Modelling and mapping hydrological risks related to flooding and slopes, inland to coastal

J. Ogilvie, M. Castonguay, and P.A. Arp
*Faculty of Forestry and Environmental Management,
University of New Brunswick, Fredericton, New Brunswick
E3B 6C2, Canada <jae.ogilvie@unb.ca>*

Potential hydrological risks (flooding and slope instabilities) can be modelled and mapped (mainland, coastlands, and islands) using; (i) province- to state-wide digital elevation data and images, and (ii) local LiDAR-derived digital elevation models (DEMs). This modelling and mapping applies conventional algorithms used for deriving slope, flow direction and accumulation from DEMs into map features displaying (i) flow channels, (ii) flood plains, (iii) the cartographic depth-to-water next to all flow channels, shorelines, and wetland borders, and (iv) the extent to which coastal lands are subject to sea-level rise. Additional algorithms are used to automatically (i) locate road and stream of flow-channel crossings, (ii) draw catchment borders based on catchment order or stream order, and (iii) display and classify the recharge-discharge zonation across the land. The maps provide a high-resolution platform for planning land and water resources, from state-, municipal, industrial, and private perspectives, with geological and ecological considerations included. The illustrations show how this modelling process works, with examples for New Brunswick and Nova Scotia. This process can used to anticipate and determine the extent of inland and coastal flooding and related damage to local infrastructure.