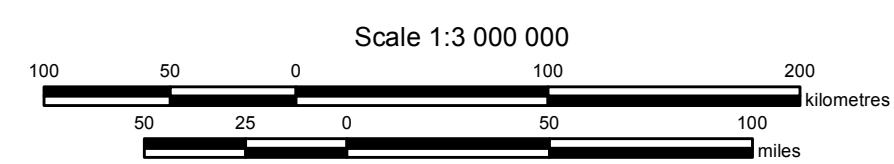


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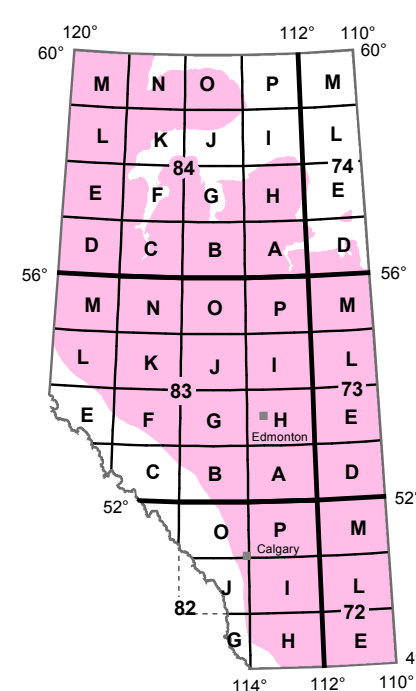
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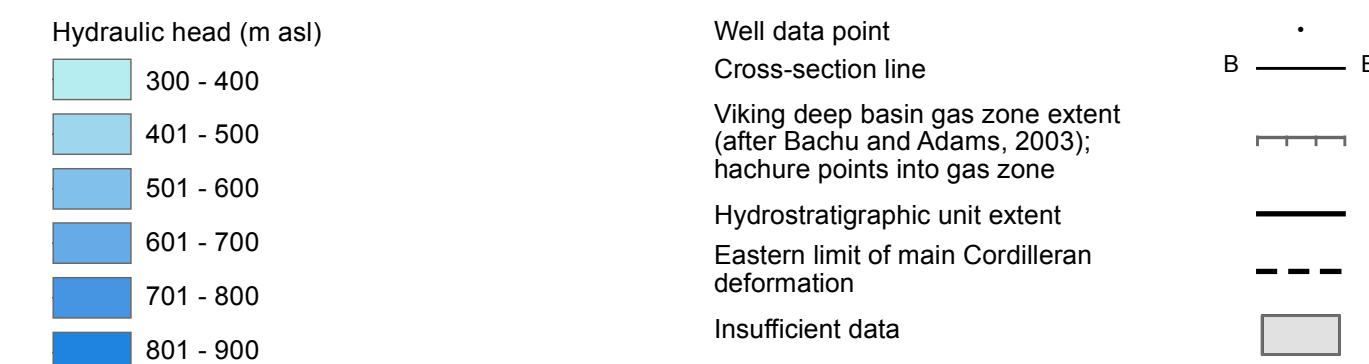
**Distribution of Hydraulic Head in the
Peace River / Viking / Bow Island Hydrostratigraphic Unit**
Hydrogeology by: A. Singh and T.G. Lemay.



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



SYMBOL LEGEND



This map depicts the distribution of hydraulic head in the Peace River / Viking / Bow Island hydrostratigraphic unit (PVB HSU). The horizontal and vertical extent of the unit was adopted from the 3D Provincial Geological Framework Model of Alberta, Version 1 (Branscombe et al., 2018). The relationship of the PVB HSU with the units above and below as well as its geometry can be seen on Figure 1. On the basis of time equivalency, similarities in lithologic composition, and previous hydrogeological assessments (Bachu, 1995, 1999; Bachu and Adams, 2003; Bachu et al., 1993; Michael, 2002) the Peace River / Viking / Bow Island stratigraphic units were combined into a single hydrostratigraphic unit (Figure 2).

Methodology

The hydraulic head distribution map is a result of a simple kriging technique using publicly available data from 1 510 oil and gas wells and 110 water wells. A screening process modified from Jensen et al. (2013) was used to ensure that only representative formation pressures from oil and gas wells were used. The final gridded map surface was clipped based on the spatial distribution of representative hydraulic head data and an assessment of plausible data trends. The hydraulic head map highlights the regional topographic influence with relatively higher heads in the southern portion of the HSU. Residual values are plotted at each location (Figure 3) to indicate where underprediction and overprediction occurs compared to the measured hydraulic head values.

Using the methodology of Singh et al. (2017) the Cumulative Interference Index (CII) technique was implemented to identify and remove pressure tests that were influenced by production or injection (Figure 4). An additional formation-scale map shows the distribution of total dissolved solids in the PVB HSU (Figure 5).

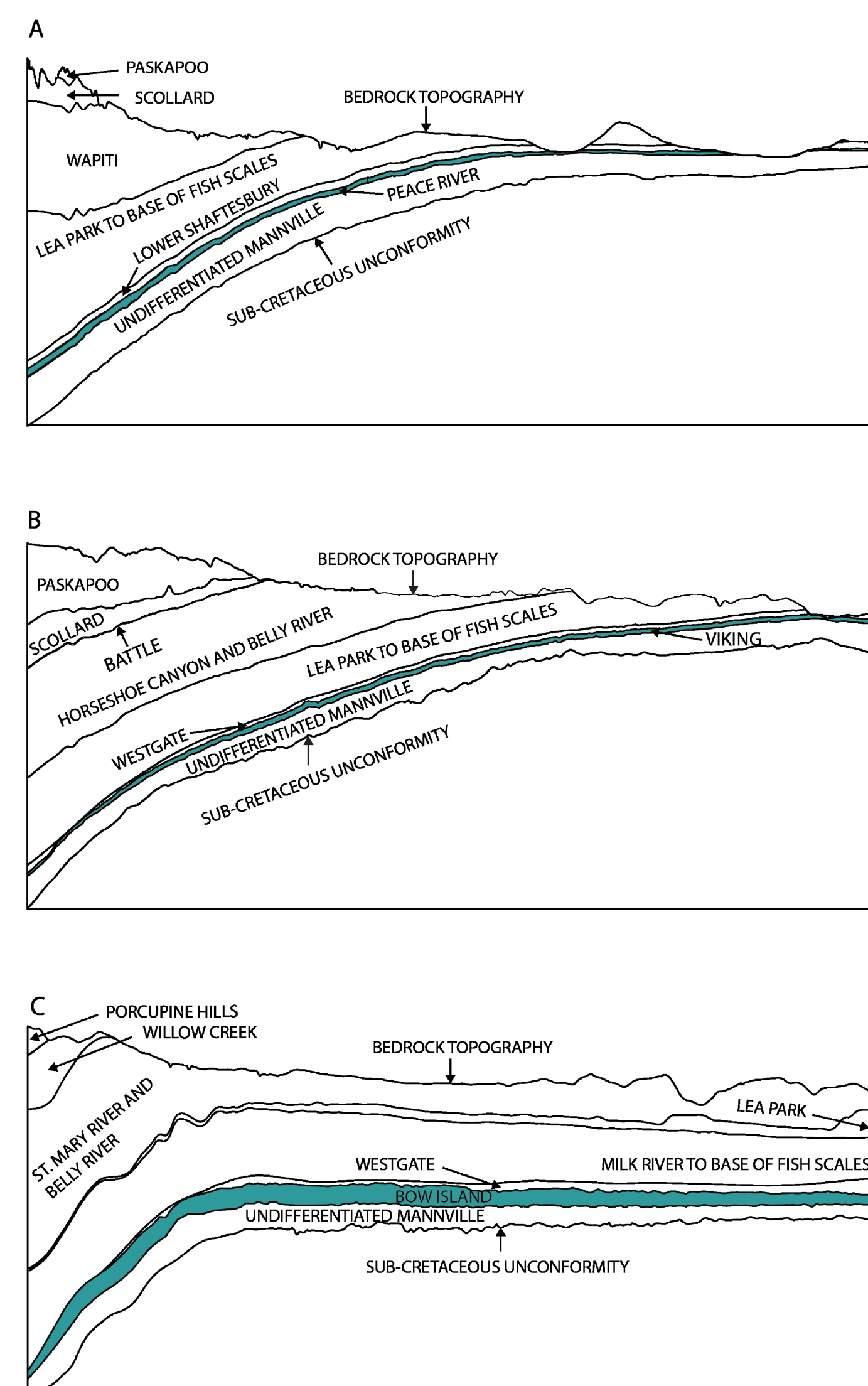


Figure 1. Schematic cross-sections identifying the geometry and variable thickness of the PVB HSU (not to scale).

Acknowledgements

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Recommended Reference Format

Singh, A. and Lemay, T.G. (2021). Distribution of hydraulic head in the Peace River / Viking / Bow Island hydrostratigraphic unit; Alberta Energy Regulator / Alberta Geological Survey, AER/AGS Map 594, scale 1:3 000 000.

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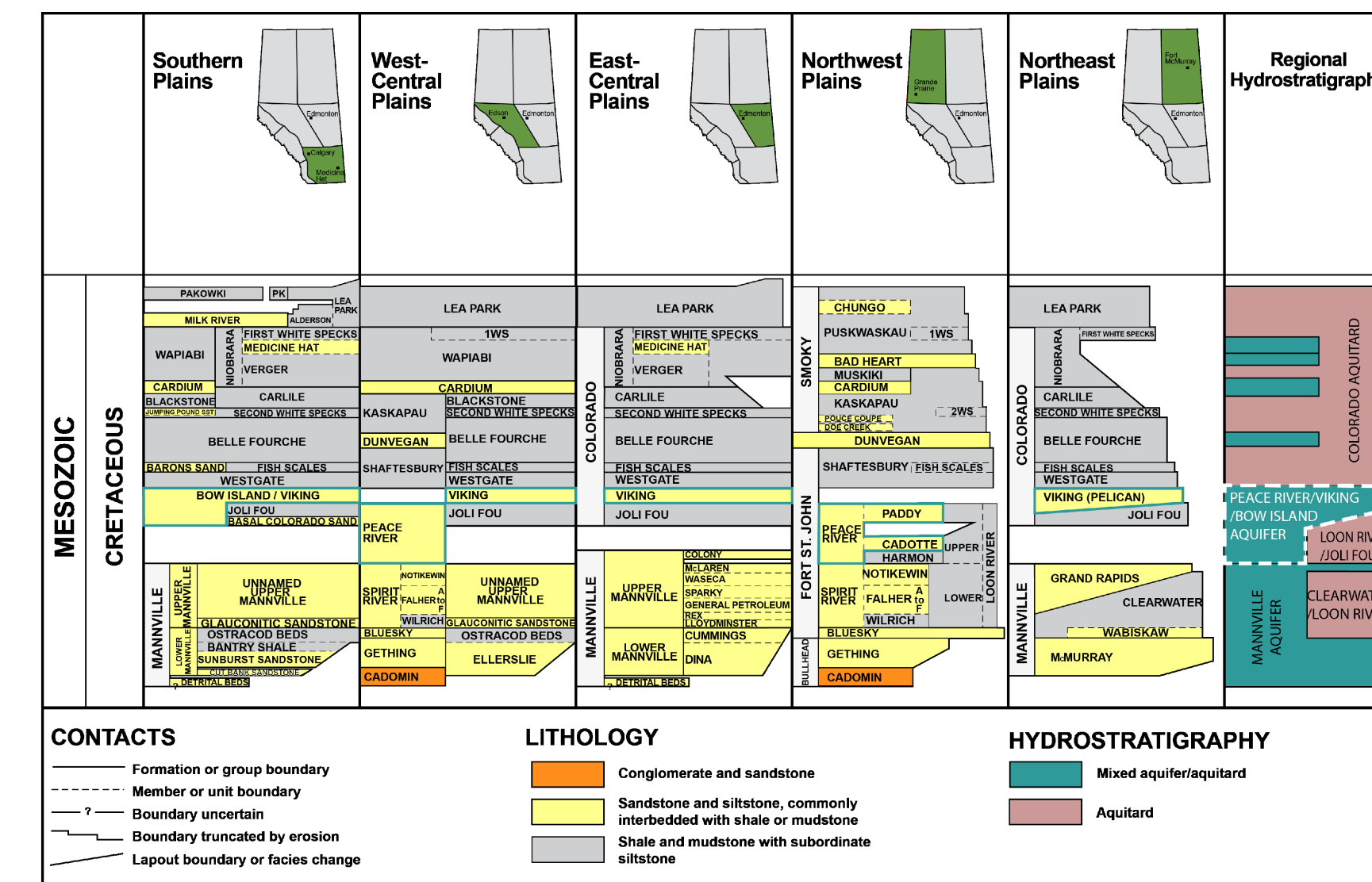


Figure 2. Regional lithostratigraphy based on Alberta Geological Survey (2019), with regional hydrostratigraphy based on Hitchon et al. (1989). Solid teal lines depict the top and base of stratigraphic units combined for the mapping of the PVB HSU. Dashed white lines depict the PVB HSU within the regional hydrostratigraphy. Strata above the Lea Park Formation are not shown.

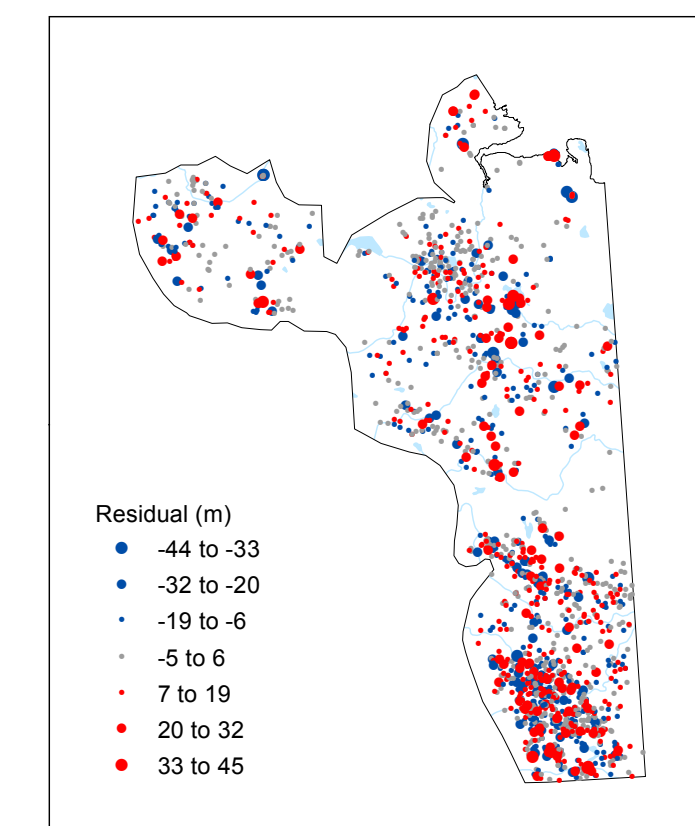


Figure 3. Calculated residuals between the modelled distribution of hydraulic head and measured values. Symbol classes are based on the standard deviation of the calculated residuals.

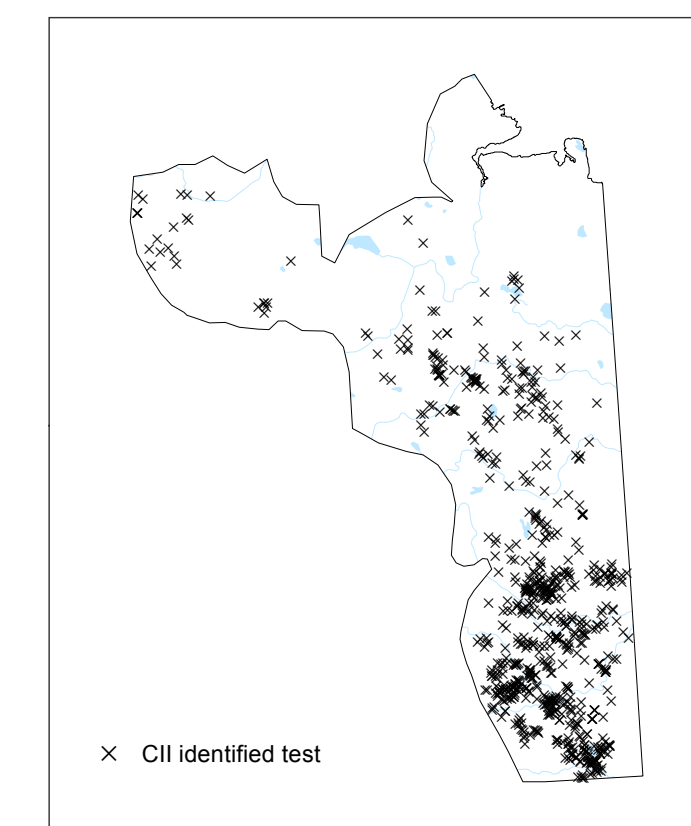


Figure 4. Location of tests that may have been influenced by production or injection and were removed during the Cumulative Interference Index (CII) process.

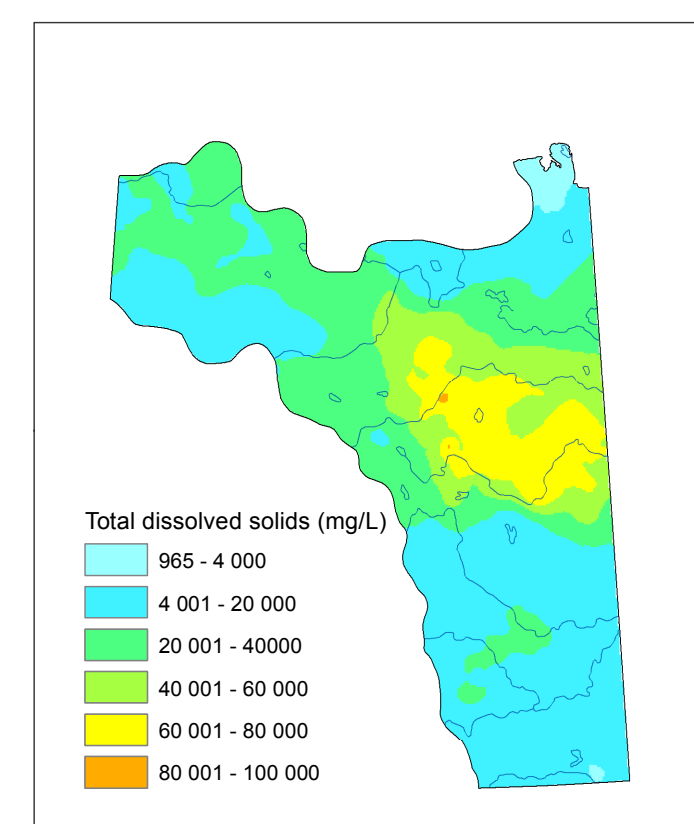


Figure 5. Distribution of total dissolved solids (TDS) in the PVB HSU (Lemay et al., 2021). The map extent is based on the spatial distribution of TDS data and differs from the extent of the main map.

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