

**Glacial processes explain the probable origin and aid in the exploitation of the
Fredericton aquifer, Fredericton, New Brunswick**

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The Saint John River Valley underwent significant infilling during the Millville / Dungarvon Phase of the late Wisconsinan. The deposition of these glacial sediments in thicknesses of up to 50 m has provided excellent material for groundwater resources. Localized geological settings include permeable Quaternary deposits along the banks of the Saint John River which provide an opportunity for the economical extraction of potable water from those deposits.

The City of Fredericton receives the majority of its supply of water from production wells located near the Saint John River. The intake screens for the wells are positioned in glaciofluvial sands and gravels forming the Fredericton Aquifer. A substantial increase in water demand suggests the need to investigate the capabilities of the aquifer to sustain stresses due to pumping.

A working hypothesis for the geology of the Saint John River Valley at Fredericton has been developed for the

application of a computer model for the assessment of the effects of groundwater withdrawal. It is suggested that six geological units are present under the Valley Flat. They include: (A) bedrock; (B) buried sand and gravel channel; (C) lodgement till; (D) glaciofluvial outwash sands and gravels; (E) lacustrine clay/silt; and (F) fluvial sands and gravels. "Snapshots" of groundwater elevations in the aquifer and the Saint John River level support the hypotheses that the recharge to the aquifer occurs mainly via openings in the clay/silt unit, defined as "windows". About two thirds of the recharge is considered to occur from the Saint John River through direct hydraulic connection provided by the defined from windows. The remainder occurs from rainfall and snow-melt with a small amount contributed from the underlying bedrock. The location and extent of these windows need to be confirmed.