

Post-Wildfire Hazard Assessment and Risk Management

Special Report



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Introduction

After a wildfire, the likelihood of natural hazards such as landslides¹, severe surface soil erosion and flooding can increase significantly. In wildland–urban interface areas (i.e. fires near populated areas), these hazards can increase the risk to life, property and infrastructure.

This issue came to the Board’s attention during its 2004 special investigation into repairing damage caused by fighting forest fires.² Of 12 wildfires sampled, 6 experienced landslides or flood events since our field visits. In three of these cases, provincial highways were affected; houses were destroyed or damaged in two cases. In its report, the Board stated its intent to examine the process and responsibilities for identifying and managing post-wildfire risks to life, infrastructure and forest resources.

This report has been prepared under the authority of section 135 of the *Forest and Range Practices Act*. Section 135 permits the Forest Practices Board to make a special report on matters related generally to the performance of the Board’s duties, if the chair considers such a report to be in the public interest.

Objectives

This special report examines how post-wildfire hazards are assessed, managed and communicated. Specifically, the following questions are answered:

- What post-wildfire hazard assessment and risk management processes are in place in BC?
- Who is responsible for identifying, assessing, managing and communicating post-wildfire risk?
- Who assumes post-wildfire risk and who determines acceptable levels of risk?
- Does the current process work? Can it be improved? Are roles and responsibilities clear?
- What are the implications for public safety?

To answer these questions, we contacted representatives from a number of public and private sector organizations.³

¹ For the purposes of this report the term “landslide” includes debris flows, debris floods, debris slides, debris avalanches and rock fall.

² The investigation examined the rehabilitation of damage done while suppressing wildfires and did not examine post-wildfire hazards and risk management. The report can be found on the Board’s website at [www.fpb.gov.bc.ca/special/investigations/SIR12/Fire_Rehab_Plans\(SIR12\).pdf](http://www.fpb.gov.bc.ca/special/investigations/SIR12/Fire_Rehab_Plans(SIR12).pdf)

³The Board contacted the Ministry of Forests and Range, Ministry of Environment, Ministry of Transportation, Provincial Emergency Program, Regional Districts, City of Kelowna, Terasen Gas, CN Rail, CP Rail, Telus, and members of the Association of Professional Engineers and Geoscientists of British Columbia.

The project focussed on the Southern Interior Forest Region. This is the region of BC where most wildland-urban interface wildfires have occurred in the past few years, and where most post-wildfire hazards have been identified by government.

What Can Happen?

The risk to life, property and infrastructure can increase after a wildfire due to a number of hazards, as discussed below:

Rock fall is a serious concern after wildfires. Heat can fracture bedrock, causing large rocks to roll down steep slopes. The risk of falling rock increases when vegetation that previously supported loose rock is burned.

When large forested areas are burned by wildfire, it affects **forest hydrology**. Wildfires can cause changes to the timing and volume of water flow during spring freshet. Increases in peak flows can cause flooding, and may overwhelm culverts or bridges or cause stream channel erosion. Changes to forest hydrology can also decrease slope stability, which increases the probability of landslides.

Layers in the **soil can become water-repellent** after a wildfire. As plants and litter on the forest floor burn, waxes and lipids are vaporized. These gases condense as they enter the soil and cool, covering individual soil particles with a waxy coating. This water-repellent effect can last for several years. It appears that water-repellent conditions existed in BC's southern interior during the 2003 and 2004 wildfire seasons.



Debris flow on Highway 3A at Jansen Creek, August 7, 2004.

-- Photo courtesy of Dwain Boyer

As rain or snowmelt cannot infiltrate water-repellent soil, the water flows overland. If the rainfall is intense, it can cause significant erosion, flooding, debris floods, or in gullied terrain, debris flows. A debris flood is a flood down a steep slope containing a large amount of sediment or debris. A debris flow is a rapid, wet landslide containing a higher proportion of soil, rock and debris rapidly flowing down steep gullies.

Debris flows and debris floods can be catastrophic, as the following example illustrates.

Kuskonook Fire

In the late afternoon of August 27, 2003, lightning started a wildfire in the Kuskonook Creek drainage north of Creston BC. The wildfire burned almost 5000 hectares. An assessment after the fire revealed that a water-repellent soil layer had formed where the wildfire was severe.

A year later, in the late evening and early morning of August 6-7, 2004, an intense rain storm occurred over the Kuskonook Creek drainage. The increased surface runoff, partially due to water-repellent soils, caused a large debris flow in Kuskonook Creek. An estimated 20-30,000 cubic metres of soil, ash, wood and rock flowed down steep gullies onto Kuskonook Creek and continued into Kootenay Lake. Two houses were destroyed and Highway 3A was closed for a number of days. A smaller debris flow also occurred at nearby Jansen Creek during the same storm. Fortunately no one was injured in either case.



Two houses were destroyed and Highway 3A at Kuskonook Creek was blocked for several days.
(August 7, 2004)

-- Photo courtesy of Dwain Boyer

The Kuskonook Creek debris flow was not an isolated incident. Several similar events occurred after the 2003 and 2004 wildfire seasons.

Wildfire	Event(s)
Okanagan Mountain Park (2003)	Debris floods and flash flooding posed risk to infrastructure, 50 homes and 150 people (October 2003.)
Cedar Hill (2003)	Debris floods blocked Hwy. 97 and flooded three homes. (June 2004.)
Vaseux Lake (2003)	Intense rainstorm caused flooding. Debris closed Hwy. 97. (June 30, 2004.)
Strawberry Hills (2003)	At least three debris floods occurred, one of which partially blocked Hwy. 5. (July/August 2004.)
Lamb Creek (2003)	Debris flows and debris floods caused sediment to enter Lamb Creek. (August 2004.)
McLure (2003)	A major flood occurred after a rapid snowmelt and soil slumped into a creek. (February 2005.)
McGillivray (2003)	A landslide in a small creek triggered a debris flow which damaged a water intake. (Spring 2005.)
Botanie (2004) and Sleetsis (2005)	Rain triggered many small debris flows. One had sufficient momentum to derail a parked train. (August 2005.)
Ingersol (2003)	Sustained rain caused eight large debris flows and six smaller events which impacted forestry operations and a public road. (October 2005.)

According to the Ministry of Forests and Range, historical accounts indicate these types of events are not uncommon. After the 1998 Silver Creek wildfire near Salmon Arm, a debris flood in May 1999 affected private property, and over the next three years, 15 small landslides were attributed to the effects of the wildfire. At the 1994 Tiffen Creek fire near Lillooet, heavy rains extinguished the fire and also caused severe erosion. Finally, at the 1973 Eden wildfire near Salmon Arm, debris flows occurred four times between 1975 and 1983, and all of the events damaged private property.

In the United States, land managers have recognized and managed post-wildfire hazards, including water-repellent conditions, for many years. However, water-repellent conditions were not fully appreciated by forest managers in BC before 2003, when summer weather was very dry and fires burned late in the season. Wildfires were unusually intense and damage was severe.

In summary, rock fall, debris flows, debris floods, extreme erosion and flooding are all potential hazards after a wildfire. When these natural hazards exist where people live and work, the risk to human life, property, infrastructure and resources is increased.

Who Is Involved And What Are Their Responsibilities?

The Board interviewed various parties to determine roles and responsibilities in natural hazard assessment and risk management. Some have roles in approving development while others have mandates of emergency preparedness and response.

Provincial Government

Ministry of Forests and Range (MOFR)

MOFR's Protection Branch is responsible for suppressing wildfire. If government chooses to rehabilitate private or Crown land after a fire, the *Wildfire Regulation* requires government to prepare and implement a rehabilitation plan. Normally a rehabilitation plan will specify treatments for fireguards, water crossings and other suppression works. To prepare the plan, a hazard and/or risk assessment may be done to prioritize work sites. It is important to note that this rehabilitation only applies to damage done while suppressing the wildfire, and not to fire impacts in general. Other than the *Wildfire Regulation*, MOFR's mandate does not require it to assess post-wildfire hazards or perform risk assessments.

However, there is an expectation among many interest groups and the public that MOFR should assess hazards and manage risk after a wildfire. The Ministry of Forests and Range, after all, manages forest resources, and issues licences and cutting permits to salvage timber from burned areas. MOFR also employs engineers, geoscientists, hydrologists and other professionals who are capable of assessing hazards and risk. Also contributing to this expectation is the fact that MOFR has, at times, seeded burned areas with grass to promote the growth of vegetation and stabilize slopes.

Provincial Emergency Program (PEP)

PEP helps local governments and people prepare for, respond to, and recover from emergencies and disasters. Its mission is to enhance public safety and reduce property and economic loss from actual or imminent emergencies or disasters. PEP also provides support by coordinating and integrating various agencies and levels of government in emergency management.

PEP fulfills its mission by providing expertise, disaster response and recovery funding. PEP also administers the Natural Hazards Mitigation Fund (NHMF). In 2005, \$3 million was available from the fund for local governments and agencies to enhance public safety in communities at risk from natural hazards, including wildfires. Further discussion of the NHMF appears later in this report.

Historically, PEP has primarily focused on emergency preparedness and response. However, as emergency management in BC matures, PEP has supported communities in addressing hazards, risks and vulnerabilities and provided support through pre-incident mitigation and post-incident recovery.

Ministry of Environment (MOE)

For 25 years, the Ministry of Environment had a significant role in reviewing and approving new development on floodplains and high-hazard areas. MOE staff built an extensive knowledge base of engineering reports and flood hazard mapping. Requests for subdivision development, or the relaxation of building permit requirements, were referred to the ministry by local governments. MOE would deny development applications if they were proposed in high-hazard areas.

This function was transferred to local governments and provincial government land development approval officers in 2004. Today, MOE provides flood hazard mapping and interpretive guidelines for local governments, and approval officers, as tools to use when considering development proposals. Flood hazard mapping identifies known debris flow hazard areas and is useful when assessing hazards and risk after wildfire. The ministry also produced development guidelines to identify qualified professionals, and to provide guidance for acceptable flood or debris flow assessment reports.

During emergencies, landslide specialists from government and/or the private sector assess hazards and provide recommendations on how to respond to landslide events. In some areas, MOE provides a coordination role by keeping a roster of landslide specialists who are on call to respond in short notice. Government regulations also require MOE to coordinate initial response to debris avalanches and debris flows.

Ministry of Transportation (MOT)

Ministry of Transportation officers are responsible for approval of subdivisions in rural areas of the province outside of municipal boundaries. If development is proposed in a hazardous area, MOT may require a professional engineer to assess the proposal and determine if it is safe for the intended use. MOT will then review the engineer's report and may approve the application, reject it or require that additional conditions or restrictive covenants be added to the property title.

MoT is also responsible for highway infrastructure. In general, MoT or its contractors react to hazardous situations, rather than proactively seeking them out. For example, if a debris flow blocks a highway, a contractor will clean it up.

Regional Districts

Regional districts approve development within their boundaries. Some may enact bylaws respecting development on floodplains. Regional districts do not typically have professional engineers or geoscientists on staff with experience in identifying natural hazards. However, using MOE guidelines, regional district staff can identify development proposals that are located in areas subject to flooding, but not to natural hazards in general. If development is proposed on land subject to flooding, mud flows, debris flows, debris torrents, erosion, land slips, rock falls, subsidence or avalanche, the *Community Charter* permits local governments to require the developer to hire a qualified professional, to certify that the land may be used safely

for the intended purpose. Once this requirement is met, a building permit can be issued. If the requirement is not met, the building permit is denied.

The *Emergency Program Act* requires local authorities to prepare local emergency plans to prepare for, respond to, and recover from natural disasters. As of January 2006, all regional districts must have completed local emergency planning. PEP has prepared hazard, risk and vulnerability assessment tools to help communities prepare for, respond to and recover from disasters. There is also financial assistance available from PEP to complete planning.

Utilities and Railways

Disruption of operations can cost a utility or railway millions of dollars. These companies are interested in protecting the integrity of their networks, and will spend whatever is necessary to protect them. However, utilities and railways do not necessarily know about a wildfire above their infrastructure. In 2003 and 2004, MOFR elected to notify them of potential hazards. Once they are aware of a new hazard, most utilities and railways use staff or retain local consultants to assess the situation. These companies have funds readily available for mitigation or repair.

Licensees

Timber salvage is a common practice after large wildfires. A licensee who traditionally operates in an area may salvage the timber under its forest licence. Alternatively, salvage may be done by others under a non-replaceable forest licence or under the MOFR small scale salvage program. To date, most salvage has been regulated by the *Forest Practices Code of British Columbia Act*. With certain exceptions, a licensee must conduct a terrain stability field assessment when required by the district manager, or where a forest development plan shows an area as having potentially unstable terrain or a moderate likelihood of landslides⁴.

Under the new *Forest and Range Practices Act*, licensees must ensure that their activities do not cause landslides that have a material adverse effect on forest resources⁵. If activities contributed to a landslide, a licensee may avoid penalties by demonstrating that it had been diligent in its planning. In other words, did the licensee take steps to ensure that its activities did not cause a landslide? Part of showing diligence is to conduct a terrain stability field assessment that confirms the proposed activities are appropriate for the site.

Terrain stability assessors and forest planners face special challenges when considering salvage programs in areas affected by wildfire. Licensees and professionals must be aware of both the short- and long-term hazards created by wildfires.

⁴ Section 37 of the *Operational and Site Planning Regulation*

⁵ Section 37 of the *Forest Planning and Practices Regulation*.

What Happened After The 2003 Wildfires?

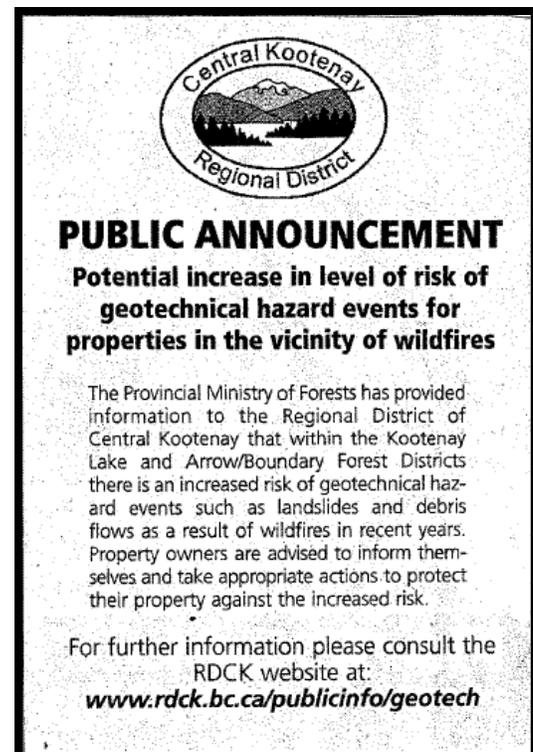
Although the Ministry of Forests and Range does not have a specific mandate to do so, MOFR professional engineers in the Southern Interior Forest Region conducted overview hazard assessments after the 2003 wildfires. In the fall and winter of 2003-2004, the professional engineers wrote to governments, utilities and railways and advised them that the risk to life and infrastructure may have increased after the wildfires. The letters provided a summary of potential hazards after wildfires and suggested an approach to risk management. Key areas at risk were identified, and the engineers suggested that the regional district or utility conduct a more detailed review.

The professional engineers sent the letters to uphold their professional code of ethics which requires them to “hold paramount the safety, health and welfare of the public.” They felt compelled to apply their knowledge of potential hazards and impacts and warn those at risk. Several consultants also independently contacted regional districts and utilities.

Reaction to the letters was mixed. Utilities, railways and the Ministry of Transportation appreciated the information because they would not necessarily know that a wildfire occurred above their infrastructure, and that the risk of potential hazards was elevated as a result. Generally speaking, due to the value of their infrastructure and regard for public safety, utilities and railways were willing to make resources available to follow up on these warnings and take appropriate action.

Some regional districts were also appreciative of the information. They chose to pass on the information to their constituents by way of a newsletter, public notice and/or press release.

However, not all regional districts accepted the warning and acted proactively. One thanked the ministry for the letter but suggested that MOFR contact individual landowners directly. Another regional district felt that the information provided was too general and requested additional detail. The regional district said that until it received detailed engineering reports with mapping identifying the extent of hazards, it would not be in a position to notify individual landowners. MOFR staff clarified that it was not in a position to undertake detailed risk analysis for all interface wildfires, or undertake detailed risk assessment and/or propose mitigation for all down-slope consequences. MOFR suggested that those activities were best accomplished by the agencies responsible for the value at risk. That regional district has since posted a notice on its website,



Example of notice posted by the Central Kootenay Regional District.

indicating that there is a potential increase in the level of risk of geotechnical hazard events for properties near wildfires. Maps of the wildfires are also available.

In the case of the Cedar Hill wildfire near Falkland, flooding and debris floods occurred in June 2004, a year after the wildfire. A professional geoscientist investigated and warned that the risk of further flooding or debris flows would remain elevated for a number of years. In that case, the regional district chose to notify individual property owners in the area and suggested they may want to carry out a risk assessment for their property.



Cedar Hill June 26, 2004 -- Debris floods blocked Highway 97 at the top of the picture and flooded three homes. Debris flood paths are visible as dark areas on the field and beside the road.

-- Photo courtesy of Craig Beeson

City of Kelowna

The 2003 Okanagan Mountain Park wildfire burned approximately 15,000 hectares of forest in nine watersheds that drain through the City of Kelowna. City staff immediately recognized that the burned area could pose a serious hazard to Kelowna residents. The city was concerned first about public safety, but also the security of its infrastructure, such as roads, culverts and drinking water intakes. It hired an expert team to complete an assessment to determine the hydrologic risks and slope hazards resulting from the wildfire.

As part of the risk assessment, the City assessed Crown land above Kelowna. It recognized that the risk to its residents and infrastructure would probably originate on Crown land outside city boundaries. The study identified and assessed risk, determined the probability of various events, and recommended appropriate options for mitigation. City council supported staff and approved \$2 million for post-wildfire hazard abatement. Council decided to do the mitigation work before securing outside funding. In this case, the City of Kelowna had the financial capacity to pay for whatever work was necessary to protect its residents.

The expert team was concerned that an intense rainfall on water-repellent soils could cause flooding. The team warned the City that hazardous conditions might persist for 3-5 years and that many drainage structures were not large enough to handle the anticipated flows. On October 22, 2003, a localized rainstorm deposited up to 20 mm of rain in a 45-minute period over parts of the wildfire. As feared, debris floods and flash flooding occurred. An estimated 50 homes and 150 people were threatened.

To address the ongoing risk to public safety, property and infrastructure, the City proposed mitigation in areas of greatest risk. It applied to the federal government for disaster assistance funding to recover the costs of implementing its proposal, but no commitment has been made to date by the federal government.

2003 Firestorm Provincial Review (Filmon Report)

During the preparation of the *2003 Firestorm Provincial Review*,⁶ the review team was advised of the issues surrounding post-wildfire hazards and water repellent soils, and recognized that it will take time for the landscape to return to normal hydrological function. The team noted that the most significant concern for residents facing the risk of water or landslide damage is that they are likely uninsurable. The review also noted that damage could occur to fish streams and water sources. As a result, the review team made the following recommendation:

“The provincial government, in partnership with local governments, should examine watershed restoration as soon as possible, to identify the areas of severe watershed destruction and develop a plan for the protection and rehabilitation of these areas.”⁷

What Has Happened Since 2003?

Ministry of Forests and Range

Staff in the Southern Interior Forest Region recognized that, while their process for hazard assessment and risk management after the 2003 fires was effective, it was uncoordinated. They wanted to formalize a process to systematically identify post-wildfire hazards and increased risks, and communicate that information to those who could be affected. They also wanted to recognize and respond to the recommendation of the Filmon Report. To date no formal MOFR initiative to implement the report’s recommendation has been announced.

Staff received support from MOFR’s executive to develop a standard operating procedure (SOP) for “post-wildfire management of increased risk of severe surface erosion, landslides, gully processes and flood events.” The procedure is meant to be used for interface fires. It is currently in draft form, and has not yet been approved by the Southern Interior Forest Region.

⁶ <http://www.2003firestorm.gov.bc.ca/>

⁷ Ibid, pp. 67-68.

The procedure calls for reports of all wildfires located on moderate to steep slopes above settlements, occupied private property or infrastructure, to be reviewed. Where a reasonable risk exists, a team of specialists will undertake a risk analysis. Specific risk analysis procedures are being developed. If the risk analysis indicates moderate or high risk, the SOP calls for the results to be forwarded to the relevant land manager and stakeholders so they may take appropriate action.

The SOP suggests that where jurisdictions overlap, MOFR must appoint a lead agency. The lead agency would be responsible for more detailed risk analyses and evaluation, and where necessary, development and implementation of risk control measures such as watershed treatments, protective structures or even moving residences.

Finally, the SOP calls for monitoring, evaluation and research of risk control measures to ensure that objectives are met.

Provincial Emergency Program

In April 2005, the provincial government announced the Natural Hazards Mitigation Fund (NHMF) to address risks from natural hazards. The fund is administered by PEP and it provides up to \$150,000 per project, on a cost-sharing basis, to reduce risks to public safety and damage to infrastructure from natural hazards. In the 2005-2006 fiscal year, \$3 million was allocated to the fund.

Two of the funded projects for 2005-06 relate to post-wildfire hazards and risk management. One is the development of the risk analysis procedure that is part of the Southern Interior Forest Region's SOP. The other is the development of best management practices for slope hazard assessments for residential developments. These guidelines are for members of the Association of Professional Engineers and Geoscientists of British Columbia to use in determining whether or not a proposed development will be safe.

PEP is aware that regional districts face issues with the NHMF. First, it provides only 75 percent of the funding for successful projects. Unfortunately, unlike municipalities, regional districts do not have discretionary funding to cover the remaining 25 percent of a project's cost. Also, as a regional district cannot borrow money, it would first have to canvass local residents in an area and hold a referendum to determine if the public supported the project. If approved, the regional district could establish a local service and tax residents to pay for it. Such a process typically takes 18 months, and the deadline for project proposals was May 31, 2005. This may not be an issue in future years, but it does mean that regional districts may have to plan farther in advance to ensure that their 25 percent share of the funding is in place to complete a project.

Secondly, it is unlikely that a small number of people living at the bottom of a burned slope would be able to pay for significant hazard mitigation projects. Some residents in rural areas do not want to pay even for basic fire protection.

There is no doubt that \$3 million will not go very far when one considers the extent of natural hazards in British Columbia. However, it is a start, and having provincial funding available may make local governments more aware of natural hazards, including those caused by wildfire. PEP has applied for additional funding for the program for the next three years.

Discussion

The Board set out to answer a number of questions in this report. Based on the information obtained through interviews with various agencies, we offer the following comments.

What post-wildfire hazard assessment and risk management processes are in place in BC?

There is no province-wide coordinated program, nor any standard approach, for post-wildfire hazard assessment and risk management. In the Southern Interior Forest Region, a draft SOP for post-wildfire management of increased risk of severe surface erosion, landslides, gully processes and flood events has been developed. It is currently being tested, and if adopted by government, could provide the basis for a province-wide process.

Who is responsible for identifying, assessing, managing and communicating post-wildfire risk?

There is no lead agency responsible for post-wildfire hazard assessment and risk management. The Ministry of Forests and Range employs staff that could, and sometimes do, fulfill this role, but MOFR does not have a specific legislated mandate to do so.

Professional engineers, geoscientists and foresters have an ethical responsibility under their professional code of conduct for ensuring public safety. This means that professionals must warn of unsafe situations *that they are aware of*. As there is no coordinated hazard assessment and risk management process in the province, the number of potentially hazardous situations far outweighs those encountered by professionals in their daily work.

Regional districts and municipalities are responsible for emergency planning, but most do not have the expertise to perform hazard assessments, or the budget for consultants to do such assessments or carry out mitigation. There are often jurisdictional issues – it is not uncommon for a community to be placed at risk by a hazard that exists on land outside its jurisdiction. Kelowna is an example. No local government is empowered to do work outside of its jurisdictional boundaries, so it must rely on others to mitigate risk.

Larger municipalities and some regional districts have more access to funding and are more likely to have skilled staff. For example, the City of Kelowna had the means to be proactive and assess hazards after the 2003 wildfire.

Certainly, the responsibility for communicating increased risk is shared between levels of government and among government agencies. Any party that knows about a hazardous

situation must inform those potentially affected as a principle of due diligence and professional practice. People living below a potentially hazardous situation do not care what level of government alerts them to an increased risk. However they do expect that government will inform them of imminent hazards and an increased risk to life and property. They also expect government to respond to that risk, regardless of whether or not it has the mandate to do so.

Who assumes post-wildfire risk and who determines acceptable levels of risk?

Ultimately it is the property owner, land manager, utility or railway that assumes the risk for natural hazards and determines, by their actions, a level of risk that is acceptable to them.

The Ministry of Transportation has criteria for acceptable risk levels when it considers subdivision development applications. The probability of a hazard occurring must not be more than 10 percent in 50 years. This gives an indication of what the ministry considers to be an acceptable risk.

Does the current process work? Can it be improved? Are roles and responsibilities clear?

There is currently no coordinated, province-wide post-wildfire hazard assessment and risk management process. Roles and responsibilities remain unclear so the Board is making recommendations for improvement.

What are the implications for public safety?

Natural hazards will always pose a risk to people and property. However, a comprehensive post-wildfire risk assessment procedure that includes risk assessment, assignment of responsibilities for all levels of government and the public, and a comprehensive communication plan will reduce the risk to public safety, private property and infrastructure following interface fires.

Recommendations

Leadership

Post-wildfire hazard assessment and risk management in British Columbia is uncoordinated and roles and responsibilities of various agencies and governments are unclear. A coordinated approach is needed and part of that should include the designation of lead agencies or ministries responsible for: 1) assessing post-wildfire hazards; and 2) managing risk.

The Board recommends that the provincial government designate a lead agency (or agencies) for post-wildfire hazard assessment and post-wildfire risk management.

Standard Process

A process for assessing post-wildfire hazards and managing risk in BC is being developed. Assignment of responsibilities for all levels of government and the public should be part of the process, as should a comprehensive communication plan to ensure that potentially affected stakeholders are aware of increased risk. When post-wildfire hazards and risks are identified, the results should be forwarded to all appropriate local governments and provincial agencies for consideration and inclusion in their emergency plans.

The Southern Interior Forest Region standard operating procedure for interface fires is currently being tested and procedures for risk analysis are being developed. Once an appropriate procedure is approved by government, it should be implemented where the public safety is at risk following forest fires.

The Board recommends that the provincial government complete a standard operating procedure for post-wildfire risk assessment and management and implement it where appropriate.

Funding

Under the Southern Interior Forest Region Standard Operating Procedure, a qualified professional assesses hazard and risk and recommends mitigation. It does not establish who should be responsible for acting on the recommendations of the professional, or where the money should come from to pay for those actions.

Ultimately the owner of the infrastructure or land manager is responsible for taking the steps he or she feels is necessary to mitigate risk to an acceptable level. However, as discussed previously, individual landowners and regional districts are often not in a position to fund mitigation projects. Low-interest loans or federal or provincial government funding are two possible options.

The Board recommends that, where there is an unacceptable risk to people, property or infrastructure after an interface wildfire, the provincial government should explore ways of helping those at risk manage and mitigate the risk.

The Board requests that the British Columbia Inter-Agency Emergency Preparedness Council respond to these recommendations by December 31, 2006.