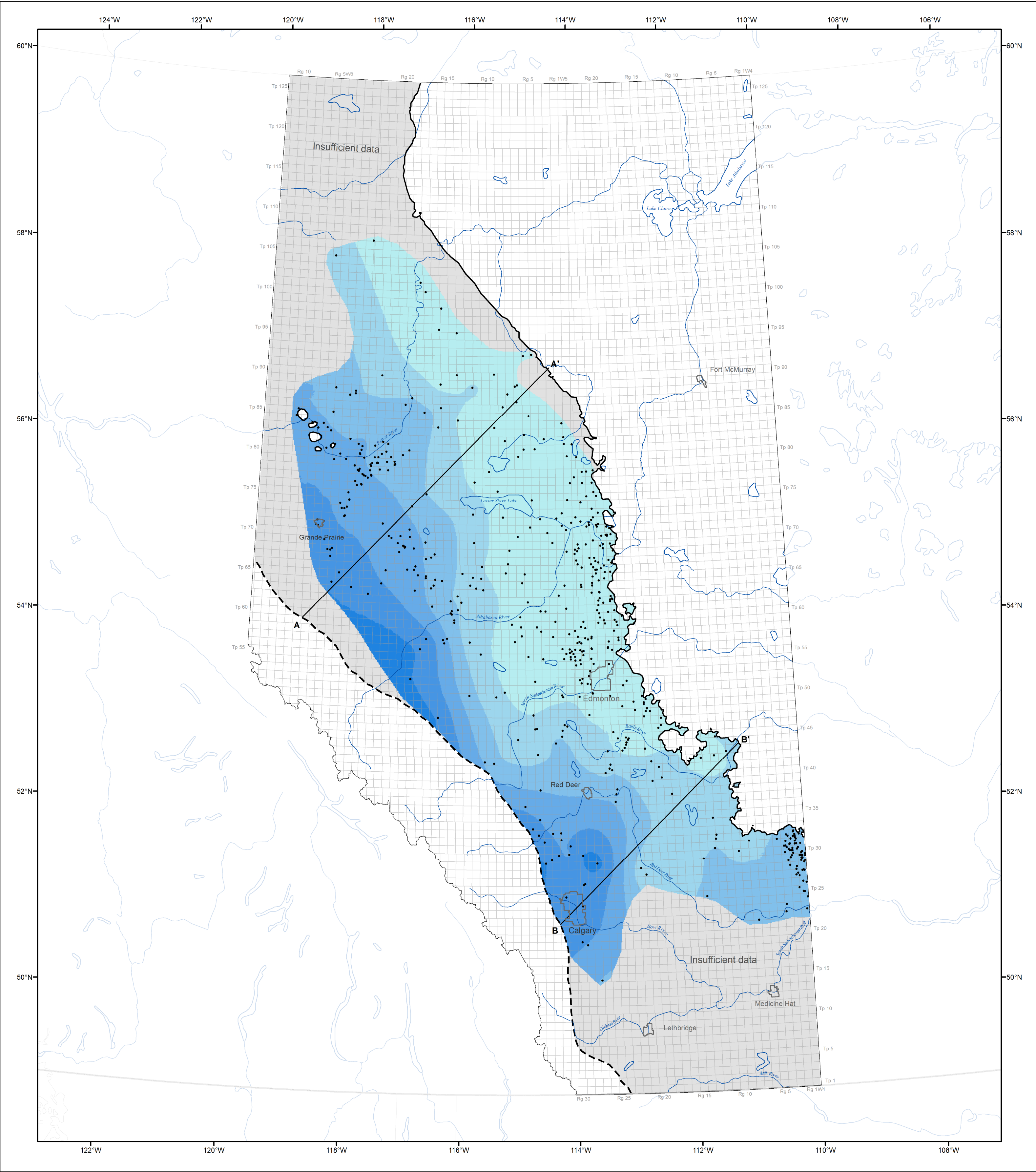


HYDRAULIC HEAD
WABAMUN HSU



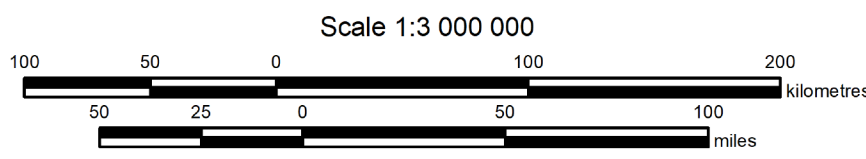
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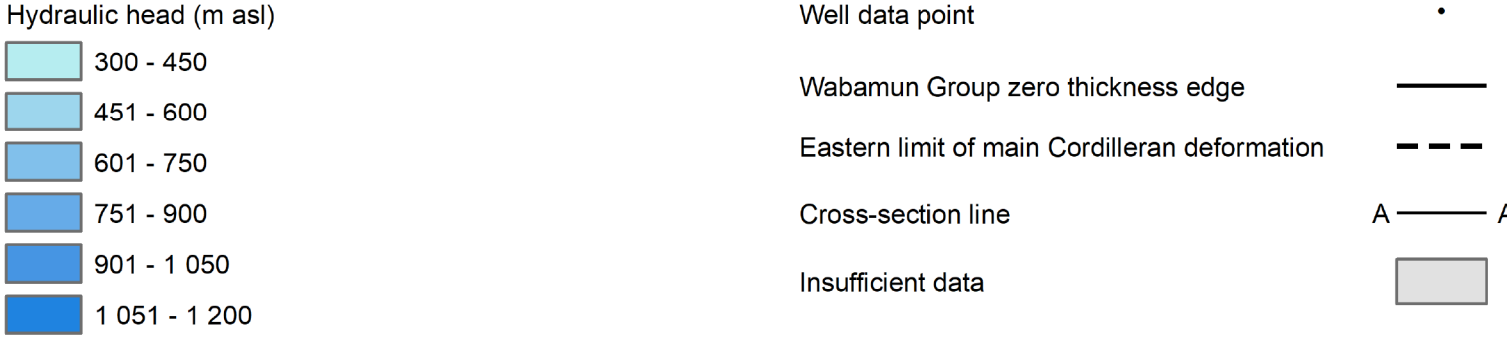
Map 547

Distribution of Hydraulic Head in the
Wabamun Hydrostratigraphic Unit

Hydrogeology by: J. Brinsky



SYMBOL LEGEND



This map depicts the distribution of hydraulic head in the Wabamun hydrostratigraphic unit (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 Wabamun HSU with the units above and below as well as its geometry can be seen in Figure 1 and Figure 2.

Methodology

The hydraulic head distribution map is a result of an empirical Bayesian kriging technique using publicly available pressure data from 533 drillstem tests from oil and gas wells. A screening process modified from Jensen et al. (2013) was used to ensure that only representative pressures were used to calculate equivalent freshwater hydraulic heads. The final gridded map surface was clipped based on the spatial distribution of representative data. 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) was determined and used to identify and remove data that have been influenced by production or injection (Figure 4). An additional formation-scale map shows the distribution of total dissolved solids in the Wabamun HSU (Figure 5).

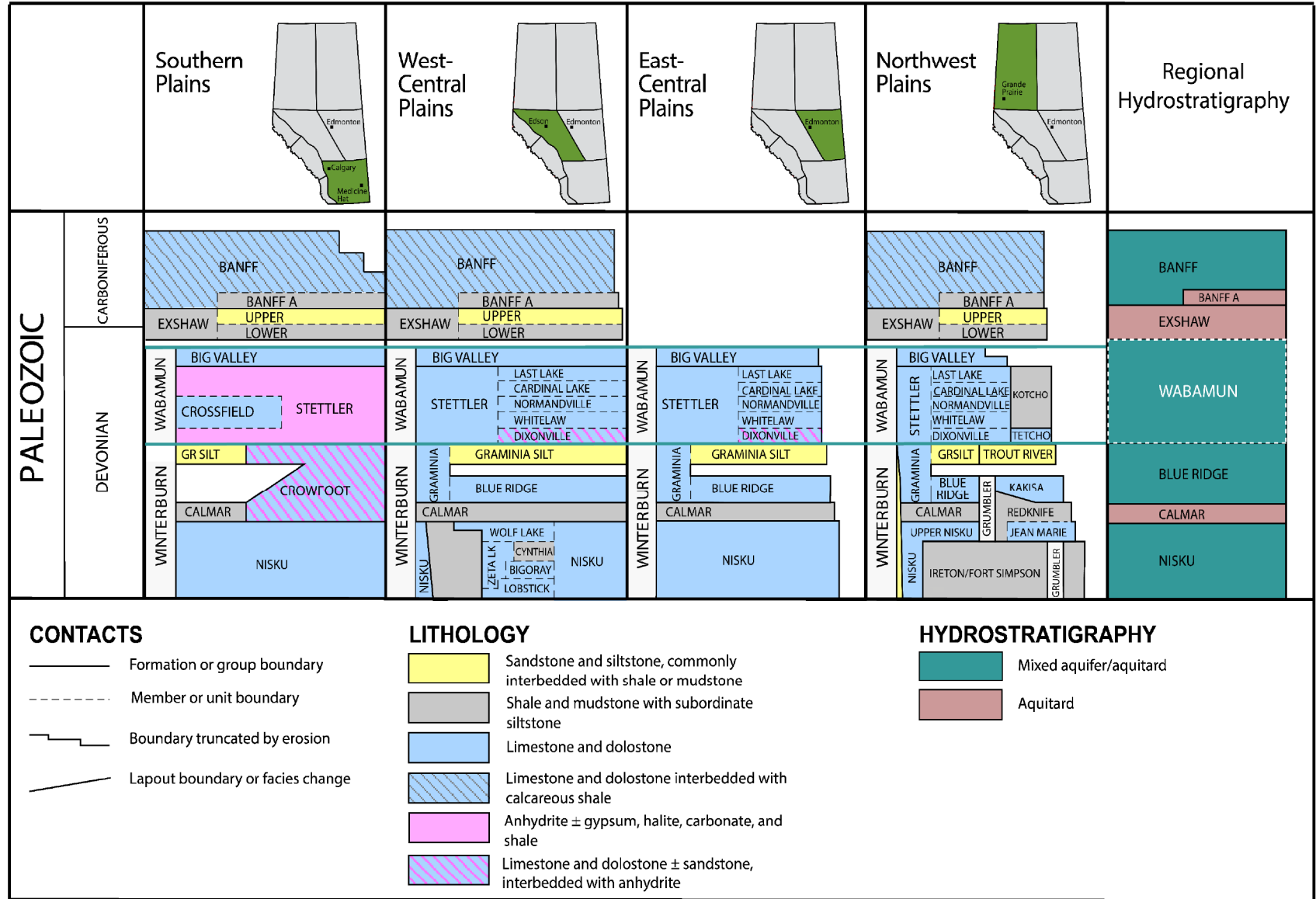


Figure 1. Regional lithostratigraphy and hydrostratigraphy (based on Alberta Geological Survey, 2019). Solid teal lines depict the top and base of stratigraphic units combined for mapping the Wabamun HSU. Dashed white lines depict the Wabamun HSU within the regional hydrostratigraphy. Strata above the Banff HSU and below the Nisku HSU are not shown.

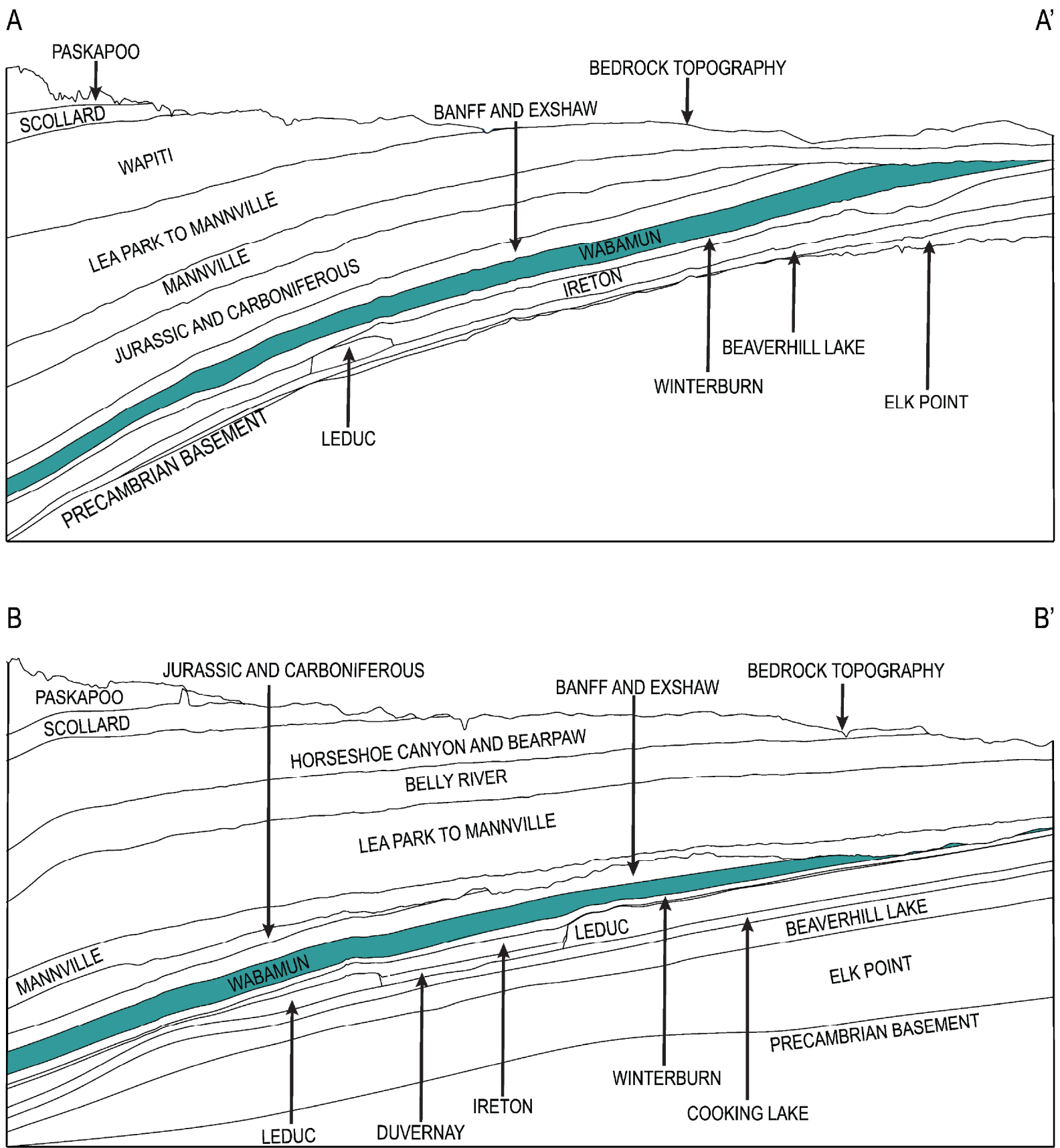


Figure 2. Schematic cross-sections identifying the geometry and variable thickness of the Wabamun HSU (not to scale). Jurassic and Carboniferous strata have not been subdivided at the scale of this cross-section.

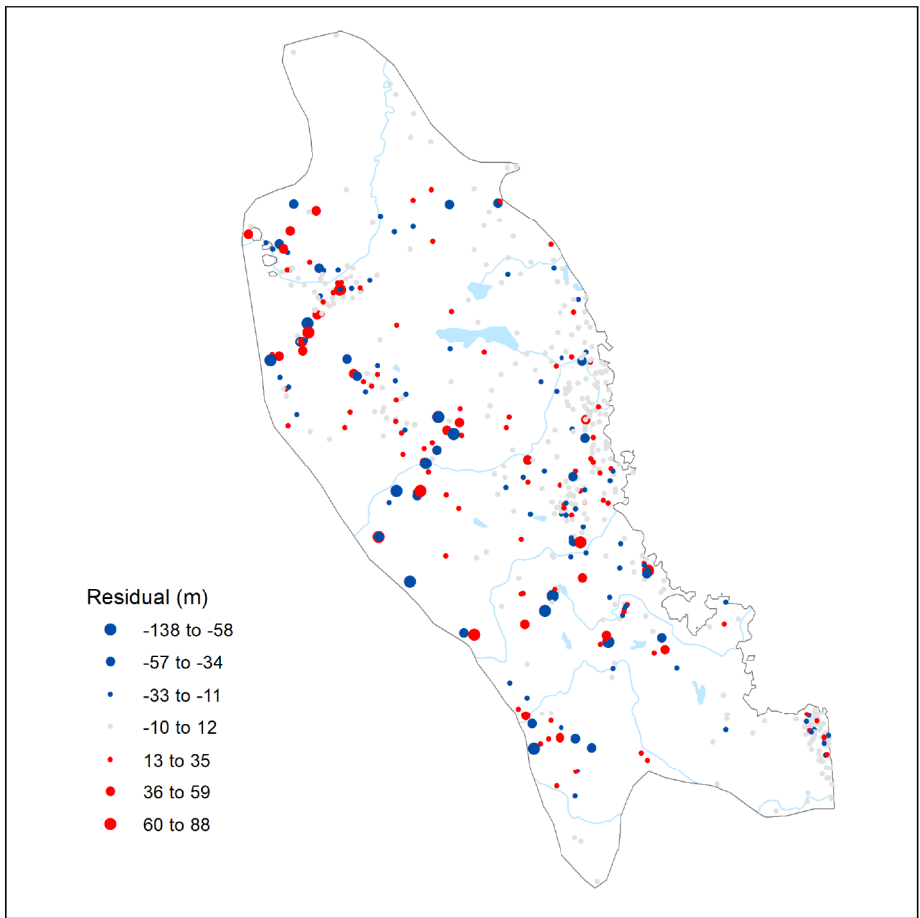


Figure 3. Calculated residuals between the modelled distribution of hydraulic head and measured values. Symbol classes are based on the standard deviation of the calculated residuals.

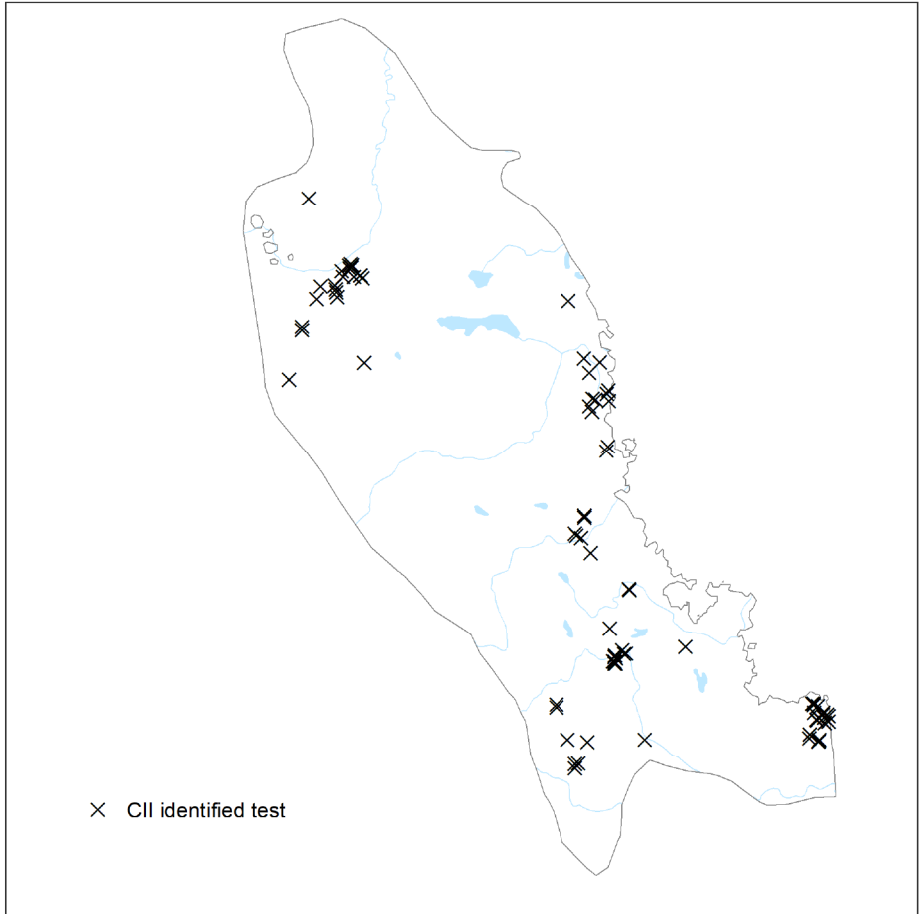


Figure 4. Location of tests that may have been influenced by production or injection and were removed during the Cumulative Interference Index (CII) process.

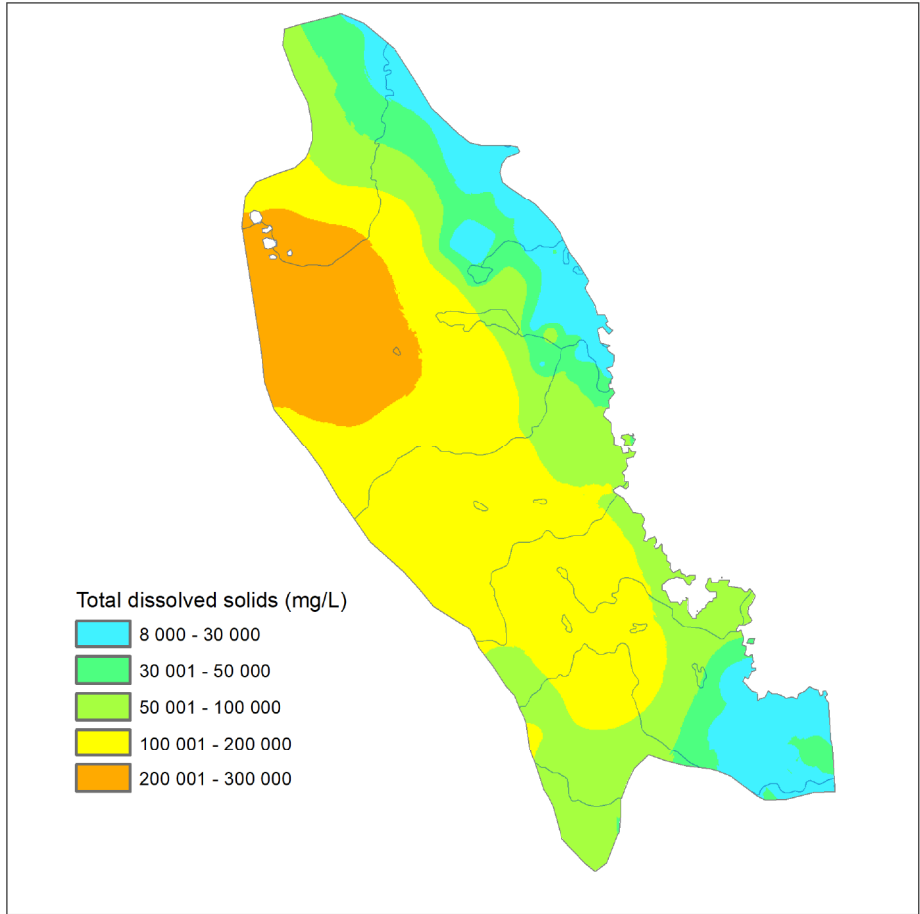


Figure 5. Distribution of total dissolved solids in the Wabamun HSU (Brinsky, 2020).

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