The development of a Geographic Information System environmental hazard prediction model for Cheticamp River, Cape Breton Island, Nova Scotia

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This study documented mass wasting events in the Cape Breton Highlands in an attempt to develop a hazard prediction model using Geographic Information System (GIS) technology. The study area is restricted to the Cheticamp River watershed. Volcanic rocks, volcanogenic sedimentary rocks, and their metamorphic equivalents dominate the area. Soil cover is highly variable and is primarily classified as Rough Mountain Land.

Through literature reviews, interviews, airphotos, orthophotos, and a digital elevation model, 28 debris flows were identified within the study area. The debris flows generally start at the top of the plateau and terminate in the Cheticamp River. Composition ranges from shattered rock, silt, clay, and dead vegetation. The characteristics of these events (slope, aspect, soil cover, surficial sediment, geology, etc.) were evaluated and analyzed, and the information was compiled in a GIS database. The average debris flow has a slope measuring 36.6°, with a range of 27°–45°. Aspect is variable, typically between 337° and 023°. The debris flows are dominated by dead stand or soft wood vegetation. Therefore, areas within the study area that display these characteristics have a high susceptibility to failure. Factors such as surficial sediment, bedrock geology, and soil cover were found to have a limited effect on debris flow potential in this study. The model developed for the Cheticamp River watershed is applicable to much of the Cape Breton Highlands and can be used for slope hazard risk assessment and the planning of future development within this region.