

Lithium Potential in Alberta

AER/AGS Information Series 160

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1 Summary

The Alberta Geological Survey estimates Alberta has 82.5 million tonnes of lithium carbonate equivalent (LCE) in-place within Devonian brines often associated with oilfields. This positions Alberta to become a major global supplier as global demand for lithium, a critical mineral, accelerates.

2 Alberta Highlights

Lithium occurs in two main deposit types in Alberta (Figure 1):

1. Lithium-rich brines
2. Metalliferous black shales

2.1 Lithium Brine

Elevated Li concentrations are widespread in brines within Devonian carbonate aquifers, often associated with overlying oilfields. The Alberta Geological Survey (AGS) recently completed a province-wide lithium brine resource assessment and estimates that 82.5 Mt LCE resides in the Devonian Leduc and Swan Hills formations (Alberta Geological Survey, 2026). The AGS has identified further potential in the Wabamun Group and the Nisku, Keg River, Slave Point, and Montney formations, however, no mineral resources have been assigned to these units as more sampling is required to quantify the potential.

Several companies have secured leases for lithium brine extraction in Alberta, targeting the Leduc and Swan Hills formations (Figure 1). E3 Lithium is exploring the Leduc Formation in the Red Deer region known as Bashaw and Garrington. In the Bashaw District, E3 Lithium has reported measured and indicated mineral resources totaling 16.2 Mt LCE at a Li grade of 75.5 mg/L (E3 Lithium, 2024). Additionally, E3

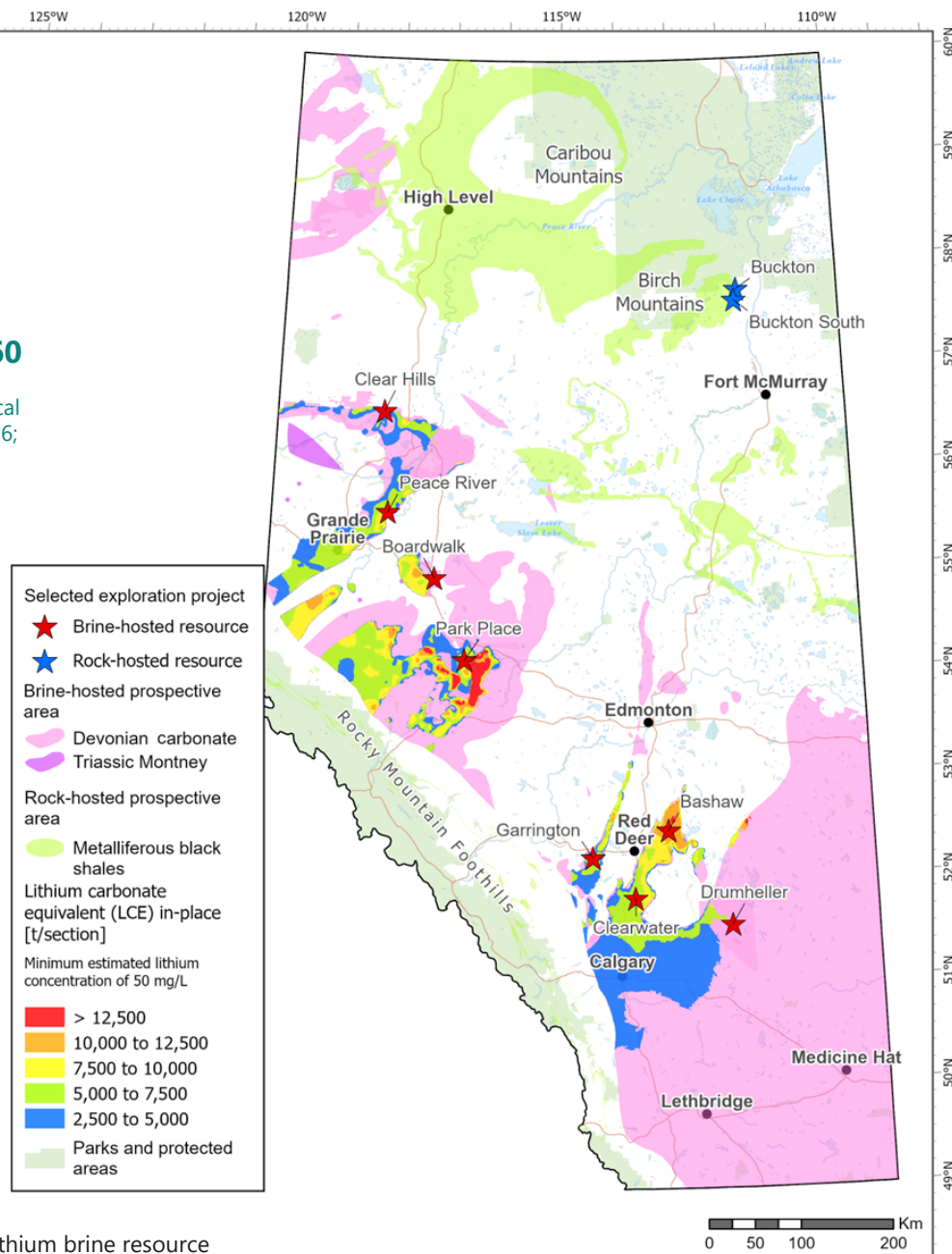


Figure 1. Areas of lithium prospectivity in Alberta, and locations of lithium exploration projects.

Lithium is progressing an extraction facility called the Clearwater Project that is within the Bashaw District. The Clearwater Project has assigned mineral reserves (proven + probable) of 1.1 Mt LCE. Phase 1 production is anticipated in 2028/2029 with an initial rate of 12,000 tonnes per annum (tpa) of LCE. In the Garrington District, measured and indicated resources are estimated at 5.0 Mt LCE, with an additional 0.30 Mt LCE of inferred resources with a Li grade of 54.0 mg/L (E3 Lithium, 2025). In northwestern Alberta near Grande Prairie, LithiumBank Resources Corp. has two projects called Boardwalk and Park Place that are targeting the Leduc and Swan Hills formations. Reported measured-and-indicated mineral resource for the Boardwalk Project is 5.2 Mt LCE

Company Name	Location	Stratigraphic Unit	Description	Li Grade (mg/L)	Inferred Resources (Mt LCE)	Measured + Indicated Resources (Mt LCE)	Mineral Reserves (Probable + Proven) (Mt LCE)
E3 Lithium	Bashaw District	Leduc Formation	Lithium extraction planned; Lithium Production Planned	75.5	No estimate	16.2	1.1
E3 Lithium	Garrington District	Leduc Formation	Lithium extraction planned	54.0	0.3	5.0	No estimate
LithiumBank Resources Corp	Boardwalk Project	Swan Hills and Leduc formations	Lithium extraction planned	81.6	2.78	5.2	No estimate
LithiumBank Resources Corp	Park Place Project	Swan Hills and Leduc formations	Lithium extraction planned	80.1	21.7	No estimate	No estimate
Neolithica Ltd.	Peace River	Leduc Formation	Lithium extraction planned	70.0	10.0	No estimate	No estimate

Table 1. Summary of industry reported lithium brine resource estimates with lithium grades >50 mg/L in Alberta.

with an additional 2.78 Mt LCE of inferred resources at a Li grade of 81.6 mg/L (LithiumBank, 2025a). The Park Place Project has reported inferred resources of 21.7 Mt LCE at a Li grade of 80.1 mg/L (LithiumBank, 2025b). In the Peace River area, Neolithica Ltd. is exploring the Leduc Formation and has reported inferred resources of 10 Mt LCE (Neolithica, 2023). At present, the total industry reported lithium mineral resources and reserves is 62 Mt LCE for projects with lithium grades >50 mg/L. (Table 1)

2.2 Metalliferous Black Shales

Highly metalliferous black shales in Alberta are known to be enriched in a wide variety of elements, including lithium. In the Birch Mountains region, the Buckton deposit is divided primarily into two polymetallic Cretaceous black shale zones, the Buckton zone and the Buckton South zone. According to historical resource estimates by DNI Metals Inc., the inferred resource of the Buckton zone was 283.2 kt of recoverable Li_2CO_3 , with an indicated resource of 17.2 kt recoverable Li_2CO_3 (Eccles et al., 2013a; Dufresne and Eccles, 2025). The inferred resource of the Buckton South zone was 78.2 kt Li_2CO_3 (Eccles et al., 2013b; Dufresne and Eccles, 2025). The Buckton and Buckton South zones are the most advanced rock-hosted lithium prospects identified in the province.

3. Key Takaways

- Alberta brines are estimated to contain 82.5 million tonnes of lithium-carbonate equivalent. Assuming 90% of this can be recovered with direct lithium-extraction technologies, and a price of USD \$20,000/tonne of LCE, total potential revenue exceeds \$1 trillion. This is a theoretical yield without consideration of timing and operational factors, but helps to illustrate the opportunity.
- Alberta's key advantage is its mature petroleum industry and technical expertise related to recovery of fluids from the subsurface, facility and infrastructure engineering, and regulatory regime.

References

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