

4 WHAT should you do during a storm or heavy runoff event?

- ▶ Pay attention to weather forecasts that include thunderstorm or heavy rainfall warnings.
- ▶ Check the current Environment Canada weather forecast at http://weather.gc.ca/canada_e.html
- ▶ Avoid driving in an area where a wildfire has recently occurred. Potential dangers include washed-out bridges and culverts. Roads running below steep banks are susceptible to landslides. If it's absolutely necessary to travel in the area, stay alert and watch the road ahead of you for collapsed pavement, mud, fallen rocks or other indications of debris flows.
- ▶ Never drive across a flooded road.
- ▶ If your home is in an at-risk area and severe weather is occurring or in the forecast, stay alert. Listen for any unusual sounds (e.g. tree trunks cracking or boulders knocking together) and watch for changes to water flows in local stream channels. Consider sleeping on an upper floor of your home and don't sleep in the basement.
- ▶ Do not enter water channels or hike upstream to inspect water lines or buildings. Consider leaving the area temporarily if you are concerned (and if it is safe to do so).
- ▶ On forested land where a wildfire has recently occurred, avoid camping on floodplains, beside small streams, on alluvial fans or at the base of burned slopes. Be aware that forest service roads or resource roads may wash out if a flood occurs and could cut off access to the area.

How long do post-wildfire risks last?

In areas that have been severely burned, post-wildfire risks may last for two years or more. However, the increased risk of floods or debris flows in severely burned areas may persist much longer.

After two or three years, the regrowth of vegetation and reduced water repellency of the soil should lower the risk considerably.

How can you get more information about potential risks to your property?

Consulting geotechnical specialists can provide specific information about your property and post-wildfire hazards, including potential risk-mitigation techniques.

This bulletin provides general information only and does not cover all potential hazards. Additional information resources are available online:

- ▶ Current wildfires: www.bcwildfire.ca
- ▶ Association of Professional Engineers and Geoscientists of B.C. (APEGBC): www.apeg.bc.ca/Home
- ▶ Environment Canada weather: http://weather.gc.ca/canada_e.html
- ▶ Current flood information, Emergency Management BC information and contacts: <http://www.embc.gov.bc.ca/index.htm>
- ▶ Ministry of Forests, Lands and Natural Resource Operations district offices and contacts: www.gov.bc.ca/for



Landslide and Flooding Risks DUE TO WILDFIRES

*What you can do to recognize
and deal with the hazards*

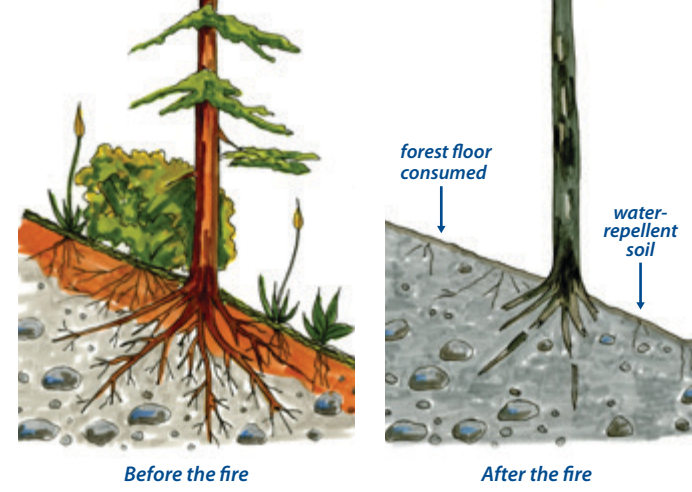
The large Terminal Creek mudslide near Squamish occurred during a localized rainstorm in September 2015, stranding recreationalists.



There was widespread flooding on the Squamish River after a severe rainstorm in September 2015.



Ministry of
Forests, Lands and
Natural Resource Operations



Part of the Elaho River drainage area was burned by wildfire in 2015.

This is the Elaho drainage area in June 2015, showing evidence of how severe the wildfire was in that area.

Wildfires remove the protective ability of vegetation, increasing runoff, erosion, debris flow and the potential for landslides.

INTRODUCTION

This pamphlet describes how wildfire activity may increase the risk of natural landslides and flooding, the warning signs you should watch for, and what you should do in an emergency. This information can help you and your family avoid a potentially dangerous situation.

1 HOW does wildfire activity increase the risk of landslides and flooding?

Periodically, British Columbia experiences severe wildfires near populated areas, such as those that occurred in 2003, 2009, 2010 and 2015.

A severe wildfire damages the forest canopy, as well as the smaller plants and soil below the trees. This can result in increased runoff after intense rainfall or a rapid snowmelt, putting homes or other structures below the burned area at risk of localized floods and landslides.

2 WHAT specific hazards should you watch for after a wildfire?

- ▶ **flooding**, especially after an intense rainfall
- ▶ **landslides**, which could include a:
 - » debris flow (a specific type of fast-moving and powerful landslide, resulting from heavy water runoff and carrying large amounts of soil, rocks, wood debris and trees)

- » rockfall (resulting from the fire-induced cracking of rocks and the loss of stumps, logs and roots that would normally hold loose rocks in place)

What values could be put at risk?

- ▶ **Residential**, farm and industrial buildings that are downslope or downstream of the site of a severe wildfire could be affected by post-wildfire hazards, even if the fire was only one or two hectares in size.
- ▶ **Structures** that are located below a recent wildfire and are near a creek, gully or alluvial fan are most at risk.
- ▶ In an area that has experienced flooding or landslides in the past, there is an increased likelihood that a flood or landslide could happen there again.
- ▶ **Roadways**, railway lines, pipelines and other types of infrastructure (including bridges that are downslope or downstream of a wildfire) may be obstructed, inundated or washed out.
- ▶ **Domestic water lines**, irrigation water lines and water intakes (and other structures in gullies, streams or creeks) could be damaged or destroyed by a post-wildfire flood or landslide. These areas may be at risk during these events but also after them, due to water channel blockages.

What weather conditions trigger post-wildfire floods and debris flows?

The most common trigger is intense rainfall (e.g. 10mm of rain falling in under 30 minutes). The risk increases if the rainfall follows a prolonged dry period, because water can't soak into

dry, fire-altered soils quickly. The water is repelled and flows over the land, instead of soaking into it.

In coastal areas, fall rainstorms are the most likely causes of post-wildfire floods or debris flows. A rapid spring snowmelt can also be a trigger in drainage areas that have experienced severe wildfires.

3 HOW can you deal with post-wildfire hazards?

- ▶ **Be informed. Be ready.**
- ▶ **Familiarize** yourself with the landscape and its normal drainage channels. Know where your home or property is situated with respect to natural drainage channels. Find out if any floods or landslides have occurred in the area in recent years.
- ▶ **Contact** local authorities to learn about any emergency response and evacuation plans for your area. Attend any meetings that are held to inform the public of local risks.
- ▶ **Develop** your own emergency plans for your family, property and/or business. Post-wildfire hazard events can occur with little advance warning, so it's important to be prepared.
- ▶ If a wildfire occurs on Crown (provincially owned) land, a post-wildfire risk analysis may be conducted to determine if the safety of nearby residential areas may be affected. **Contact your local government** office or Emergency Management BC (EMBC) to see if a risk analysis has been done in your area.