

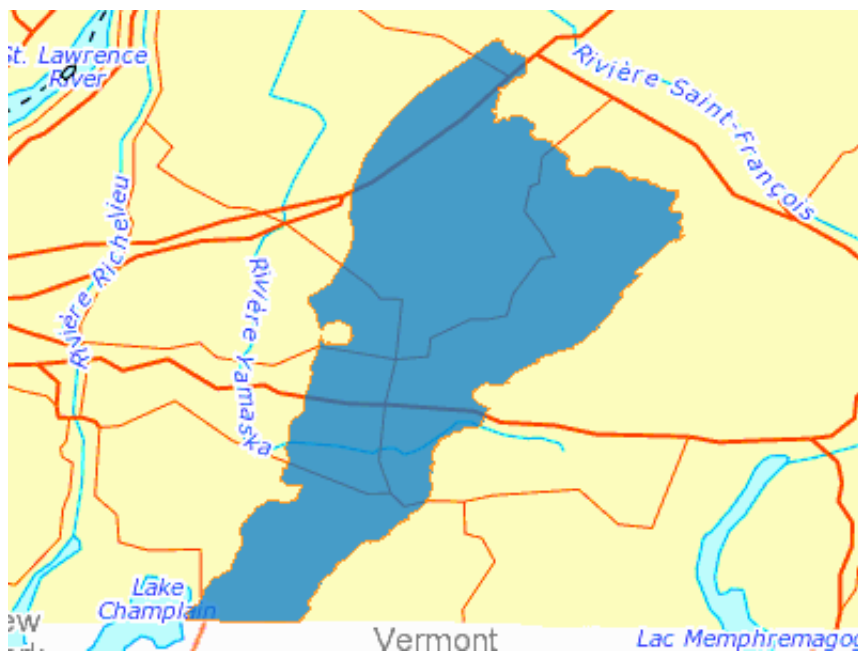
Hydrogeologic unit (Hydrogeological Context)

Metadata about this dataset

Version	Document
undefined	B99AA12B-E974-90CE-7452-53C146BE5624 (http://s-stf-ngwd.nrn.nrcan.gc.ca:8085/cocoon/api_ngwds:gin2/en/metadata/nap/B99AA12B-E974-90CE-7452-53C146BE5624.html)

Datasets

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Appalachian External zone

Update:2014-02-17

The Appalachian external unit is part of the external Humber zone, including mainly slate, shale, sandstone, and limestone. Those rock formations are covered with a thin till unit followed by thin discontinuous sandy-

gravelly coastal sediments. The latter forms potential granular aquifers in the valley. A clay cover 5-10 m thick is found in the valleys. In this context, there is a thin till unit on the topographic highs that allows higher recharge. This unit isn't only a regional recharge area. The southern part of the unit, valleys and the front of the Appalachian to the limit of the Platform of St. Lawrence designate discharge areas. Groundwater flows from topographic highs and other recharge areas to the west front of the unit and into the Noire River valley. The bedrock aquifer has low to moderate permeability, but it is exploited everywhere while the aquifer potential of the surficial deposits is only found in some parts of the valleys. There is a significant use of groundwater in this context. The aquifer has a moderate vulnerability to surface contamination. Water is good, but often exceeds aesthetic standards for Fe, Mn and S.

Physiography

Hydrogeological region	Appalachians
Hydrogeological context	
Relief	The unit has an undulating terrain along alignments NNE-SSW. Elevations rise gradually eastward. The field includes many slopes 2-18% and some incised valleys.
Area	2257.00 km ²

Lithology

Description	Appalachian rocks are sedimentary rocks of Ordovician and Cambrian age having undergone several episodes of regional metamorphism and deformation of varying intensity. These rocks overlap in progressive sequence the rocks of the platform of the St. Lawrence. The Appalachian external unit is part of the external Humber zone, including in chronostratigraphic order: Shefford Group (northwest area), Philipsburg Group, Stanbridge Group (east and southeast of the area) Laurier Group (northwest part) and Olistostrome Drummondville (northwest part). The rocks are mainly slate, shale, sandstone, and limestone. They are covered with a thin till unit followed by thin discontinuous sandy-gravelly coastal sediments. A clay cover 5-10 m thick is found in the valleys. Buried eskers or outcrop eskers can also be observed.
Source	

Aquifer

Aquifers	Liste des aquifères potentiel granular aquifers in the valley fractured bedrock aquifer (regional aquifer)
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Unit properties

Surficial aquifer media	
Typical	porous

value:	
Description	Thin till plain covered by thin and discontinuous sandy gravel coastal unit. The clay unit is thin (5-10 m) enters in the valleys. There are also some buried and outcropping eskers. Sequence: Thin and discontinuous sand and gravel coasts unit(< 3 m) covering thin till (< 5 m) or rock. The clay unit covers the valleys and locally some coarse glaciofluvial sediments clusters (< 15 m) may be found.

Bedrock aquifer media

Typical value:	fractured
Description	mainly external thrust sheets (allochthonous domain) Mainly composed of shales, schistes, sandstones and limestones.

Confinement

Typical value:	semi confined
Description	The regional rock aquifer is dominated by semi-confined conditions but there are large extents under unconfined conditions, the Noire River valley is generally under confined conditions.

Surficial sediment thickness

5 m Range: [0 to 45.9] m	
Description	Generally, the surficial sediment thickness is below 5 m on the high topographic locations, but the thickness is above 15 m in the valleys (mean thickness is 7.5 m with 4.9 m standard deviation and range from 0.5 to 45.9 m).

Well depth

31 m Range: [8 to 71] m	
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Groundwater depth

2.5 m Range: [0 to 66.4] m	
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Surficial unit hydraulic conductivity

Range: [4e-011 to 4e-005] m/s	
Description	Hydrostratigraphic Unit Deposits on clay (-sandy) Kh (m/s) 4E-5 Kv (m/s) 4E-6 Kh / Kv 10:1 Marine clays (very compact) Kh (m/s) 2E-9 Kv (m/s) 4E-11 Kh / Kv 50:1 Deposits under clays (till) Kh (m/s) 2E-6 Kv (m/s) 1E-7 Kh / Kv 20:1

Bedrock hydraulic conductivity

0.09 m/s	
Description	Hydraulic conductivity for the hydrogeological unit The median value for hydraulic conductivity is 10 ^{-6.2} m/s, but it ranges from 10 ^{-7.8} to 10 ^{-4.8} m/s. Hydraulic regional conductivity The

decreasing trend of transmissivity with depth in the rock is observed in all contexts. The average hydraulic conductivity is $10^{-3.9}$ m/s near the top of bedrock ($z = 1$ m) which gradually loses an order of magnitude at a depth of 10 m ($10^{-4.9}$ m/s), 25 m ($10^{-5.9}$ m/s), 60 m ($10^{-6.9}$ m/s) and 200 m ($10^{-7.9}$ m/s).

Regional precipitation

1064.5 mm/yr Range: [1023.9 to 1306.5] mm/yr

Regional evapotranspiration

575 mm/yr Range: [370 to 644.4] mm/yr

Regional runoff

460.2 mm/yr Range: [79.2 to 1146.2] mm/yr

Regional recharge

114.7 mm/yr Range: [0 to 417] mm/yr

Description	Recharge rates are moderate to low in the Noire River valley. There are local potential recharge in other areas.
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Regional discharge

Description	Discontinuous discharge are in the valley of Black River. Regional discharge areas at the west front of the external sheet. Throughout the south and the north-eastern part of that context is an regional Appalachian water discharge area.
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Aquifer vulnerability

142 Range: [77 to 187]

Typical value:	medium regional
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Description	Moderate vulnerability
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Groundwater Quality

Typical value:	fresh - sulfurous
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Description	Frequent aesthetic exceeding for Fe, Mn and S.
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