire hazard on private land. Further, there is little incentive to FireSmart a property, as insurance companies do not currently encourage the adoption of FireSmart practices, or discourage doing nothing. There is also a belief that the fire department or the Wildfire Management Branch will be there to help in the case of a wildfire, despite warnings to the contrary. Wildfire Management Branch's climate change action plan states that in the event of mega fires, "suppression responses cannot be solely relied upon to protect communities or natural resource values."

For owners of larger tracts of private land, there is little to compel owners to mitigate existing wildfire hazards. However, local bylaws could address this situation. As an example, a recently updated bylaw permits a City of Kelowna fire inspector to order a person to deal with a fire hazard.

In summary, FireSmart Canada principles have not been widely adopted by private landowners in BC. Relying solely on a voluntary program to encourage residents to take action has not been effective. Having said that, residents and private landowners must take personal responsibility and take steps to protect themselves and their properties.

Local Governments

Regulating the creation of more interface

The *Local Government Act* empowers local governments to designate areas for protection from hazardous conditions, including wildfire. Through wildfire development permit areas, local governments can require developers to build using fire resistant materials, mitigate hazardous fuels, optimize fire hydrant location and address emergency access and evacuation concerns. The cost is passed on to the homebuyer, not the local government. Covenants can also be put in place to ensure that sites are maintained.

To get a sense of whether local governments are addressing the creation of more at-risk interface through development rules, the Board reviewed the 39 official community plans in the Okanagan Valley and Similkameen regions (see Appendix 4). Nineteen communities designated a wildfire development permit area and fifteen of those required the adoption of FireSmart standards, consistent with the Filmon report recommendation.

In summary, about half of the local governments in the Okanagan Valley – Similkameen area require that wildfire hazard is considered for new developments, and about half of those communities require the hazard to be mitigated in accordance with FireSmart principles.

The provincial government is currently streamlining building requirements to ensure consistency throughout BC. The Province will have the sole authority to create building requirements. UBCM has

expressed concern that a new building code may limit the ability of a local government to require new development to be consistent with FireSmart principles. It remains to be seen if this is the case.



Figure 10. New homes in West Kelowna. Fire retardant used to fight the 2014 Smith Creek wildfire is visible on the hillside.

Conclusions

BCs fuel management approach to date relies on private landowners to take steps to protect their properties and local governments to protect municipal and Crown land within two kilometres of communities. The Board's view is that this model is not addressing the problem in a meaningful way and is not likely to do so in the future, for the following reasons:

- Private landowners have not widely adopted FireSmart principles, and untreated fuels immediately adjacent to residences are common.
- Treating the identified hazard at the current average cost is unaffordable.
- Some local governments and First Nations are not carrying out the treatments that they have identified in their community wildfire protection plans.
- To date the forest industry has not played a major role in managing forest fuels in the interface.
- There are insufficient tools, such as best management practices, to help prescribing professionals and government to do a good job.

Part 3 – Opportunities for Improvement

While good work has been done and local governments, First Nations, practitioners and government have learned a lot, the problem is not being addressed at the scale needed. As a result, the Board recommends that the program be reviewed to find ways to:

1. Provide sustainable and adequate funding.
2. Treat more area effectively and at a lower cost.
3. Redefine the role of local government.
4. Reduce the hazard in all new interface areas during the development phase.
5. Convince or compel at-risk private landowners to participate in the FireSmart program.

The Board recognizes that finding solutions to these issues is easier said than done. The following ideas are provided to start the discussion.

1. Sustainable Funding

While the cost of fuel management may seem expensive, research has shown that, in general, hazard mitigation investments cost less than wildfires when all direct, indirect and additional costs of wildfire are tallied. Money spent on mitigation through an effective interface fuel management program should reduce social, economic and environmental impacts to communities. Some of these impacts include smoke-caused health issues, disruption to the tourism industry, property loss, and damage to watersheds, among many others.

Ideas

Build on the success of the ecosystem restoration program model, bringing everyone together and leveraging funding. Determine who stands to benefit from fuel management and engage them. For example, the tourism industry, forest industry, recreational groups, homeowner associations, utilities, insurance industry, community forests, fire departments, environmental groups, fish and game clubs, parks, educational institutions, camps, service clubs, emergency preparedness organizations, government, etc. The coordinating role could be filled by local government (see *Redefine the Role of Local Governments* section below) or by district staff in smaller communities.

2. Efficient and Effective Treatments

Treatments need to be carried out efficiently and be effective if the wildfire hazard is to be addressed meaningfully.

Ideas

Set the standards

Establish best management practices (BMPS) for practitioners and approvers. Prescribing professionals and government approvers need guidance on what is acceptable based on expert knowledge and experience. BMPs should include an overarching objective and success measures. BMPs should provide flexibility for professional judgment. Wildfire Management Branch has an

excellent database including photos of fuel types that could serve as a resource for discussion of treatment and costing criteria.

Expand the knowledge base

Encourage, facilitate, and participate in locally-based programs to expand and improve the professional knowledge base in fuels management. This should include local fire departments and consulting, industry, and government professionals, and be delivered by knowledgeable practitioners.

Engage the industry

Where commercial opportunities exist in high-risk stands within community wildfire protection plans, incorporate logging as the primary treatment. For example, where logging can take place profitably, government could issue a forest tenure that requires clean logging to achieve a prescribed condition (e.g., basal area, density, or crown closure), and the cost and complexity of follow-up treatments would be significantly reduced.

Where commercial timber exists but an economic case cannot be made for harvesting, government could contract the company to cut and deck merchantable timber off site, and use the proceeds from sale of the wood to offset the cost of harvesting and any follow-up treatments.

Recognize that logging to meet public safety objectives imposes additional costs to industry and remove that financial barrier by adjusting stumpage within community wildfire protection plans.

Recognize that the current species and stocking standards do not make sense in areas managed for public safety and develop alternate standards for harvesting within community wildfire protection plans.

Return planned fire to the landscape

A prescribed burning program could not only cost effectively reduce hazardous fuels but also have biological benefits. Prescribed burning currently only occurs when agencies such as BC Parks, Wildfire Management Branch or the ecosystem restoration program advocate for it. Most strategic wildfire prevention initiative projects do not include prescribed burning, despite it being an effective tool to further reduce the hazard. In general the forest industry is not using prescribed burns due to concerns about liability. Complicating the problem is that we are losing skilled practitioners in industry and government as these workers retire.

Incorporate innovation

Where conditions permit, incorporate mechanical methods of treatment in non-commercial stands to reduce the cost of treatment and to increase the area treated annually.

Monitor effectiveness

Develop criteria to assess the effectiveness of fuel treatments and to assess treated sites affected by wildfire. Share the results with practitioners to assist with ongoing program improvement. This information should be made readily available to everyone in the fuels management community.

Keep better records

Government needs to do a better job of record keeping. There are a number of challenges with the existence and accuracy of fuel treatment records. A complete digital record of all fuel management

treatments completed to date is not available. Government does not know if harvesting by the forest industry within the interface is actually a fuel treatment. It's critical for this information to be easily available to not only gauge progress, but also to inform Wildfire Management Branch when it manages wildfire. Fuel treatments should be available in a fire management plan so fire managers are aware of the fuel type when protecting communities.

3. Redefine the Role of Local Governments

Reengage local governments by supporting them in a different role.

The current model requires numerous local governments to develop expertise and to use scarce resources and capacity to manage the wildfire hazard. This model has worked for many larger communities such as Kelowna, Kamloops and Prince George, but it is not ideal for smaller communities.

Ideas

Take advantage of local governments' strengths

Consideration could be given to building on the strengths of local governments. Local governments are experienced in community consultation and relationship-building. With financial support from the province, local governments could provide the link between residents and community groups and the forest industry. They could facilitate discussions with the aim of reducing the wildfire hazard, while at the same time respecting the needs of the community. The overarching goal should be community safety. For example, high school students might be used to reduce the wildfire hazard in a small park, while a local forestry contractor might be used to treat a larger site on the outskirts of town. In other words, the role of the local government would shift from doer to facilitator. This will require the provincial government to take a stronger role in technical leadership and project management.

4. New Development

All new development in the at-risk interface must be planned and constructed in accordance with FireSmart Canada standards or in accordance with a professional assessment.

The Filmon report recommended that municipalities within fire prone areas should formally adopt the FireSmart standard both for private and public property. At a minimum, the report said, the standard should apply to new developments. The report stated:

If we are to be successful in avoiding substantial losses to property and infrastructure due to interface fires, we must examine and implement appropriate planning, building code, and hazard abatement programs that will lessen the severity when wildfires do occur. Guidelines are not sufficient, restrictive bylaws and building codes must be enacted.

The British Columbia government should require municipal and regional governments to implement building codes and land use requirements that have proven useful elsewhere in limiting the impact of interface fires.

Some communities created interface development permit areas where developers must mitigate hazards, however others have not. The current approach of leaving it up to individual communities has resulted in a patchwork of regulation.

Ideas

The new *Building Act* may provide an opportunity for government to standardize building requirements in the interface.

5. Engage Homeowners

At-risk private landowners need to take personal responsibility for their safety. The current model of raising awareness and relying on FireSmart Canada isn't working. The presence of untreated fuels in high hazard areas immediately adjacent to residences is compromising all other efforts. While government has an education role, homeowners must also take personal responsibility.

Ideas

Incentives and disincentives

Provincial government should work closely with the insurance industry to provide incentives and penalties to homeowners with reference to building standards and FireSmart principles.

Regulation

Provincial and/or local governments require the authority to compel homeowners to treat problem fuels to FireSmart standards (e.g., high hazard fuel types identified in community wildfire protection plans) within a reasonable time period (e.g., two to five years). The Kelowna model of a fire official ordering abatement could be applied elsewhere. For unincorporated communities, the *Wildfire Act* should be amended to allow government to enter onto private land and carry out works for public safety under prescribed circumstances (e.g., failure to comply with an order), and to bill the landowner for costs.

Advertising and creating awareness of wildfire risk

Add a new message to Wildfire Management Branch's annual wildfire prevention media campaign – your home may be at risk but there are things you can do to protect yourself.

Information sharing

Provide a website, or build on the success of the FireSmart Canada website, where communities can learn from each other about successes and failures. Provide a way to connect and share lessons learned, including those from neighbouring jurisdictions such as Washington, Alberta, Yukon and Alaska.

Appendix 1

Ministry of Forests, Lands and Natural Resource Operations – Vanderhoof Resource District

The mountain pine beetle infestation was the catalyst for a wildland urban interface fuel management program in the Vanderhoof resource district. In 2005, Wildfire Management Branch staff started the program and, in collaboration with district staff, the small scale salvage program was initially used to harvest dead and dying pine.

Recognizing that licensees needed to make a profit to keep working, the ministry issued competitive forestry licences-to-cut in order to reduce stumpage costs. This required the support of the regional manager. The result was that the ministry's development costs were covered, the licensee was able to operate profitably, and the fuel hazard was reduced.

Public acceptance was not an issue in light of the beetle infestation. Government staff went to Fort Fraser with harvesting plans and were well-received by the community. In fact, residents wanted even more dead pine to be harvested.

It soon became apparent that the program had to expand, and more licensees had to be involved. Ministry staff met and built relationships with licensees and the program grew. Today it is a co-operative effort between the small scale salvage program, timber licensees, BC Timber Sales, the stewardship program, Forests for Tomorrow, the Society for Ecological Restoration in Northern BC and the Wildfire Management Branch zone.

Harvesting was focused on a 2-kilometre buffer around communities. As of 2014, 17 524 hectares of dead pine on Crown land and 5383 hectares of dead pine on private land were harvested. Fifty-six hectares of green timber was spaced and pruned. Today there are very few patches of economically harvestable dead pine within 2 kilometres of communities. The program is now expanding outside of the two-kilometre area and moving towards creating landscape level fuel breaks.

According to district staff, the following factors contributed to a successful program:

- A champion (Wildfire Management Branch zone staff) who recognized the need and got the ball rolling.
- The will to do it.
- Finding stumpage solutions.
- Public support.
- Partnerships with industry.
- Good relationship and close proximity of ministry staff and Wildfire Management Branch staff.

Appendix 2

City of Kelowna

The most significant wildfire in Kelowna's modern history was the 2003 Okanagan Mountain Park fire. That 25 000 hectare wildfire burned 239 homes and led to the evacuation of tens of thousands of residents. Since then, the city has proactively addressed the risk of interface fires on a number of fronts, including completion of two community wildfire protection plans, extensive fuel management treatments, new wildfire protection development rules and engagement of private landowners.

Community Wildfire Protection Plan

In 2004, the City of Kelowna completed its first community wildfire protection plan. Updated in 2011, the community wildfire protection plan identifies the level of wildfire risk in the community and provides treatment recommendations. All forested areas within 100 metres of structures were assessed for fuel load and fire behavior, and the result was a prioritized list of sites requiring fuel management treatments.

Fuel Management Treatments

Using a variety of funding sources, including the strategic wildfire prevention initiative, the Okanagan Training and Development Council, and federal job creation programs, the city treated all of the priority areas which were identified as having a High to Extreme wildfire threat score, according to the *Wildland Urban Interface Wildfire Threat Assessments in BC* document. The treatments were completed in accordance with professional fuel management prescriptions. Note that these sites will require maintenance over time.

Wildfire Development Permit Area

Based on a recommendation in the community wildfire protection plan, the city amended its official community plan to create a wildfire development permit area. This process ensures that developers deal with the wildfire hazard before homes are built. Requirements include ensuring access for fire suppression and evacuations and optimizing fire hydrant locations. If any land is to become the property of the city (e.g., for a park), the fire hazard must be mitigated to a level deemed acceptable to a qualified professional. Buildings must be fire resistant and landscaping must be consistent with FireSmart principles.

Private Land

The wildfire hazard on private land is a major concern to the city. Beginning in 2004, staff sent letters to, and visited, landowners with large properties identified in the community wildfire protection plan as having a moderate to extreme wildfire hazard. These efforts have increased more recently to encourage owners to reduce the wildfire hazard. The city focused on parcels with forest health issues in 2012, due to the increased hazard once trees attacked by mountain pine beetle die and dry out. Staff offered assistance connecting the affected landowners with local professionals and contractors who mitigate wildfire hazards.

Bylaw Update

In 2013, the city updated its Fire and Life Safety Bylaw to provide a fire inspector with the ability to require landowners to reduce a fire hazard on private land. The bylaw defines 'fire hazard' as any condition that increases the likelihood of fire or that may provide a ready fuel supply to augment the spread or intensity of fire. A person must not permit combustible materials to accumulate in or around premises to endanger property or constitute a fire hazard. A fire inspector may issue an order to remove or deal with the accumulation of material. To date, the city has chosen to educate residents as described above.

FireSmart

The city is committed to becoming a FireSmart community, leading by example to ensure the safety of its citizens, buildings and infrastructure. In the summer of 2014, the city completed FireSmart modifications to an existing city-owned house in Knox Mountain Park. The house and surrounding area demonstrates what can be done to reduce the impact of a wildfire on homes.

Fire department and city staff are currently meeting with four at-risk communities: Gallagher's Canyon, McKinley Landing, Clifton Road and Quail Ridge. The purpose is to help residents see the risk and find champions within the community that will take charge of the fire mitigation projects. Through the FireSmart Canada community recognition program, the city is actively seeking out community champions to advocate for wildfire safety in their neighbourhoods.

In summary, the City of Kelowna has adopted a successful and multi-faceted approach to reducing the risk of wildfire. All of the high priority city-owned land has received mitigation treatments. New developments must be built according to FireSmart principles, and work is underway to encourage private landowners to do the same. If necessary, a bylaw enables a fire inspector to require mitigation work on private land.

What contributed to this successful program?

- Leadership and support from city council.
- Support from senior management and the Fire Chief. Kelowna is one of only a handful of municipalities that had dedicated staff to mitigate the wildfire hazard.
- Professional capacity within the parks, planning and fire departments to recognize and manage the risk. At first, the city relied on consultants. However it has since developed the capacity to complete prescriptions through its urban forestry program.
- Funding from municipal sources and other levels of government, including employment insurance return to work programs.
- Community appreciation of wildfire risk, in part from the 2003 Okanagan Mountain Park fire.

What challenges lay ahead?

Encouraging widespread adoption of FireSmart principles by residents and securing funding for ongoing maintenance of fuel management treatments. Now that sites have been thinned out, grass is established and it needs to be burned and/or grazed to reduce the fine fuels and maintain healthy soils, especially in Kelowna's hot, dry climate. Prescribed burning in the community has not happened and probably won't for some time. The city may initiate a grazing program if funding is available.



Figure 11. A fuel management treatment at Knox Mountain Park in Kelowna. Note the fire-resistant asphalt shingles on the house on the left and the cedar shake roof on the right.

Appendix 3

Anarchist Mountain

The west-facing slopes of Anarchist Mountain, just east of Osoyoos, provide incredible views of Osoyoos Lake and the Cascade mountains in an open ponderosa pine, Douglas fir and grassland setting. In 2003, development of the area began with about 300 lots ranging from 1 to 4 hectares in size. A key feature of the 2425 hectare development was that 600 hectares was reserved from development as conservation lands.

On July 16, 2003, a vehicle with malfunctioning brakes started a fire near the development and within 24 hours it grew to 1000 hectares. It eventually burned 1230 hectares and two homes were lost, along with some outbuildings and recreational vehicles.

Concerned about the wildfire risk, the developer commissioned a wildfire hazard reduction assessment in 2004. His crew then set out to reduce the hazard by pruning vegetation and removing coarse fuels in accordance with the assessment. He also required FireSmart provisions in the building scheme. The wildfire also spurred some residents to take wildfire fighting training and to form a volunteer fire fighting society and fire department. The developer bought a fire truck for the community.

Ten years later, in May 2013, residents formed the Anarchist Mountain FireSmart Committee to help residents protect the community from wildfire. The committee believes that people living in forested areas need to be aware of the wildfire threat and take action by being FireSmart. The community is fortunate that a member of the volunteer fire department is also an experienced firefighting consultant, and he was the champion, for action

On June 12, 2013, a westbound tractor trailer lost its brakes and crashed in a runaway lane below the community, igniting a fire. This incident was a disturbing reminder to the community about the wildfire risks. A month later, the community held its first FireSmart day, where residents could learn how to protect themselves from wildfire. FireSmart day is now an annual event. The committee also manages a program for residents to drop off yard waste, performs FireSmart property assessments to give the owner a plan of action, maintains an informative website and has developed an effective call out system to alert the community in case of emergency. Half of the approximately 140 existing homes have been assessed. In recognition of its efforts, the community has received acknowledgement from the FireSmart program.

The Anarchist Mountain community is privately owned, so it was not able to access government funding through the strategic wildfire prevention initiative for fuel management. These factors contributed to a successful community effort on private land:

- The developer required FireSmart provisions in the building scheme before homes were built.
- A hazard assessment identified the risk and the developer took action to address it, including removing fuel at building sites and planning roads to serve as fuel breaks.
- A community champion initially took the lead and now other neighbourhood champions have come forward to help.
- The community understands the risk of living in the interface and is motivated to protect itself. Recent wildfires in the area have kept the issue top of mind for residents.

What has the community learned?

- Don't worry about your neighbours. If you FireSmart your property, your neighbours will ask you what you are doing and want to do the same.
- FireSmart activities are not necessarily expensive. Community work days and friendly competitions between neighbourhoods can motivate residents.
- Residents are more likely to listen and take action immediately after a wildfire incident.
- Wildfire is the only natural disaster where residents can affect the outcome through fuel management.

What issues does the community face?

- Conservation lands and vacant property—once FireSmart work is done on individual properties, the next logical step is the conservation lands. Members of the community would like to manage fuel within the conservation lands, but they currently have no authority to do so. There are also a number of vacant lots owned by banks and private individuals. The community can't address this issue by itself—it needs policy support from government. For the larger conservation areas, mechanized treatments are needed.
- Coarse fuels and ladder fuels are being replaced with fine, flashier fuels. A long term maintenance plan is needed.
- The community feels like it is doing this on its own. It suggests a website where different communities can connect, learn and share experiences.
- Where are the BMPs?

In summary, the community is doing an excellent job of protecting itself from wildfire. There is a great willingness to act, but some support from government is needed, specifically tools to manage fuel on private land.

Appendix 4

Review of Official Community Plans

Okanagan Valley / Similkameen Community	Wildfire Development Permit Area established?	Development meets FireSmart standard at a minimum?
Cities		
Armstrong	No	No
Enderby	No	No
Kelowna	Yes	Yes
Penticton	Yes	Yes
Revelstoke	Planned	Planned
Vernon	Yes	Yes
Districts		
Coldstream	No, but intends to review wildfire interface issue.	No
Lake Country	Yes	Yes
Peachland	Yes	Some FireSmart type work may be required. Professional hazard assessment required.
Sicamous	Yes	No, but professional forester requirement to assess risk.
Summerland	Yes	Yes
West Kelowna	Yes	Yes
Regional Districts		
Central Okanagan		
- South slopes	Yes	Yes
- Rural Westside	Yes	Yes
- Ellison	Yes	Yes
- Brent Rd. Trepanier	Yes	Yes
Columbia Shuswap		
- Area B	No, but assessment may be required.	No
- Area C	No. May require wildfire interface assessment.	No
- Area D	No	No
- Area E	No	No
- Area F	Yes	Yes
North Okanagan		
- Silver Star	Yes	Partial
- Area F	No. But resident must sign letter.	No
- Areas B and C	Yes	Yes
- Areas D and E	Yes, for four or more houses.	Yes

Okanagan Valley / Similkameen Community	Wildfire Development Permit Area established?	Development meets FireSmart standard at a minimum?
Okanagan-Similkameen		
- Area A	No, but may require assessment	Recommended
- Area C	No, but may require assessment	Recommended
- Area D1	No, but may require assessment	Recommended
- Area D2	Yes, and may require assessment	No, but strongly encourages best practices.
- Area E	May require assessment	Recommended
- Area F	No	No
- Area G	No	No
- Area H	No. May require assessment based on community wildfire protection plan.	Yes
Towns		
Oliver	No	No
Osoyoos	Yes. Says 'will'.	No. Assessment by RPF required.
Princeton	No, but applicants must demonstrate that FireSmart principles have been taken into account.	Yes
Township		
Spallumcheen	No	No
Villages		
Keremeos	No	No
Lumby	Yes	Partial



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