Subject:	material related to bedrock-wetland connections at Polymet mine site
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Following up on the webinar last week, here is some material related to the hydrologic connection between surficial wetlands and the bedrock aquifer.

Throughout the development of the EIS, the applicant and their consultants have made the argument that the surficial deposits, and in particular wetlands such as the 100 Mile Swamp, are not hydrologically well connected to the bedrock aquifer. 8 inches/year of leakage to establish a groundwater mound in the bedrock would require that the 100 Mile Swamp be well connected to the underlying bedrock aquifer. Statements by the applicant claiming a weak to non-existent connection between surficial deposits and the bedrock include:

1) "there may be an unsaturated zone between the surficial deposits and bedrock present in some portions of the site, which would suggest **a minimal degree of hydraulic connection between the surficial aquifer and bedrock**." (WMDP v13, Section 4.3.3.2 Bedrock)
and

2) "As discussed in Section 4.3.3.2, available data indicates that, **although the surficial aquifer and bedrock are likely hydraulically connected to some degree, the connection is believed to be weak or non-existent in many areas of the Mine Site**." (WMDP v13, Section 5.2.3.1 Groundwater Flow Path Modeling)
and

3) "Because **the dense underlying till acts as an aquitard that restricts downward water flow**, most of the organic and mineral soils in the depressional areas of the site have perched water tables." (page 3, Barr June 2, 2008, Indirect Wetland Impacts at the Mine Site).
and

4) "Figure 4 identifies the moisture content throughout the soil profiles from the soil surface to the bedrock surface (Barr, Overburden Soil Boring Logs - Draft, January 2008). The moisture content was field described as dry, moist or wet. The moisture content changes throughout each soil profile, **indicating the surficial aquifer is not always continuous from the soil surface to the bedrock surface**." (page 4, Barr June 2, 2008, Indirect Wetland Impacts at the Mine Site).
and

5) "Because of the **lack of interaction between the surficial and bedrock aquifers**, the hydrology of the wetlands at the site is primarily supported by direct precipitation with some variable surficial groundwater component from the uplands." (page 4, Barr June 2, 2008, Indirect Wetland Impacts at the Mine Site).
and

6) "A number of factors contribute to the stable hydrology of the wetlands on the site including: 1) **the lack of continuity between the bedrock and surficial aquifers**; 2) the variability of the hydraulic conductivities within the soil layers causing perched water tables;" (page 12, Barr June 2, 2008, Indirect Wetland Impacts at the Mine Site).
and

7) "**Wetlands generally have a perched surficial water table and no interaction with the bedrock aquifer**." (page 12, Barr June 2, 2008, Indirect Wetland Impacts at the Mine Site).

8) "Because of the **general lack of interaction between the surficial and bedrock aquifers**, the hydrology of many wetlands at the Mine Site is primarily supported by direct precipitation with some variable surficial groundwater components from the uplands." (PFEIS Page 4-167, lines 191-193)

9) "indicating that **the connection between the bedrock, unconsolidated deposits, and wetlands may be be relatively weak**." (PFEIS, page 4-168, line 246)

The above quotes are a few examples of the many statements in the EIS materials that contend that the surficial aquifer, and in particular wetlands, are isolated from the bedrock.

The sections of the Water Modeling Data Package (WMDP) are available as part of the PFEIS package.
The Barr June 2, 2008, Indirect Wetland Impacts at the Mine Site is available at:
https://app.box.com/s/fj9lfpppml5a1av2himffyi3c0opjia9
and is cited in the PFEIS as Barr 2008h

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