

Lithium

MANITOBA CRITICAL MINERALS



The **Manitoba Geological Survey** is committed to improving the understanding of lithium resources in the province. Magmatic deposits (pegmatites) in Precambrian rocks and lithium brine in deep saline groundwater are currently being evaluated as sources of lithium.

Lithium, the lightest metallic element, has physical and chemical properties uniquely suited to a wide range of applications, including pharmaceuticals, glass, ceramics, and aerospace technologies. More recently, the manufacturing of lithium batteries for personal electronic devices and electric or electric-hybrid vehicles has substantially increased demand.



Figure 2: Drillcore from the Zoro Lithium property at Wekusko Lake, showing light green, bladed spodumene (lithium-aluminum-silicate).

Figure 1: Geological map of Manitoba showing locations of pegmatite fields or dikes and location for lithium brine potential.



Figure 3:
Very coarse spodumene from the Wekusko Lake pegmatite field.

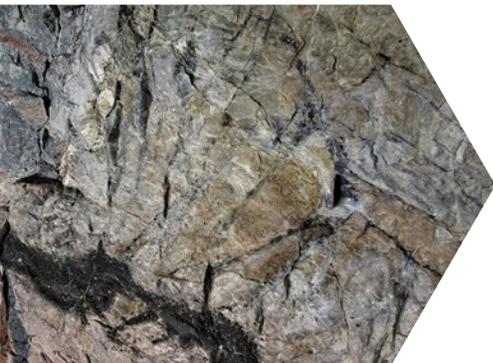


Figure 4:
Lithium mineralization (spodumene + quartz association) from the Tanco pegmatite.

Lithium-bearing Pegmatite in Manitoba

Granitic pegmatite contains the largest known resources of lithium in Manitoba. The most prolific region is the Winnipeg River–Cat Lake pegmatite field, which hosts the world-class Tanco lithium-cesium-tantalum deposit. Another prolific region is the Wekusko Lake pegmatite field, located just east of the town of Snow Lake (Figure 1). The main lithium-bearing minerals associated with this type of deposit are spodumene (Figures 2, 3 and 4), petalite and lepidolite.

Elsewhere in the Archean Superior province, lithium-bearing pegmatite occurs at Red Sucker Lake, Gods Lake, Cross Lake, Red Cross Lake and McLaughlin Lake (Figure 1).

In the Paleoproterozoic Trans-Hudson orogen, areas like South Bay, Southern Indian Lake and Granville Lake (Figure 1) have pegmatite occurrences with beryl and columbite, indicating widespread potential for lithium mineralization in those regions as well.

Lithium-bearing Brines in Manitoba

The Phanerozoic Williston Basin in southwestern Manitoba has a complex groundwater system with multiple aquifers and a wide range of salinities (Figure 5). Comprehensive data from groundwater that flows west to east into Manitoba show economic lithium concentrations in some saline aquifers. Current exploration trends in the Williston Basin are targeting lithium-bearing brines in deep Devonian-aged aquifers, particularly the Duperow Formation.

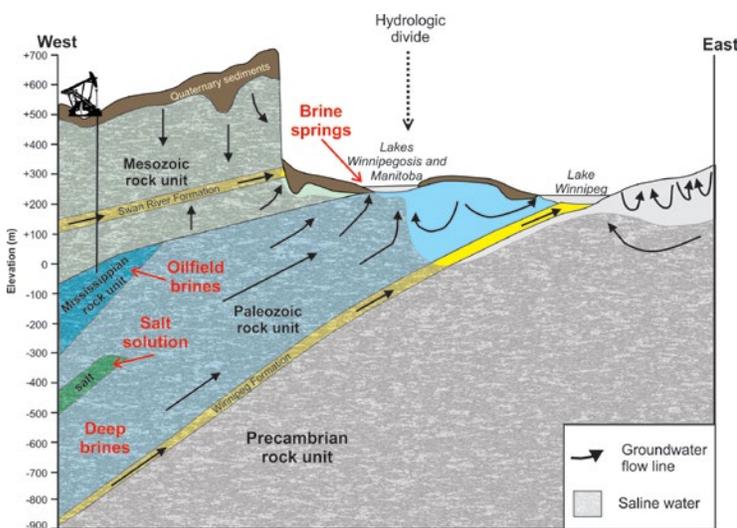


Figure 5: West to east cross-section through southern Manitoba showing different sources of brines, and generalized groundwater salinity distribution and flow in Phanerozoic rock units.



Manitoba is home to world-class deposits and high mineral potential in extensive underexplored terrains.

Learn more at manitoba.ca/minerals

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