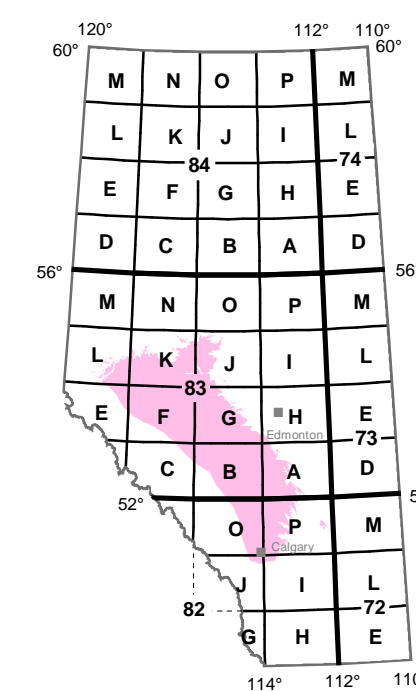
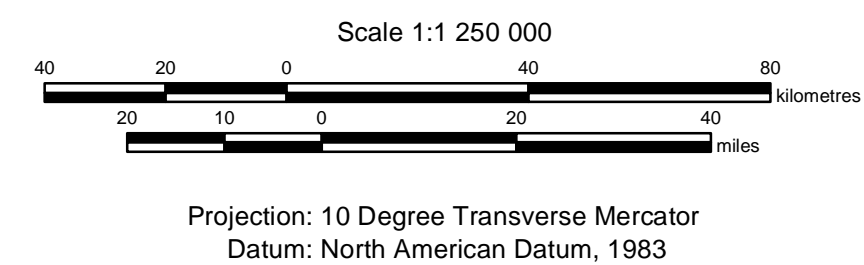
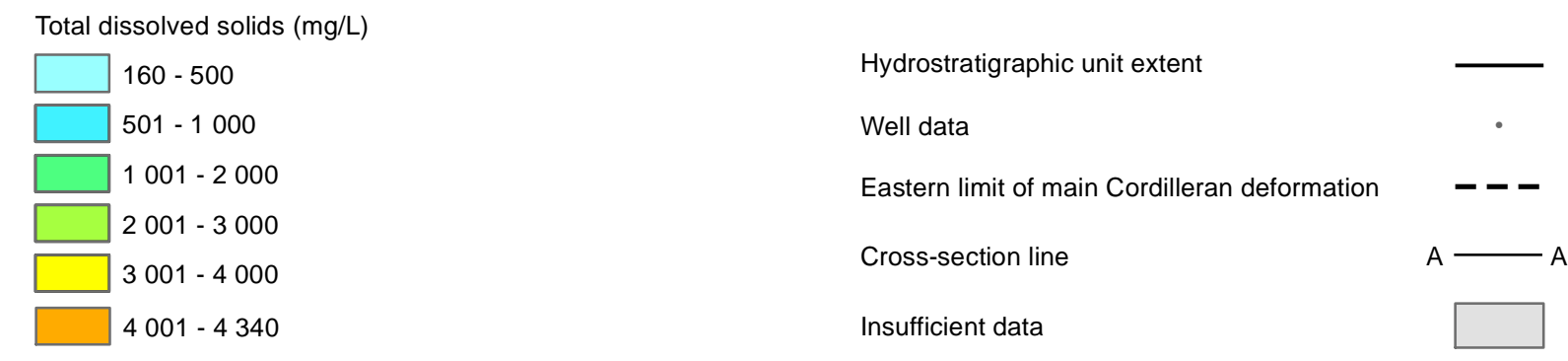


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Map 640
Distribution of Total Dissolved Solids in the Paskapoo Hydrostratigraphic Unit
Hydrogeology by: J. Klassen and T.G. Lemay



SYMBOL LEGEND



This map provides an update to previous assessments by the Alberta Geological Survey of the geology and hydrogeology of the Paskapoo Formation (Bachu and Michael, 2002; Lemay, 2003; Lemay and Konhauser, 2006; Parks and Andriashek, 2009; Barker et al., 2011, 2013; Huff et al., 2012; Lyster and Andriashek, 2012). The map depicts the concentration of total dissolved solids (TDS) in groundwater in the shallow portion of the Paskapoo hydrostratigraphic unit (HSU). The horizontal and vertical extent of the unit was adopted from the Geological Framework of Alberta, version 3 (Alberta Geological Survey, 2021). The relationship of the Paskapoo HSU with units above and below as well as its geometry can be seen in Figures 1 and 2.

Methodology

The TDS distribution map is a result of an empirical Bayesian kriging technique using publicly available data from 8 247 water chemistry analyses from water wells. The Paskapoo HSU has a vertical thickness of up to 1000 m in the western part of its extent, and its top locally reaches a maximum depth of 99 m (Figure 3). The average well depth for data used in mapping the TDS distribution in the Paskapoo HSU is 68 m, with a minimum and maximum well depth of 4 m and 400 m, respectively. Measured TDS values range from 16 mg/L to 9 683 mg/L. Outliers were identified and removed using a cross-validation statistical approach.

The final gridded map was clipped based on the spatial distribution of representative data. Residual values are plotted at each location (only greater than 1.5 and less than -1.5 standard deviations shown) to indicate where underprediction or overprediction occurs compared to the calculated TDS values (Figure 4). An additional formation-scale hydrogeological map displaying hydraulic head for the Paskapoo HSU is presented in Figure 5.

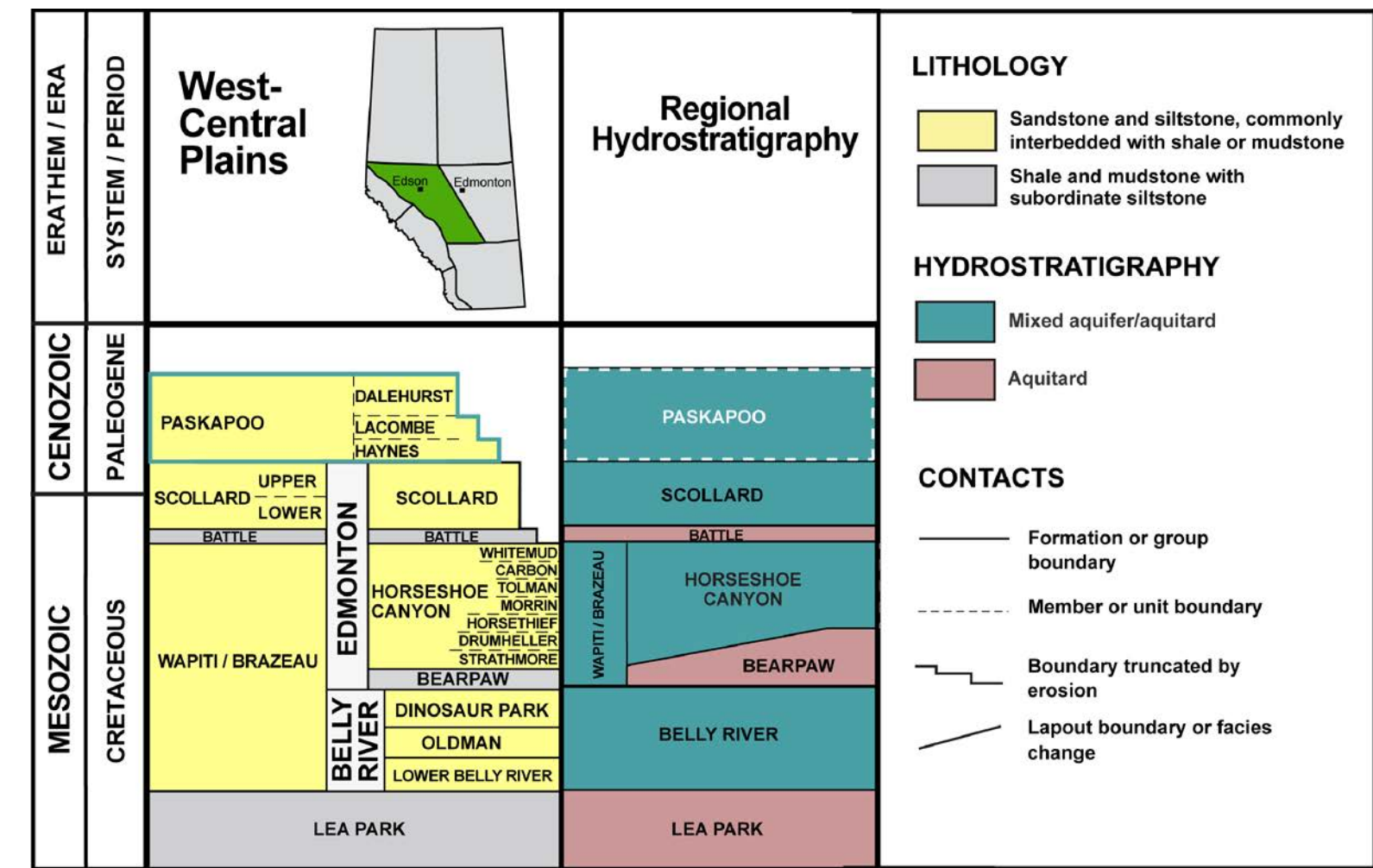


Figure 1. Regional lithostratigraphy and hydrostratigraphy (based on Alberta Geological Survey, 2019). Solid teal lines highlight the Paskapoo Formation. Dashed white lines depict the Paskapoo HSU within the regional hydrostratigraphy. Strata above the Paskapoo Formation and below the Lea Park Formation are not shown.

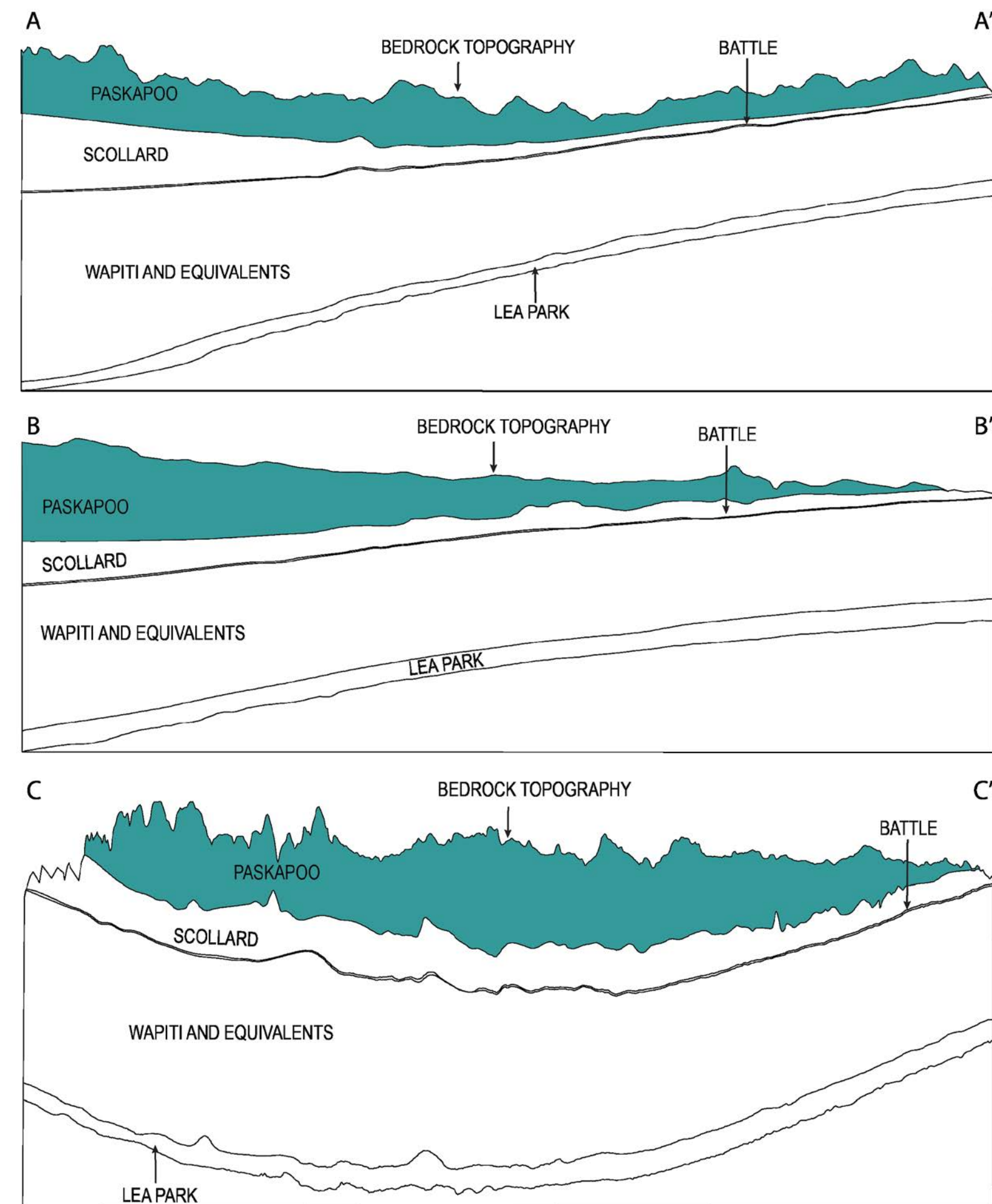


Figure 2. Schematic cross-sections identifying the geometry and variable thickness of the Paskapoo HSU (not to scale). Paleogene and Cretaceous strata have not been subdivided at the scale of these cross-sections. Strata below the Lea Park Formation are not shown.

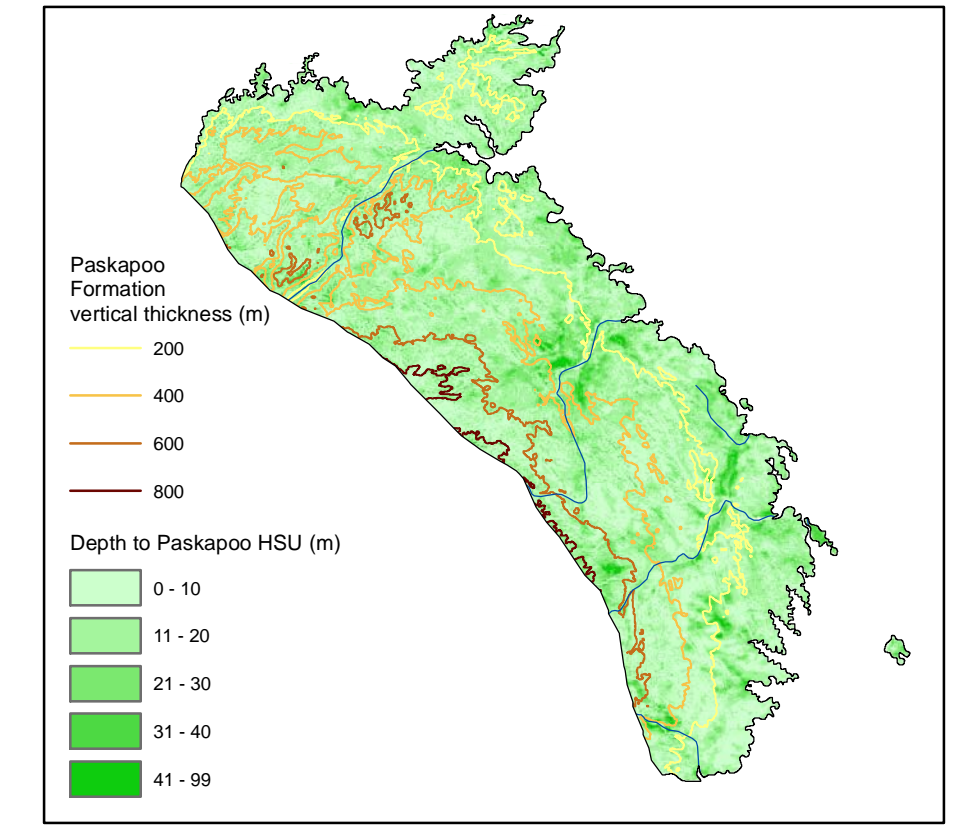


Figure 3. Depth to (from ground surface) and vertical thickness of the Paskapoo HSU.

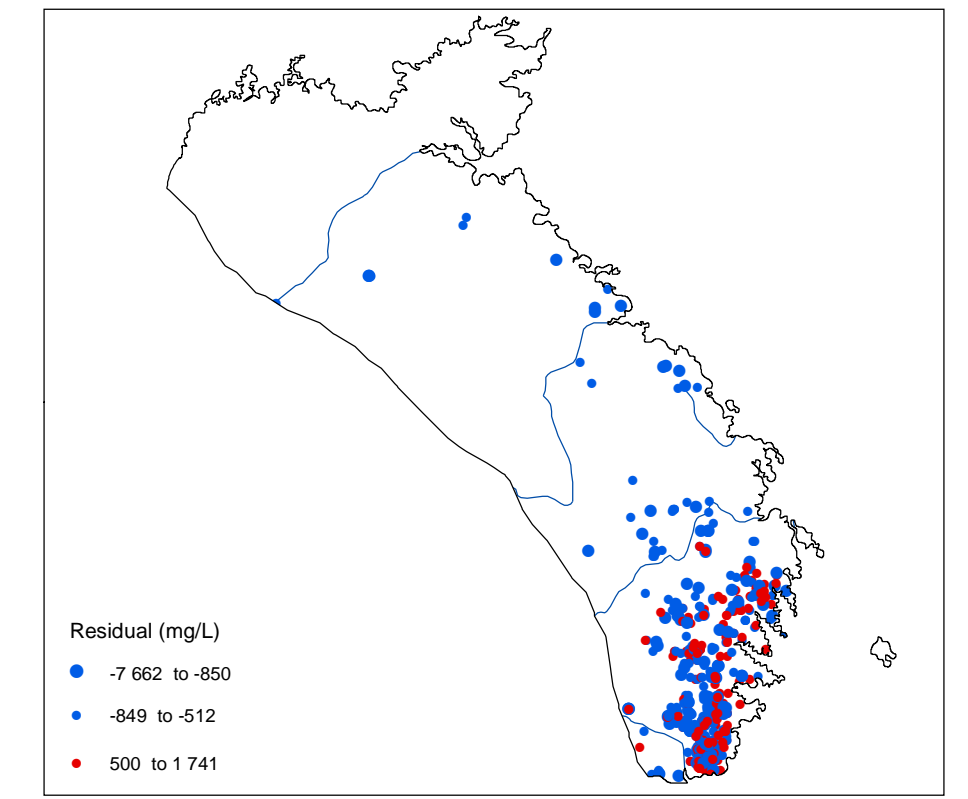


Figure 4. Calculated residuals between the modelled distribution of TDS and calculated values. Symbol classes are based on the standard deviation of the calculated residuals. Due to the large dataset, only residuals >1.5 (red) and <-1.5 (blue) from the standard deviation are shown.

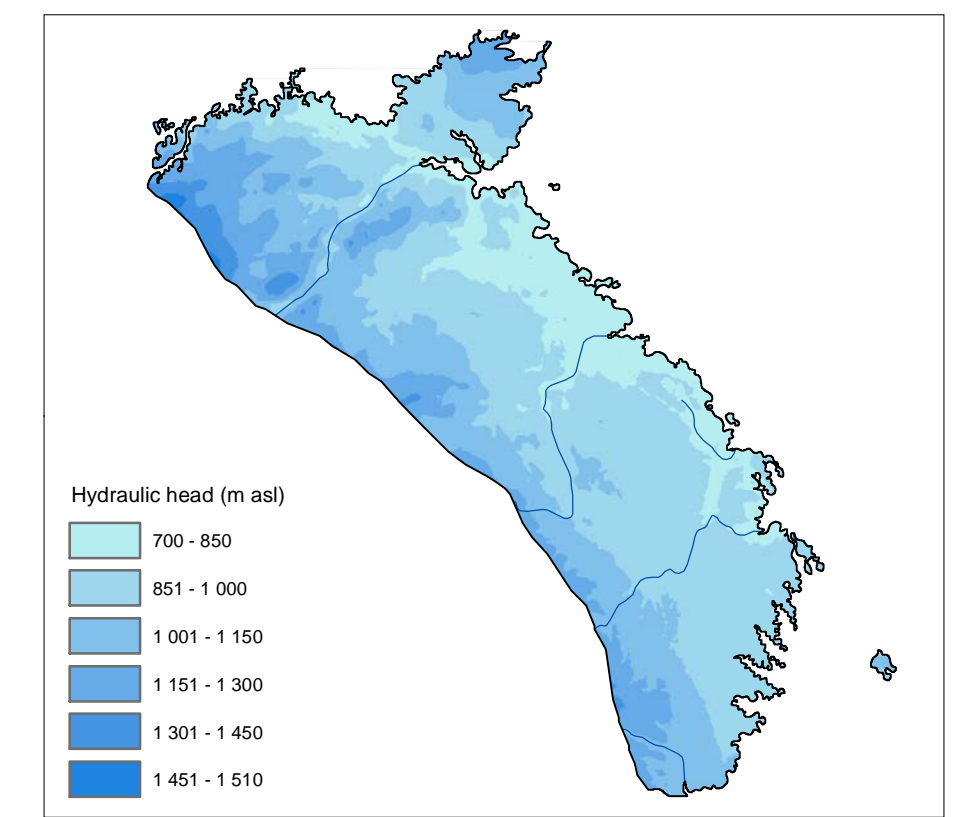


Figure 5. Hydraulic head map for the Paskapoo HSU (Klassen and Singh, 2023).

Acknowledgements

Base data from the Atlas of Canada (Natural Resources Canada, 2012) and Spatial Data Warehouse, Ltd.

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