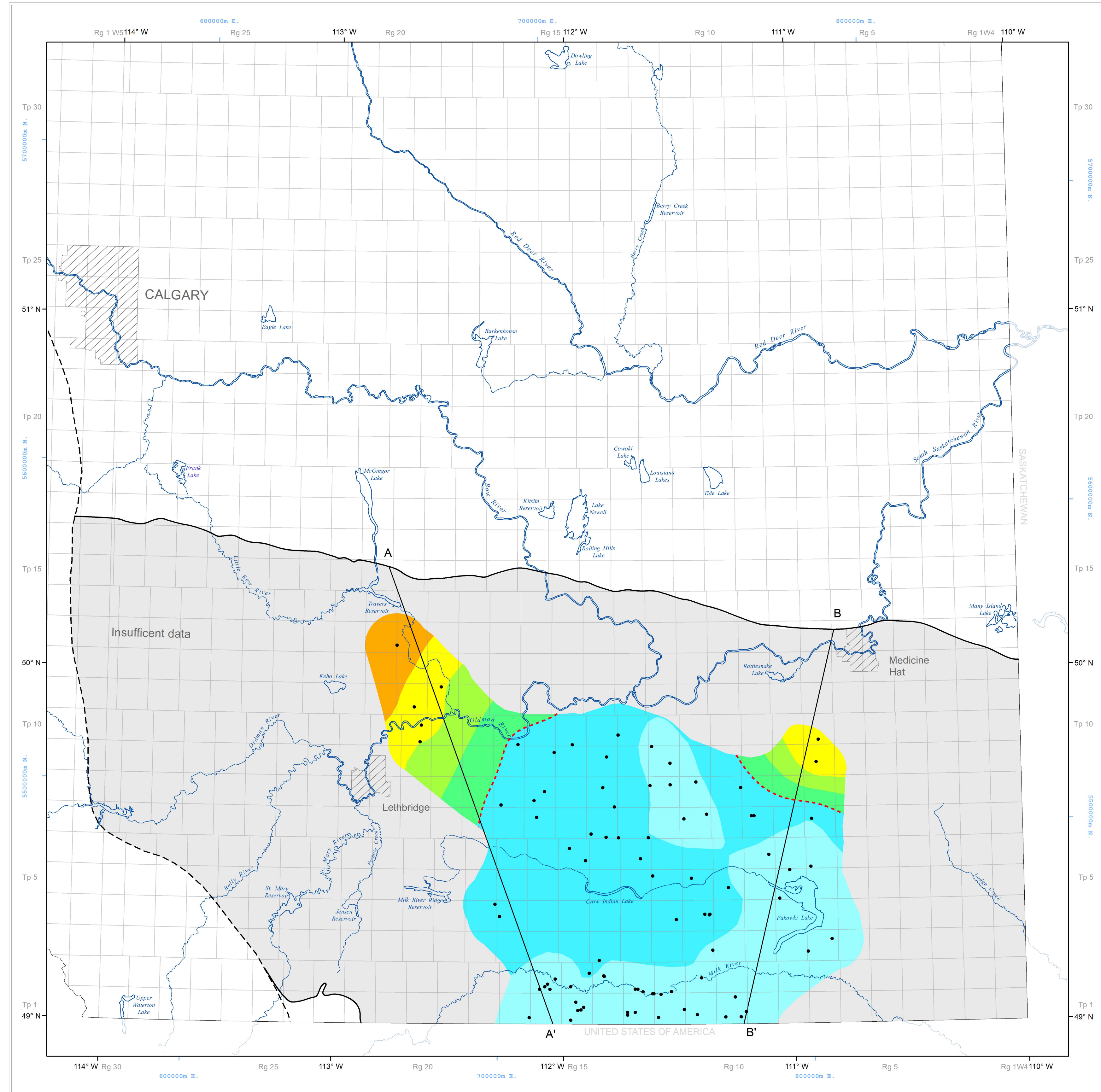


TOTAL DISSOLVED SOLIDS
MILK RIVER HSU



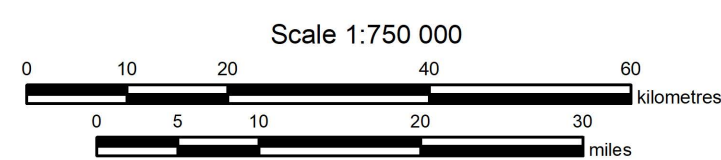
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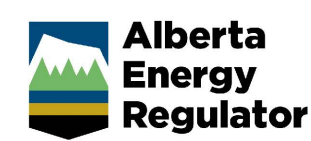
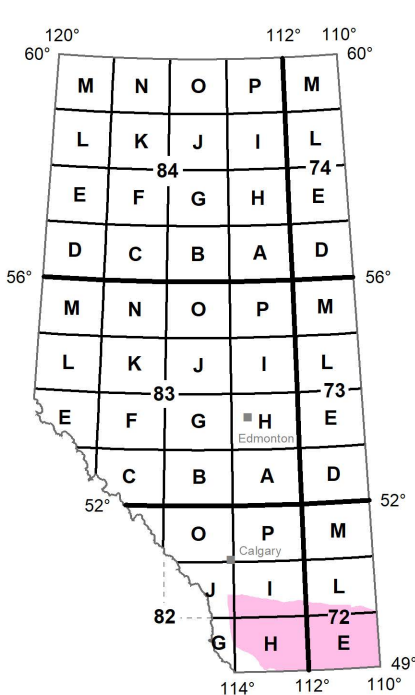
Map 598

Distribution of Total Dissolved Solids in
the Milk River Hydrostratigraphic Unit

Hydrogeology by: T.G. Lemay and A. Singh

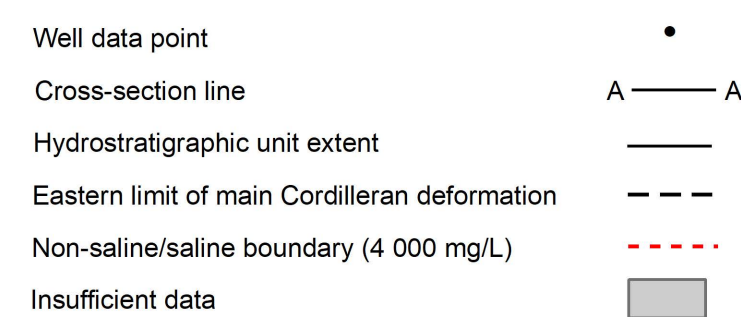
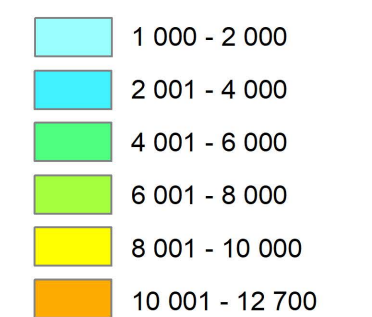


Projection: 10 Degree Transverse Mercator
Datum: North American Datum, 1983



SYMBOL LEGEND

Total dissolved solids (mg/L)



The map depicts the distribution of total dissolved solids (TDS) in groundwater in the Milk River hydrostratigraphic Unit (HSU). The horizontal and vertical extent of the unit was adopted from the 3D Provincial Geological Framework of Alberta, Version 1 (Branscombe et al., 2018). The relationship of the Milk River HSU with the 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 ordinary kriging technique using publicly available data from 97 water chemistry analyses from water wells and 7 water chemistry analyses from oil and gas wells. A screening process modified from Jensen et al. (2013) was used to ensure that only representative formation water chemistries were used. Measured TDS values range from 670 mg/L to approximately 12 000 mg/L. The final gridded map surface was clipped based on the spatial distribution of representative chemistry data. Residual values are plotted at each location (Figure 3) to indicate where underprediction and overprediction occurs compared to the measured TDS values.

Figure 4 shows the distribution of hydraulic head in the Milk River HSU, with hydraulic heads calculated using fresh water density. Figure 5 shows what the Milk River HSU looks like in outcrop in the Milk River valley.

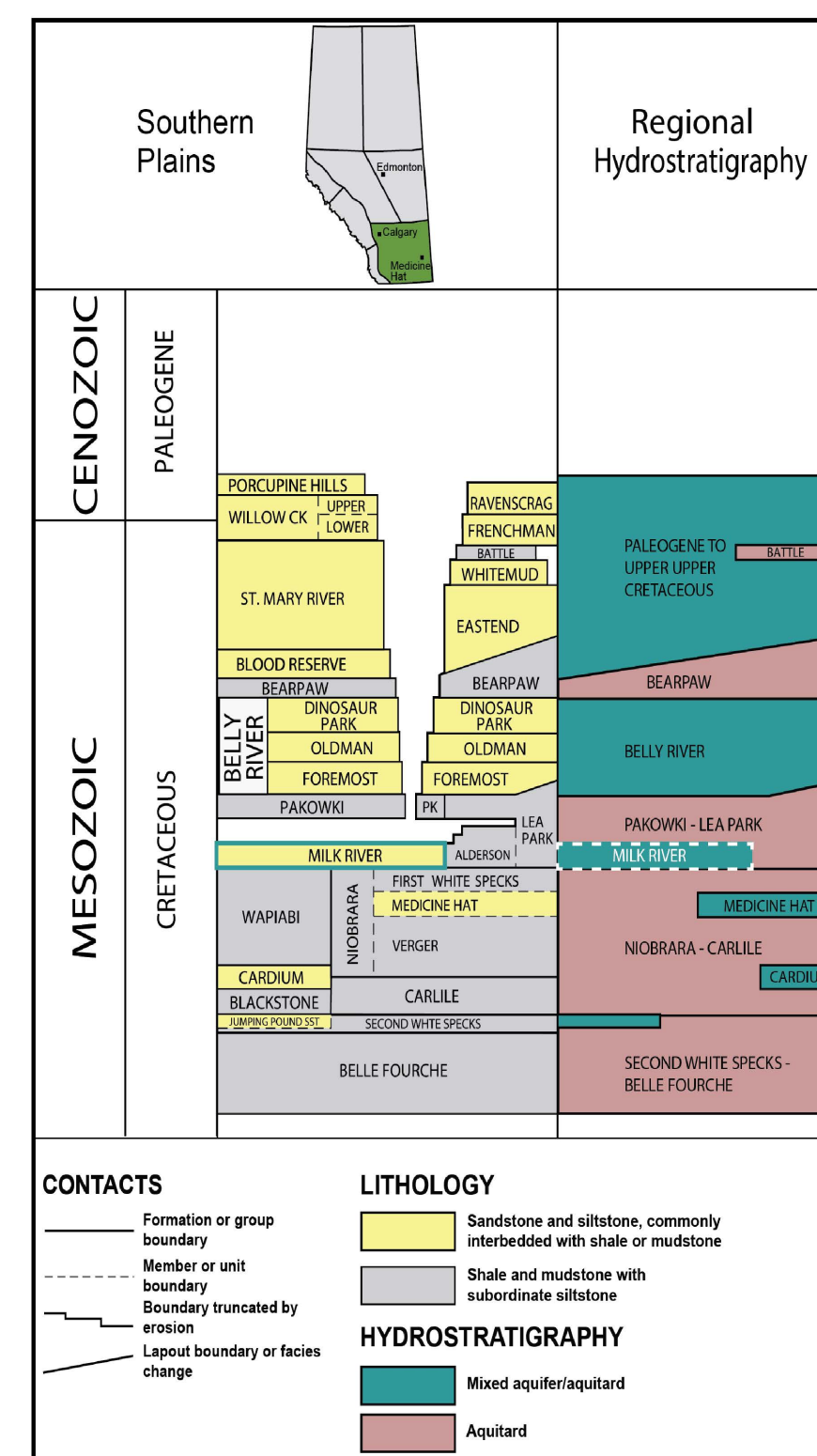


Figure 1. Regional lithostratigraphy and hydrostratigraphy (based on Alberta Geological Survey, 2019). Solid teal lines highlight the Milk River stratigraphic unit. Dashed white lines depict the Milk River HSU within the regional hydrostratigraphy.

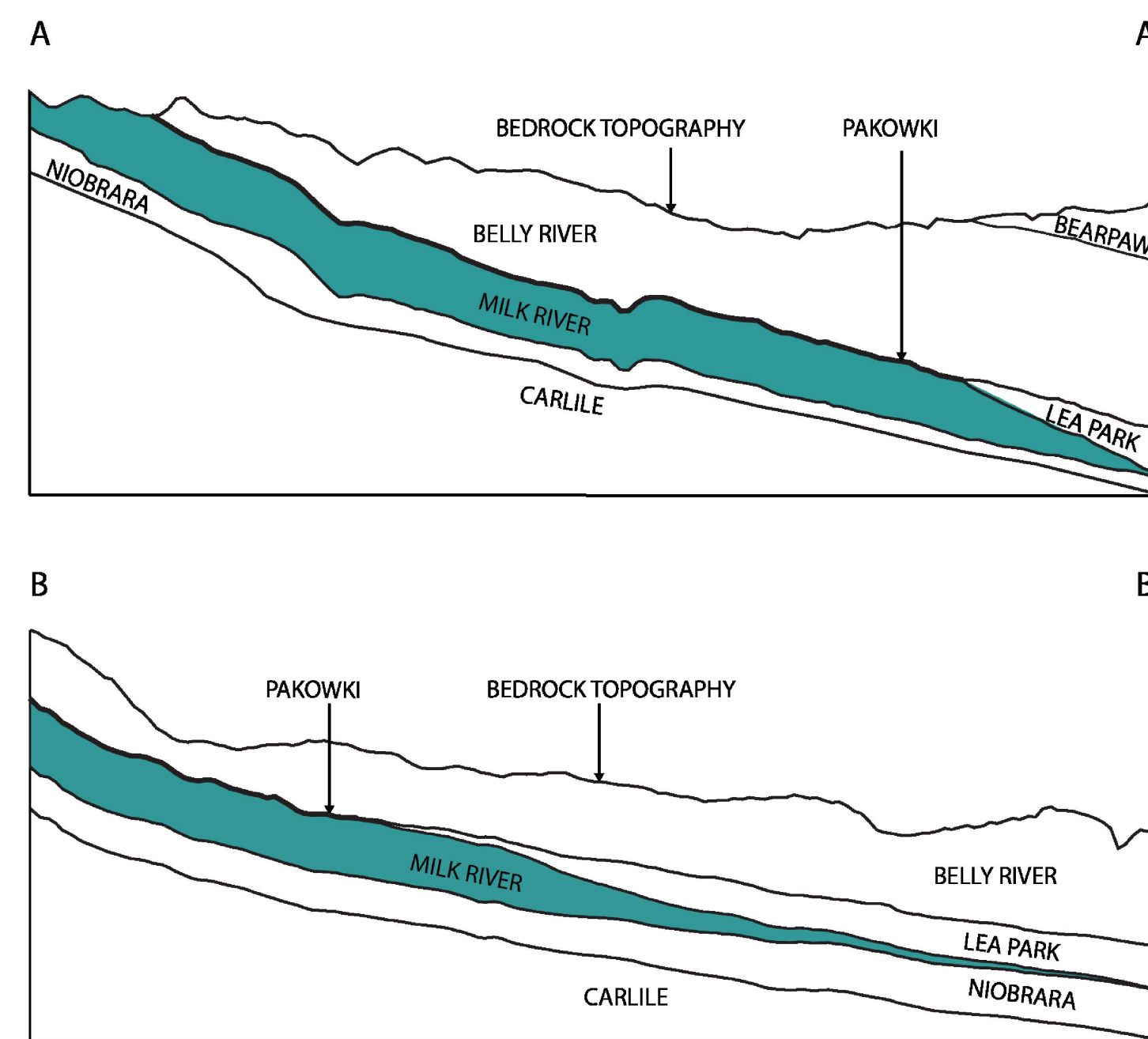


Figure 2. Schematic cross-sections identifying the geometry and variable thickness of the Milk River HSU (not to scale). Strata below the Carville Formation are not shown.

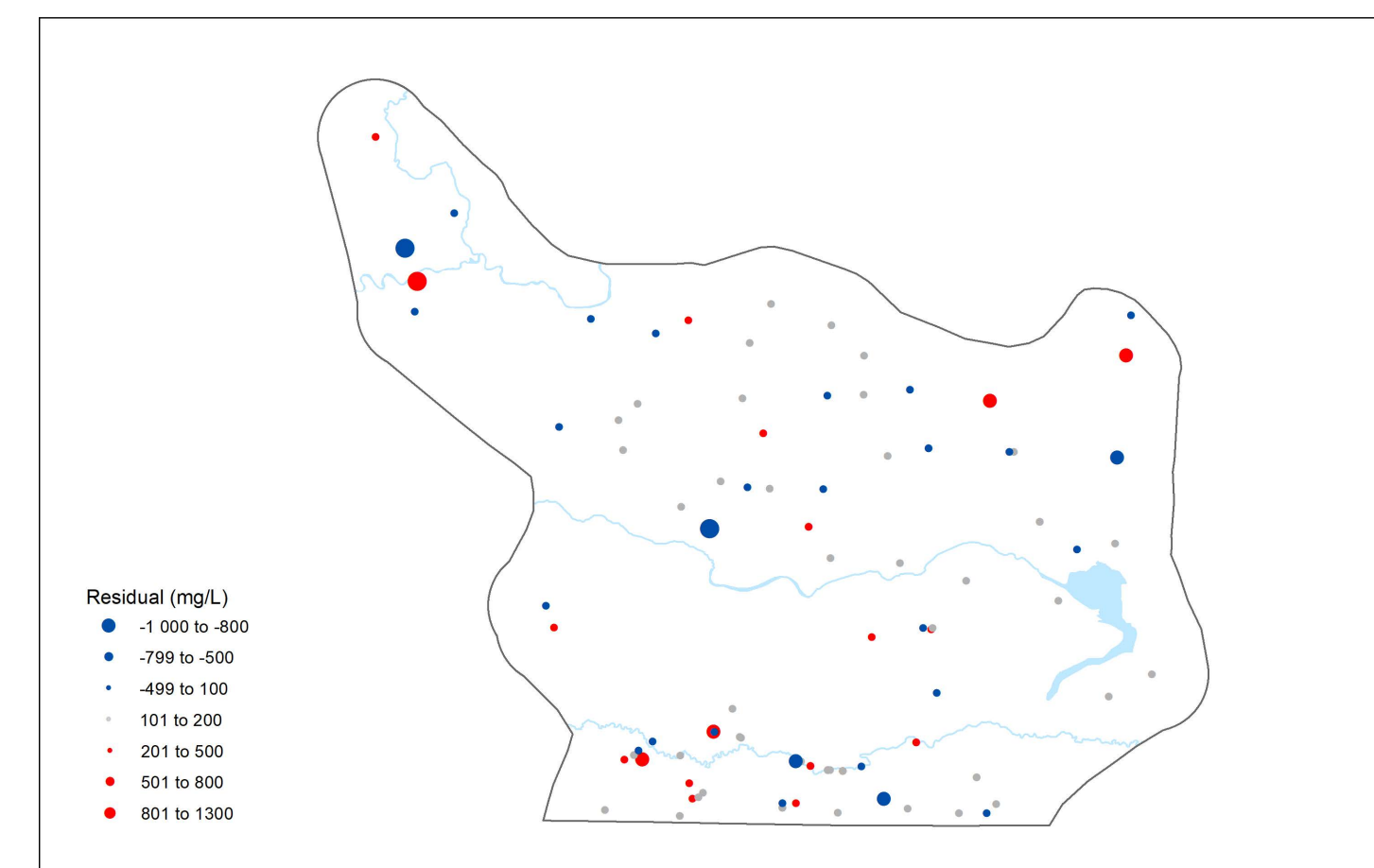


Figure 3. Calculated residuals between the modelled distribution of TDS and measured values. Symbol classes are based on the standard deviation of the calculated residuals.

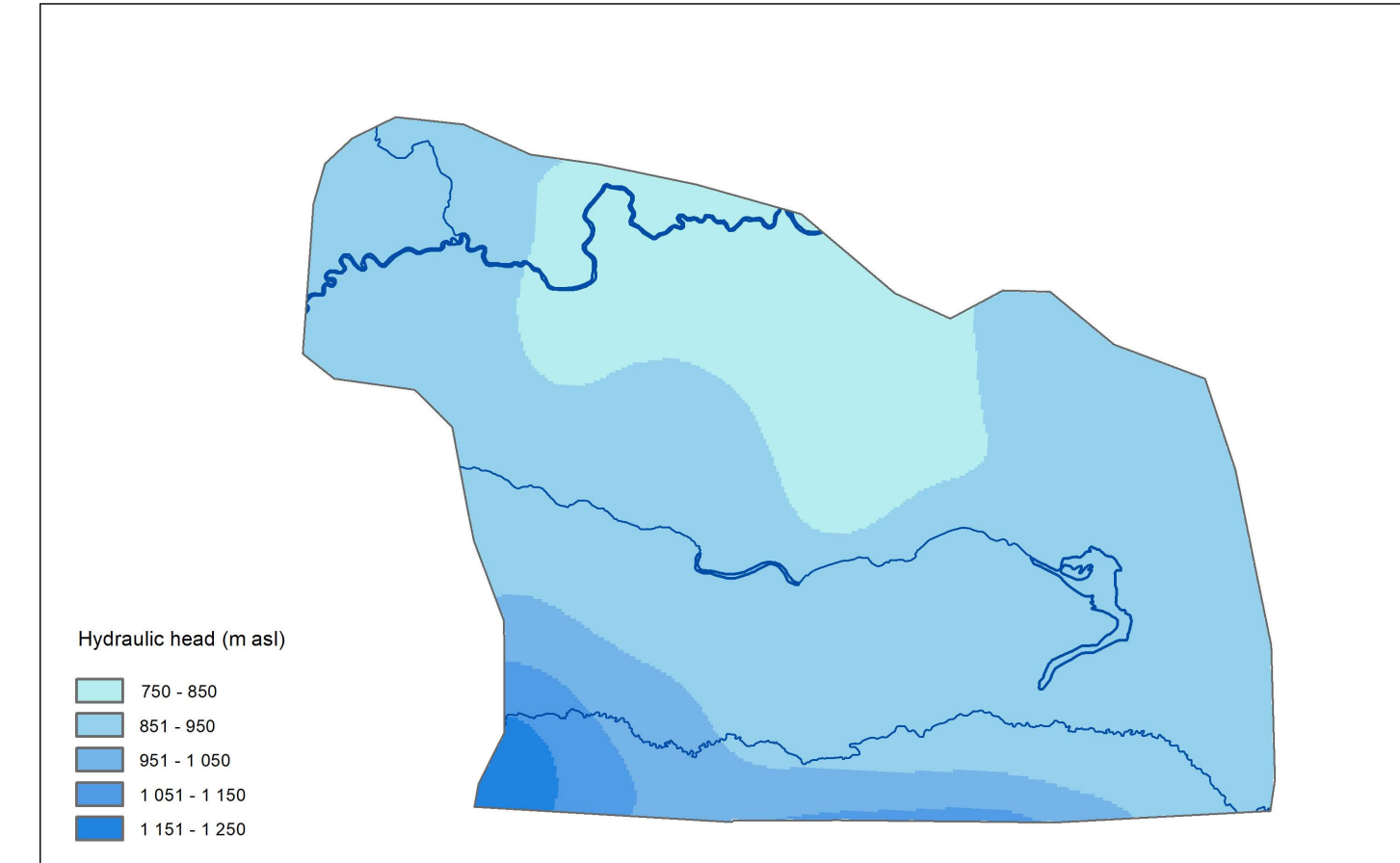


Figure 4. Distribution of hydraulic head in the Milk River HSU (Singh and Lemay, 2021).



Figure 5. Milk River at Writing-on-Stone Provincial Park incising into the Milk River HSU.

Acknowledgements

Photo courtesy of R. Elgr. data processing support by S. Stewart. Base data from the Atlas of Canada (Natural Resources Canada, 2012) and Spatial Data Warehouse, Ltd.

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- Singh, A. and Lemay, T.G. (2021): Distribution of hydraulic head in the Milk River hydrostratigraphic unit; Alberta Energy Regulator / Alberta Geological Survey, AER/AGS Map 599, scale 1:750 000.

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