
Development of a GIS-based approach for the assessment of seawater intrusion vulnerability in Nova Scotia

G. W. KENNEDY

*Nova Scotia Department of Natural Resources, 1701 Hollis Street,
3rd Floor, P.O. Box 698, Halifax, Nova Scotia B3J 2T9, Canada
<kennedgw@gov.ns.ca>*

Approximately 50% of Nova Scotians rely on groundwater for their water supply, and about 60% of Nova Scotians reside within 20 km of the coastline. In areas of the province lacking water servicing, individual, on-site wells represent the only practical means of obtaining a water supply, however, there exist limited mechanisms available to groundwater managers for evaluating the sustainability of groundwater supplies in these areas. Seawater intrusion into coastal aquifers driven by overpumping, or rising sea levels and changes in groundwater recharge resulting from climate change, is therefore a key issue for water resource management in the province.

A GIS based approach for broadly evaluating the vulnerability of bedrock coastal aquifers to seawater intrusion in unserved areas of the province was developed. The approach uses available provincial spatial datasets to evaluate relative vulnerability based on the following criteria: distance to the coast, land slope, development density, reported static water level, and any well water salinity problems reported by the driller during well construction.

A provincial relative vulnerability map was produced using this GIS approach, and more detailed mapping was prepared for five project locations (Lunenburg area, Avon River area, River Philip area, Yarmouth area, and Halifax area) identified under the on-going Atlantic Climate Adaptation Solutions (ACAS) project. The scoping approach/mapping could be used by groundwater managers to help identify emerging seawater intrusion problem areas, to identify suitable coastal aquifer monitoring well locations and areas for more detailed quantitative analyses, and to help inform land use planning.