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### Identifying and mapping the saltwater transition zone in Summerside, Prince Edward Island

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The salinization of groundwater in coastal aquifers is a global phenomenon with the potential for severe consequences in water resources in localized settings. It is therefore, imperative to understand the interaction between fresh groundwater and sea water intrusion to best manage the available resources for the future. Summerside, Prince Edward Island is the second largest city in the province and is located on an isthmus in the narrowest part of the island. The combination of intensive groundwater withdrawals and the close proximity to the coast makes this area highly susceptible to saltwater intrusion and intensive groundwater withdrawals have in the past lead to an encroachment of saline water into freshwater wells in the Summerside area. This study incorporates a detailed geological, geophysical, and hydrochemical analysis coupled with prior research, to provide an in-depth understanding of the underlying mechanisms which govern the location and extent of saltwater in the Summerside area aquifer. Six wells were drilled to varying depths in a rough transect, perpendicular to the coast. A down-hole camera was used in conjunction with electrical resistivity profiling to aid in the identification and correlation of geological units between wells. Water samples from varying depths along the transect were analyzed for major ions and stable isotopes to determine mixing relationships. With the beginning of the saltwater transition zone identified and mapped, preliminary variable-density modeling scenarios simulate the extent of this mixing zone, the response to parameter variability, groundwater extractions, and the effect of sea level rise on the position and extent of salt water intrusion for Summerside, Prince Edward Island.