

Coastal buried valleys: an unappreciated resource and potential hazard risk

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During glaciation, ice sheets occupied all of Atlantic Canada and parts of New England, significantly altering the landscape and changing drainage patterns. Pre-existing valleys were enlarged, new channels eroded and many valleys infilled with glacial sediments, some buried under ground moraine during glacier advance and others buried during glacier retreat. Deglaciation in many coastal areas was accompanied by frontal retreat of decaying glacier masses as isostatically depressed areas experienced marine transgression from rising sea level. New drainage patterns were developed where pre-glacial valleys remained buried or not fully exhumed by proglacial or Holocene-age fluvial down-cutting.

In some areas buried valleys exist as isolated remnants or conduits connected to lakes that can be used as potable groundwater aquifers (e.g., Sussex and Plaster Rock in New Brunswick). However, in coastal areas buried valleys often extend off-shore and can enable rapid infiltration and upriver migration of saline water as fresh water is extracted from aquifers farther inland. Examination of drill records in New Brunswick indicates that saline waters are found along some valleys at locations over 100 km from existing shorelines. This is demonstrated where the buried or existing estuarine valleys extend to depths greater than -60 m or -40 m, such as the Saint John River at locations 70 km and 90 km, respectively, upstream of the Bay of Fundy.

The occurrence of buried valleys and potential salinization of their resource aquifers remains a little studied hazard risk that has not been given the recognition and scientific attention that is required for the adequate protection of a sustainable resource.