

Geological and Hydrogeological Synthesis of the Utica Shale and the Overlying Strata in Southern Quebec Based on Public Data in a Context of a Moratorium on Exploration

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Abstract

In the context of an ongoing Strategic Environmental Assessment that addresses the issues related to potential shale gas development in the St. Lawrence Lowlands of southern Quebec, the authors carried out a comprehensive synthesis of the geological and hydrogeological information publicly available to support the ongoing and future efforts to assess the integrity of the geological seal between the Utica Shale and the shallow groundwater. Potable groundwater is mostly found in the St. Lawrence Lowlands in the first tens of meters below surface, at times in the surficial quaternary deposits but mostly in the underlying shallow, naturally fractured rock. However, little data exist to evaluate the possible occurrence of fresh water at greater depths. Therefore, part of this work was also aimed at documenting the existing industry data that could be used to characterize the natural fracture pattern and the hydrogeologic environment at greater depths. By highlighting geographic or thematic weaknesses in the datasets, this contribution also aimed at supporting ongoing research projects to develop a method to evaluate the vulnerability of aquifers related to activities carried out in the subsurface.