Shorts Creek drainage, burned by 2009 Terrace Mountain fire.

Introduction

This pamphlet describes (1) how wildfire may increase the risk of natural landslides and flooding hazards, (2) what to watch for, (3) how this knowledge will help you avoid putting yourself and your family in danger, and (4) what to do in case of an emergency.

1 How does wildfire potentially increase the risk of landslide and flooding hazards?

Periodically, British Columbia experiences severe wildfires near urban or other populated areas, such as those that occurred in the summers of 1998, 2003, and 2009.

Severe wildfires damage the forest canopy, the plants below, as well as the soil. This can result in increased runoff after intense rainfall or rapid snowmelt, which can put homes and other structures below a burned area at risk of localized floods and landslides.

2 What are the specific hazards to watch for after a wildfire?

- Flooding, especially after intense downpours.
- Many types of landslides, however, the most common after wildfire are:
  - Debris flows, a specific type of fast-moving and powerful landslide resulting from heavy runoff carrying large amounts of soil, rocks, wood debris, and trees.
  - Rockfalls, resulting from fire-induced cracking of rocks, as well as the loss of stumps, logs, and roots, which normally hold loose rock in place.

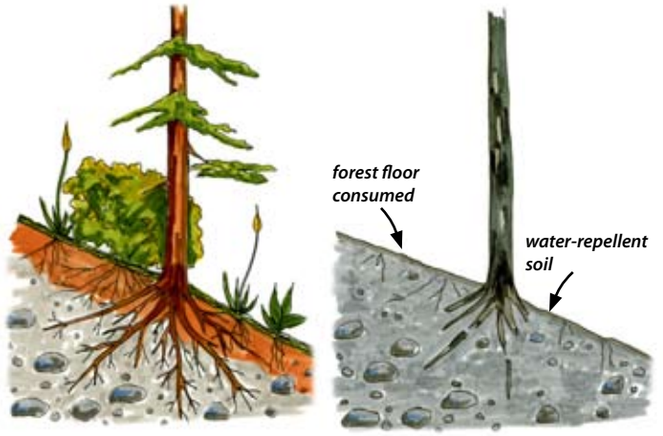
What are at risk?

- Residential, farm and industrial buildings that are downslope or downstream of a severe wildfire are at some risk of post-wildfire hazards. But the hazard may not be restricted to areas below large fires. Severe fires of only one or two hectares can in some cases trigger hazards. Structures that are below a recent wildfire, and near creeks, gullies or alluvial fans, are most at risk. Areas that have experienced flooding or landslides in the past are likely to have an increased chance of recurrences.
- Roadways, railway lines, pipelines and other infrastructure, including bridges downslope or downstream of fires, may also be obstructed, inundated, or washed out.
- Domestic or irrigation waterlines/intakes and other structures in gullies, streams, and creeks can be damaged or destroyed by a post-wildfire flood or landslide. These areas can be at risk during and even after an event due to channel blockages.

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

The most common trigger is intense rainfall (e.g., 10 mm of rain in 20 to 30 minutes). The risk increases if this rainfall follows a prolonged dry period because dry weather can increase the water repellency of fire-altered soils. On the Coast, fall rainstorms are the most likely to cause post-wildfire floods or debris flows. Another trigger is rapid spring snowmelt in a drainage that has experienced a severe burn.

Evidence of concentration of overland flow on water-repellent soils. Kuskonook Creek drainage, August 2004.



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

3 What are some things you can do to deal with post-wildfire hazards?

1. Be informed and be ready. Become familiar with the land and the normal drainage channels around you. Know where your home and property lies with respect to natural drainage channels. Find out if floods or landslides have occurred in your area in the past.
2. Contact your local authorities to learn about 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 and business. Post-wildfire hazard events can occur with little advance warning.
3. If a fire has occurred on Crown land, a post-wildfire risk analysis may have been conducted to determine the safety risks to adjacent residential areas. Contact the local government office or Emergency Management BC (EMBC) to see if a risk analysis has been done for your area. Such analyses help determine the safety risks to residential areas adjacent to wildfires.

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

1. Be aware of forecasts that may include thunderstorms, or those with heavy rainfall warnings. Check the current forecast or use a VHF weather radio (www.msc.ec.gc.ca/msb/weatheradio/index_e.cfm).
2. Be alert when driving in an area that has had a recent wildfire. Washed-out bridges or culverts are especially dangerous, and roads below steep banks are susceptible to landslides. Watch the road for collapsed pavement, mud, fallen rocks, and other indications of possible debris flows. Never drive across a flooded road.
3. If your home is in a location at risk, and severe weather is occurring or forecast, stay alert. Listen for unusual sounds—trees cracking or boulders knocking together—and watch for changes to water flows in local stream channels. Sleep in an upper floor of the house, not in the basement.
4. Do not enter channels or hike upstream to inspect waterlines or buildings. Consider leaving the area if it is safe to do so.
5. On forest land where a wildfire has recently occurred, avoid camping on floodplains, beside small streams, on alluvial fans or at the base of burned slopes. Also, be aware that forest roads may wash out if a flood occurs, cutting off access.

Kuskonook landslide near Creston, BC. This large debris flow occurred during a localized rainstorm on the night of August 6–7, 2004. The heavy rain caused rapid runoff in the headwaters of Kuskonook Creek, in an area burned by a severe wildfire the previous summer.

Mudflow from the 2009 Kelly Creek Fire after a severe rainstorm, August 2010.

How long does the post-wildfire risk last?

Post-wildfire risks begin as soon as an area is severely burned and last for another two or more years. However, increased floods and debris flow risks in some severely burned areas may last much longer. After two to three years, revegetation and breakdown of soil water repellency means the risk is considerably lower.

Do you need more specific information regarding your property?

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

This bulletin provides general information only; it does not cover all hazards. Additional information resources are available:

- For current wildfires: www.bcwildfire.ca
- For current flooding information and Provincial Emergency Plan information and contacts: www.pep.bc.ca/Emerg_Mgmt_BC/Emerg_Mgmt_BC.html
- For Ministry of Forests and Range district offices and contacts: www.gov.bc.ca/for
- For more background information on natural hazards, and why they occur after wildfire please visit: www.for.gov.bc.ca/hre/ecoearth/wildfire

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Landslide and Flooding Risks after Wildfires in British Columbia

What you can do to recognize and deal with the hazards

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