



Risk analysis procedure for post-wildfire natural hazards in British Columbia

Peter Jordan

British Columbia Forest Service, Nelson, BC, Canada (peter.jordan@gov.bc.ca)

Following a severe wildfire season in 2003, and several subsequent damaging debris flow and flood events, the British Columbia Forest Service developed a procedure for analysing risks to public safety and infrastructure from such events. At the same time, the Forest Service undertook a research program to determine the extent of post-wildfire hazards, and examine the hydrologic and geomorphic processes contributing to the hazards.

The risk analysis procedure follows the Canadian Standards Association decision-making framework for risk management (which in turn is based on international standards). This has several steps: identification of risk, risk analysis and estimation, evaluation of risk tolerability, developing control or mitigation strategies, and acting on these strategies. The Forest Service procedure deals only with the first two steps. The results are passed on to authorities such as the Provincial Emergency Program and local government, who are responsible for evaluating risks, warning residents, and applying mitigation strategies if appropriate.

The objective of the procedure is to identify and analyse risks to public safety and infrastructure. The procedure is loosely based on the BAER (burned area emergency response) program in the USA, with some important differences. Our procedure focuses on identifying risks and warning affected parties, not on mitigation activities such as broadcast erosion control measures. Partly this is due to limited staff and financial resources. Also, our procedure is not multi-agency, but is limited to wildfires on provincial forest land; in British Columbia about 95% of forest land is in the publicly-owned provincial forest.

Each fire season, wildfires are screened by size and proximity to values at risk such as populated areas. For selected fires, when the fire is largely contained, the procedure begins with an aerial reconnaissance of the fire, and photography with a hand-held camera, which can be used to make a preliminary map of vegetation burn severity if desired. The next steps include mapping catchment boundaries, field traverses to collect data on soil burn severity and water repellency, identification of unstable hillslopes and channels, and inspection of values at risk from hazards such as debris flows or flooding. BARC (burned area reflectance classification) maps based on satellite imagery are prepared for some fires, although these are typically not available for several weeks. Our objective is to make a preliminary risk analysis report available about two weeks after the fire is contained.

If high risks to public safety or infrastructure are identified, the risk analysis reports may make recommendations for mitigation measures to be considered; however, acting on these recommendations is the responsibility of local land managers, local government, or landowners. Mitigation measures for some fires have included engineering treatments to reduce the hydrologic impact of logging roads, protective structures such as dykes or berms, and straw mulching to reduce runoff and erosion on severely burned areas. The Terrace Mountain Fire, with burned 9000 hectares in the Okanagan Valley in 2009, is used as an example of the application of the procedure.