

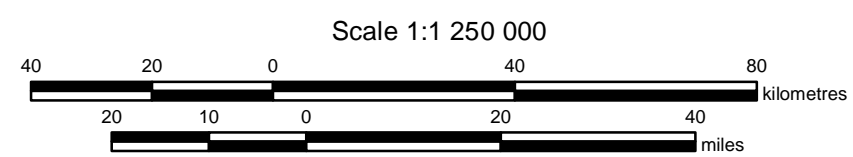
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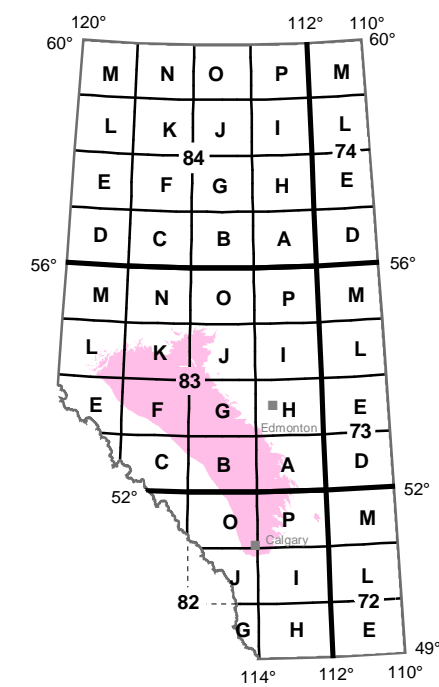
**Map 641**

**Distribution of Hydraulic Head in the Paskapoo Hydrostratigraphic Unit**

Hydrogeology by: J. Klassen and A. Singh



Projection: 10 Degree Transverse Mercator  
Datum: North American Datum, 1983



**SYMBOL LEGEND**

Hydraulic head (m a.s.l.)	Hydrostratigraphic unit extent
700 - 850	Well data
851 - 1 000	Eastern limit of main Cordilleran deformation
1 001 - 1 150	Cross-section line
1 151 - 1 300	Insufficient data
1 301 - 1 450	
1 451 - 1 510	

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; Parks and Andriashek, 2009; Barker et al., 2011, 2013; Huff et al., 2012; Lyster and Andriashek, 2012). The map depicts the distribution of hydraulic head 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 the units above and below as well as its geometry can be seen in Figures 1 and 2.

**Methodology**

The hydraulic head distribution map is a result of an empirical Bayesian kriging technique using publicly available static water level data from 35 268 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 hydraulic head distribution in the Paskapoo HSU is 41 m, with a minimum and maximum well depth of 3 m and 366 m, respectively. Outliers were identified and removed using a cross-validated statistical approach.

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 measured hydraulic head values (Figure 4). An additional formation-scale map of the distribution of total dissolved solids in the Paskapoo HSU is shown in Figure 5.

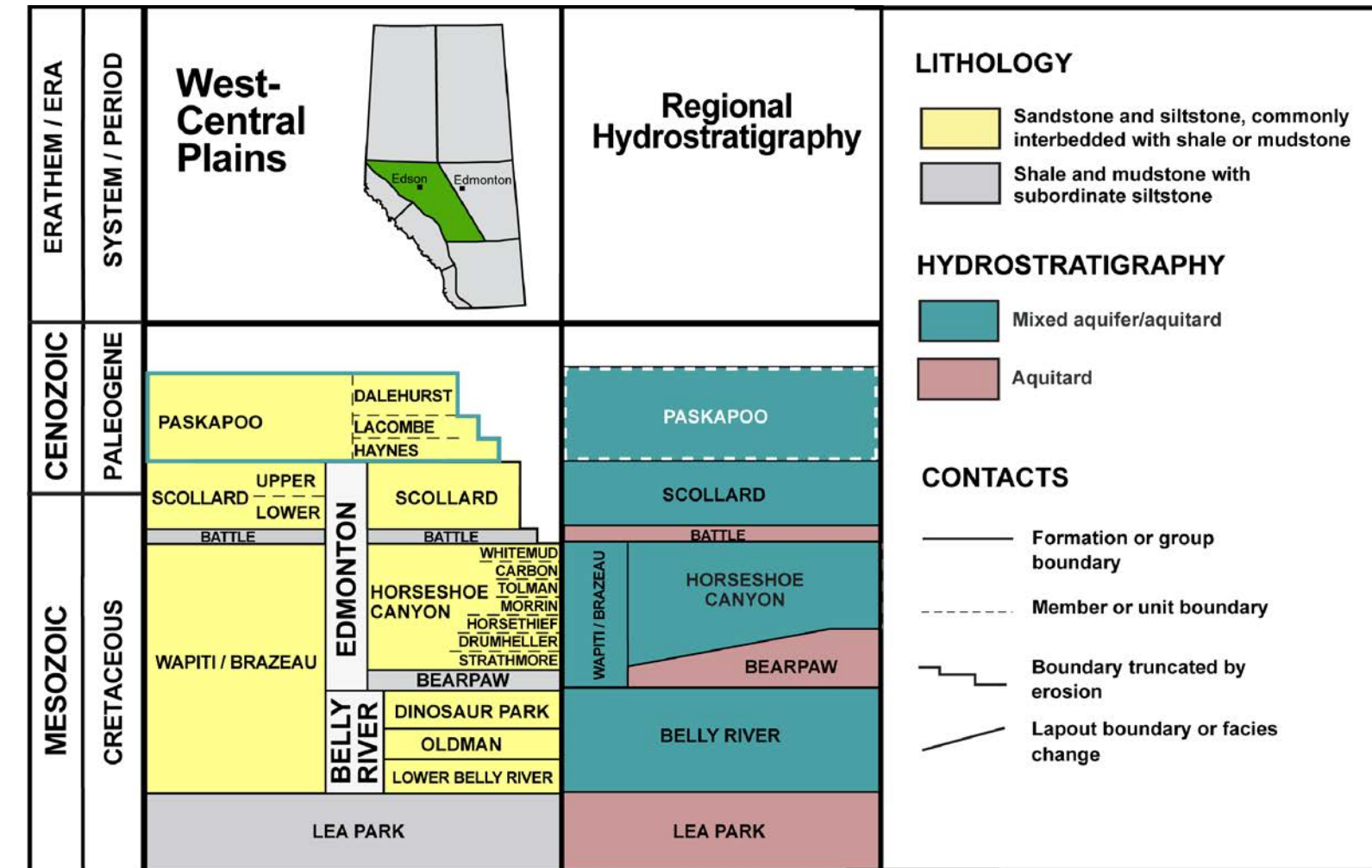


Figure 1. Regional lithostratigraphy and hydrostratigraphy (based on Alberta Geological Survey, 2019). Solid teal lines highlight the Paskapoo Formation. Dashed white lines depict the Paskapoo HSU within the regional hydrostratigraphy. Strata above the Paskapoo Formation and below the Lea Park Formation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

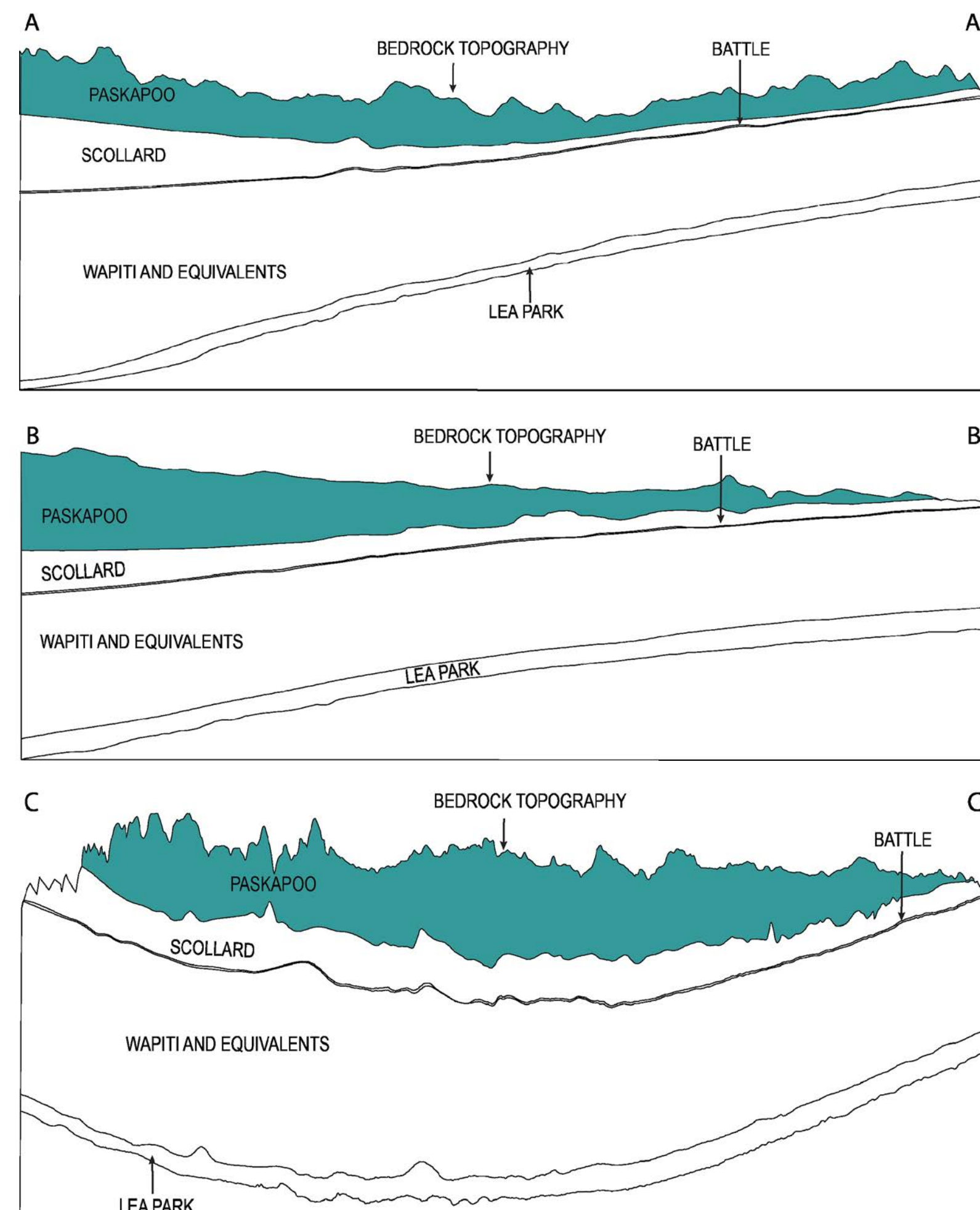


Figure 2. Schematic cross-sections identifying the geometry and variable thickness of the Paskapoo HSU (not to scale). Paleogene and Cretaceous strata have not been subdivided at the scale of these cross-sections. Strata below the Lea Park Formation are not shown.

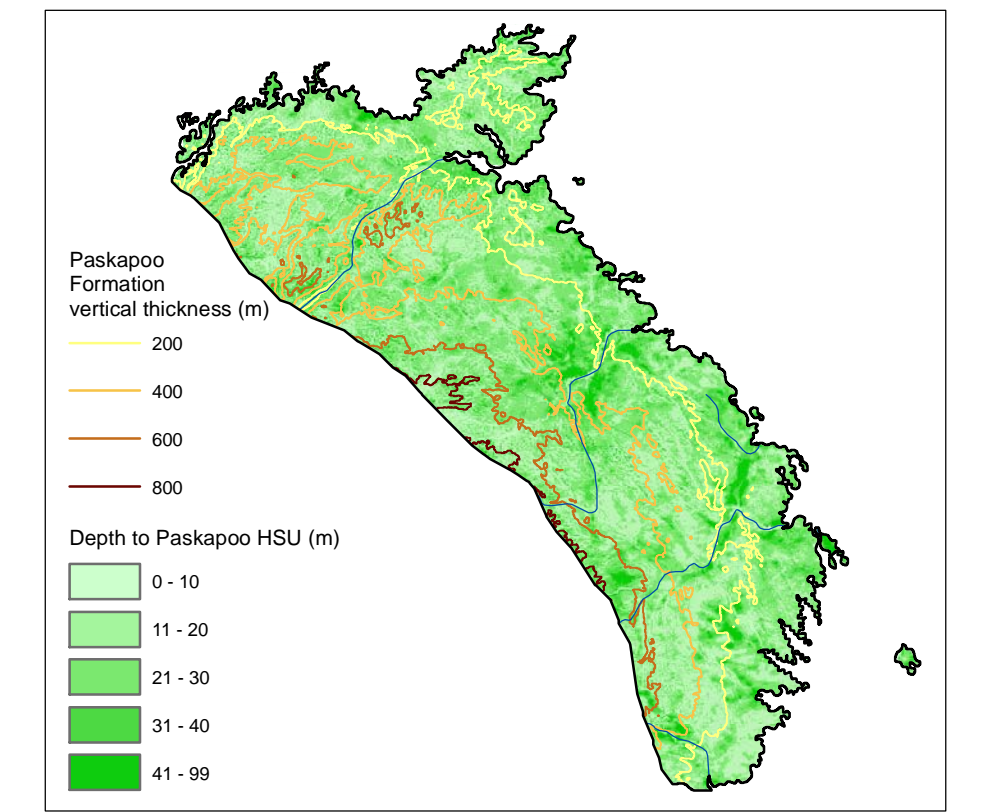


Figure 3. Depth to (from ground surface) and vertical thickness of the Paskapoo HSU.

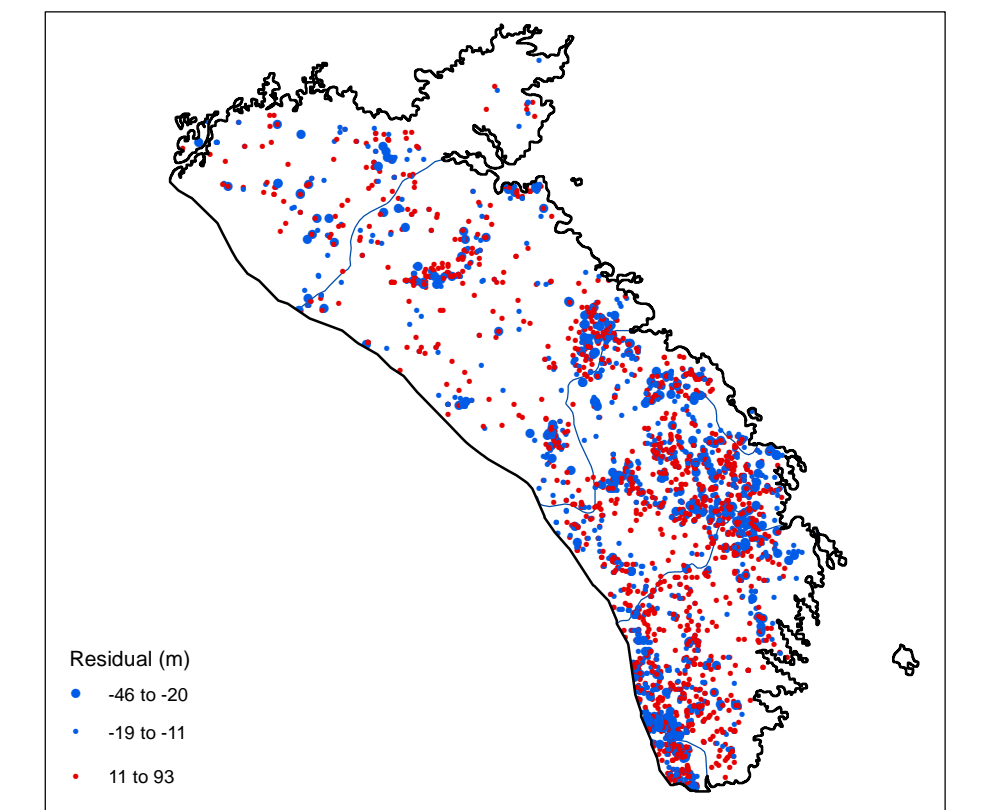


Figure 4. Calculated residuals between the modelled distribution of hydraulic head and measured values. Symbol classes are based on the standard deviation of the calculated residuals. Due to the large dataset, only residuals >1.5 (red) and <-1.5 (blue) from the deviation are shown.

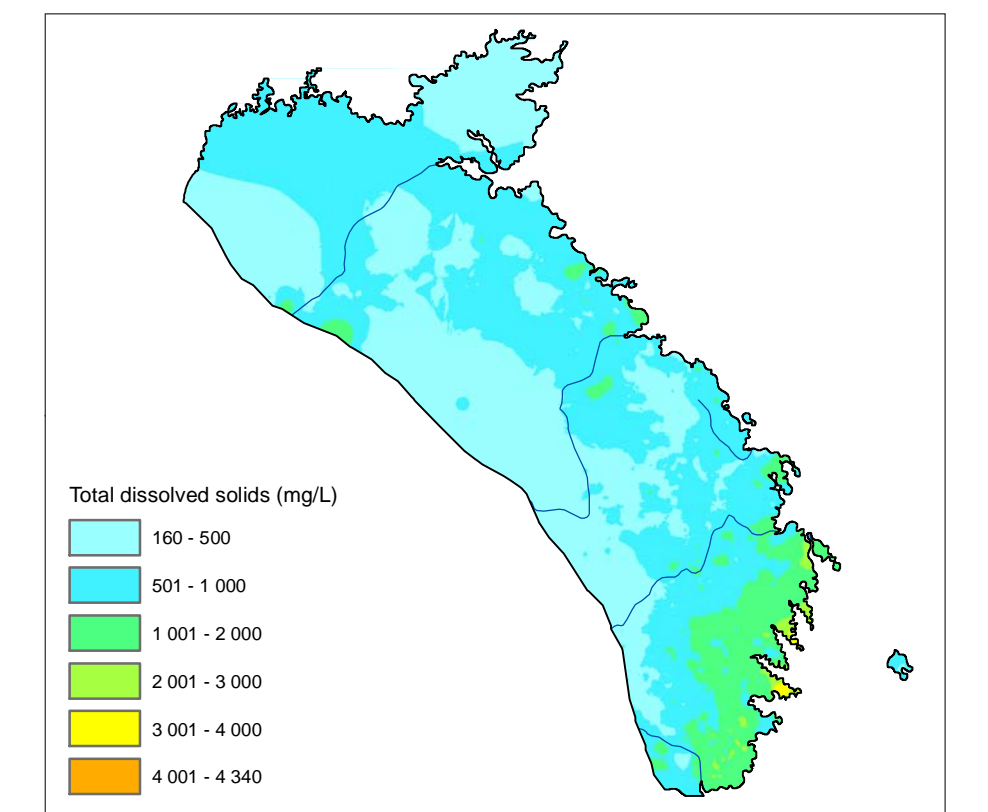


Figure 5. Distribution of total dissolved solids in the Paskapoo HSU (Klassen and Lemay, 2023).

**Acknowledgements**

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

**References**

Alberta Geological Survey (2019): Alberta Table of Formations; Alberta Energy Regulator, URL <https://ags.aer.ca/publications/table\_of\_formations\_2019.html> [October 2019].

Alberta Geological Survey (2021): Geological Framework of Alberta, version 3 (interactive app and map, methodology, model, dataset, story maps, web maps); Alberta Energy Regulator / Alberta Geological Survey, AER/AGS Interactive Application, URL <https://gfa-v3-ags-aer.hub.arcgis.com> [December 2021].

Bachu, S. and Michael, K. (2002): Hydrogeology and stress regime of the Upper Cretaceous-Tertiary coal-bearing strata in Alberta; Alberta Energy Regulator and Utilities Board, EUB/AGS Earth Sciences Report 2002-04, 81 p. URL <https://ags.aer.ca/publication/esr-2002-04>.

Barker, A.A., Riddell, J.T.F., Slattery, S.R., Andriashek, L.D., Moktan, H., Wallace, S., Lyster, S., Jean, G., Huff, G.F., Stewart, S.A. and Lemay, T.G. (2011): Edmonton-Calgary Corridor groundwater atlas; Energy Resources Conservation Board, ERCB/AGS Information Series 140, 98 p. URL <https://ags.aer.ca/publication/inf-140>.

Barker, A.A., Moktan, H., Huff, G.F. and Stewart, S.A. (2013): Maps of fresh groundwater chemistry, Edmonton-Calgary Corridor, Alberta: II - Paskapoo aquifer; Alberta Energy Regulator, AER/AGS Open File Report 2013-08, 17 p. URL <https://ags.aer.ca/publication/ofr-2013-08>.

Huff, G.F., Woods, L., Moktan, H. and Jean, G. (2012): Geochemistry of groundwater and springwater in the Paskapoo Formation and overlying glacial drift, south-central Alberta; Energy Resources Conservation Board, ERCB/AGS Open File Report 2012-05, 58 p. URL <https://ags.aer.ca/publication/ofr-2012-05>.

Klassen, J. and Lemay, T.G. (2023): Distribution of total dissolved solids in the Paskapoo hydrostratigraphic unit; Alberta Energy Regulator / Alberta Geological Survey, AER/AGS Map 640, scale 1:1 250 000.

Lyster, S. and Andriashek, L.D. (2012): Geostatistical rendering of the architecture of hydrostratigraphic units within the Paskapoo Formation, central Alberta; Energy Resources Conservation Board, ERCB/AGS Bulletin 66, 115 p. URL <https://ags.aer.ca/publication/bul-066>.

Parks, K. and Andriashek, L. (2009): Preliminary investigation of potential natural hydraulic pathways between the Scollard and Paskapoo formations in Alberta: implications for coalbed methane production; Energy Resources Conservation Board, ERCB/AGS Open File Report 2009-16, 66 p. URL <https://ags.aer.ca/publication/ofr-2009-16>.

**Recommended Reference Format**

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