

Adapting to Climate Change: Saltwater Intrusion Richibucto



Figure 1:
Location of Richibucto

The Area

Richibucto (pop. 1286 in 2011) is situated on a peninsula-like land area of approximately 70 km² that is bordered by the tidal Richibucto River and several tidal creeks.

Historically, the construction of boats, “canneries” lobster, the fishing industry, retail trade, hospitality industry and the export of logs to England made Richibucto the third largest port in New Brunswick. Today, Richibucto has one of the largest ports in the inshore and mid-shore fishery on the east coast of New Brunswick, with some 100 fishing boats. Its retail sector is also highly developed, making it the largest economic centre in Kent County.

Climate Change and Community Vulnerability

Groundwater resources in coastal communities are vulnerable to saltwater intrusion, meaning saltwater can enter groundwater and make drinking water unfit for consumption.

Saltwater intrusion will become more of a problem as our climate changes. Warming temperatures,

changing precipitation patterns, sea level rise, extreme weather events and coastal erosion will all increase the likelihood of saltwater intrusion in coastal areas.

Richibucto, with its unique location between the Richibucto River and tidal streams, has been experiencing sea water intruding into its groundwater supply, affecting drinking water quality. In the past, several town wells have produced water with elevated chloride concentrations that were believed to be caused by saline water intrusion.

Local Climate Change Addressing Adaptation Needs

With the intrusion of sea water affecting groundwater for drinking water quality, the Town partnered with the University of New Brunswick to evaluate the future impacts of climate change on groundwater use in coastal communities. The goals were to: (1) define current aquifer and groundwater conditions in the Richibucto area; and (2) forecast potential groundwater changes due to climate change and sea level rise. The study area was chosen because it was considered to be representative of hydrogeological conditions along much of the Northumberland Strait coastline of New Brunswick.

The study was conducted between 2010 and 2012 to investigate saline groundwater occurrence and the potential impacts of future climate change and sea level rise on seawater intrusion into sandstone aquifers near Richibucto. The focus of the study was on water supplies obtained from municipal production wells. The primary field activities included geophysical surveys conducted at the ground surface, drilling of three boreholes, geophysical logging of boreholes, groundwater sampling at selected locations, and

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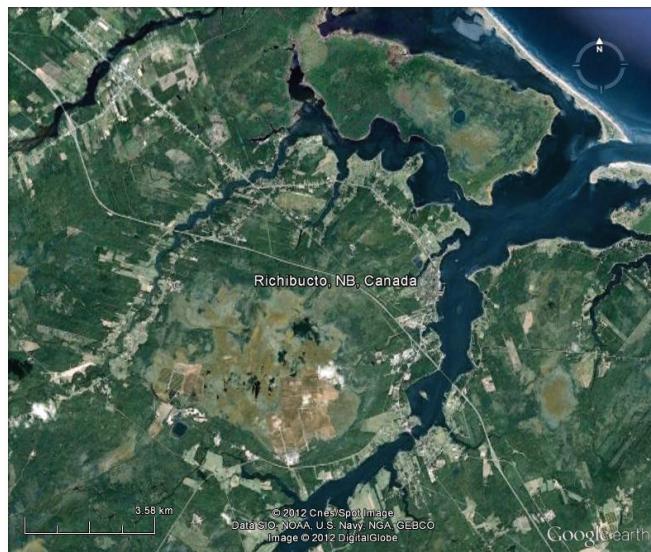


Figure 2: Richibucto study area.

K. MacQuarrie, UNB; Google Earth

groundwater level monitoring. A numerical model of groundwater flow which includes salt water movement was developed for the Richibucto region and this was then used to investigate the effect of future climate change and sea level on the distribution of groundwater salinity within the sandstone aquifers.

The model was useful for determining the general response of the groundwater system to future changes in climate, sea level, and well pumping rates.

Next Steps and Opportunities

The project report made recommendations on locating and exploring for future municipal wells, monitoring of groundwater quality, and maintaining groundwater recharge. A groundwater model for the area that can be updated in the future as new hydrogeological information becomes available was produced.

The information provided will give municipal staff a better understanding of the hydrogeological conditions and should assist with well field operation. For planners, the study has identified that groundwater recharge, which is impacted by land use, is an important factor in limiting sea water intrusion. Municipal decision makers will be able to use this information to inform the work of consultants that the municipality may engage for future groundwater studies.

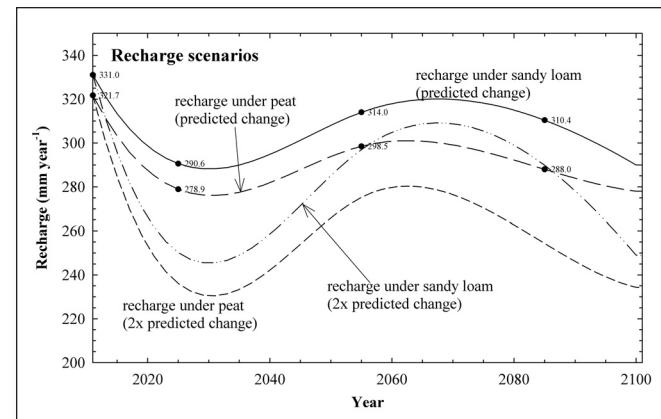


Figure 3: Groundwater recharge trends used to simulate the future impact of climate change; recharge values for peat and sandy loam soils for the years 2011, 2025, 2055 and 2085 were used.

K. MacQuarrie, UNB



Figure 4: Photo of a drill core used to help understand groundwater movement within the rock, which helps to reveal regions where aquifers may be at risk for salt water intrusion.

K. Butler, UNB

For More Information

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