AN OVERVIEW OF RECENT LARGE LANDSLIDES IN NORTHEASTERN BRITISH COLUMBIA

Marten Geertsema, BC Forest Service, Prince George, BC
Stephen G. Evans, Geological Survey of Canada, Ottawa, Ontario
David M. Cruden, University of Alberta, Edmonton, Alberta
Oldrich Hungr, University of British Columbia, Vancouver, BC
Zhongyou Lu, TDB Consultants, Inc., Prince George, BC

Abstract

Within the last few decades, at least fourteen rapid, long runout landslides, each in excess of 1 million m^3, have occurred east of the Rocky Mountains in northeastern British Columbia. Nine of these landslides have occurred within the last decade. The landslides have occurred in rock as well as cohesive sediments. The landslides include: 1. four rock avalanches; 2. eight low gradient, rapid flow slides (or earth flows) in cohesive sediments; and 3. two complex rock slide – earth flows.

The rock avalanches occur in two types of scenarios, both in sedimentary rock:: 1. on dip slopes of the foothills; and 2. on the escarpments of flat-lying sedimentary rocks where mountain tops are spreading.

The flow slides or earth flows have occurred in glaciolacustrine sediments, clay-rich tills and clay-rich colluvium, near Fort St. John, Buckinghorse River, and Fort Nelson. A number of these landslides also have a spreading component.

The complex rock slide – earth flows occurred in the Muskwa River area. They initiated as rotational movements in flat-lying sedimentary rocks, which triggered flows in clay-rich diamicts. Travel distances are as high as 2.2 km at a 3° slope.

The landslides are being catalogued in a compendium of natural hazards for northern British Columbia. We have obtained pre and post landslide aerial photography for eleven of the cases and generated detailed topographic maps of these surfaces. In addition, we have determined soil index properties for five of the flow slides.

Elements at risk from these landslides include settlements, forest roads and highways, pipelines, fish habitat, forests, and farmland. One rock avalanche came within 2 km of the Alaska Highway, and another landslide within a few km of a farm house. Most of these landslides have impounded streams or rivers, thus the hazard associated with catastrophic dam failure must also be considered.

There appears to be an increase in the occurrence of large catastrophic landslides in northeastern British Columbia. Is this due to climate change? Can we expect this trend to continue?