



Arguing for a multi-hazard mapping program in Newfoundland and Labrador, Canada

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This poster describes efforts to implement a Provincial multi-hazard mapping program, and will explore the challenges associated with this process. Newfoundland and Labrador is on the eastern edge of North America, has a large land area (405,212 km²) and a small population (510,000; 2009 estimate). The province currently has no legislative framework to control development in hazardous areas, but recent landslides in the communities of Daniel's Harbour and Trout River, both of which forced the relocation of residents, emphasize the need for action.

There are two factors which confirm the need for a natural hazard mapping program: the documented history of natural disasters, and the future potential impacts of climate change. Despite being relatively far removed from the impacts of earthquake and volcanic activity, Newfoundland and Labrador has a long history of natural disasters. Rockfall, landslide, avalanche and flood events have killed at least 176 people over the past 225 years, many in their own homes. Some of the fatalities resulted from the adjacency of homes to places of employment, and of communities and roads to steep slopes. Others were likely the result of chance, and were thus unavoidable. Still others were the result of poor planning, albeit unwitting. Increasingly however, aesthetics have replaced pragmatism as a selection criterion for housing developments, with residential construction being contemplated for many coastal areas. The issue is exacerbated by the impacts of climate change, which while not a universal bane for the Province, will likely result in rising sea level and enhanced coastal erosion. Much of the Province's coastline is receding at up to 30 cm (and locally higher) per year. Sea level is anticipated to rise by 70cm to over 100 cm by 2099, based on IPCC predictions, plus the effects of enhanced ice sheet melting, plus (or minus) continued local isostatic adjustment.

The history of geological disasters, coupled with pressures on development and the threat of rising sea levels, has prompted the initiation of a Provincial multi-hazard mapping program. Initial focus is on the north-east Avalon Peninsula, where the majority of the Province's residents are located and where most development is occurring. A regional land-use plan is being initiated for this area. While there are few, if any, standard protocols in literature for determining variables/data to be included in a hazard assessment, three important factors require consideration: the characteristics and detail of the study area, the availability of digital datasets, and the scale of data. For the north-east Avalon Peninsula hazard mapping will combine slope models generated from DEMs, bedrock/surficial geology mapping at 1:50,000 scale, Provincial flood risk mapping and municipal digital topographic data at 1:2500 scale, and historical research and field work, to produce a 'traffic-light' designation of potentially hazardous areas. Data will be presented in an ArcGIS environment. Sea-level rise scenarios will also be incorporated into the mapping. Following the experience of flood risk mapping in the Province, which identified hazardous areas for development which nevertheless continued to experience urban expansion, subsequently ensuring the utilization of these maps in future land-use planning will likely require entrenchment in legislation.