Critical Minerals in Saskatchewan

What are Critical Minerals?

"Critical minerals are metals, non-metals and mineral compounds essential to the economic and national security of nations. They are commodities that have important uses and few effective substitutes" (USGS/GSA/GSC, 2020). Many critical minerals are key components of rare and specialty metal alloys, or are strategic to the development of batteries and emerging technologies. Critical minerals have the potential to become scarce because of geological, political, or technical factors. Canada, like many other countries, has developed a list of critical minerals. The Canadian list includes 31 critical minerals, 23 of which can be found in Saskatchewan.

Saskatchewan's Critical Minerals

Chromium	Magnesium	Scandium
Cobalt	Manganese	Tantalum
Copper	Molybdenum	Tin
Fluorspar	Nickel	Titanium
Gallium	Niobium	Tungsten
Graphite	PGE	Uranium
Helium	Potash	Zinc
Lithium	REE	

Deposit Types

Critical minerals are found in a variety of deposit types in Saskatchewan (see map on reverse). Most people know about the province's vast potash deposits and the ultra-rich uranium deposits of the Athabasca Basin, but Saskatchewan also has the potential for significant rare earth element (REE) mineral deposits and the polymetallic nature of unconformity-associated uranium deposits, which can host a variety of critical minerals.

Resources and Production

- Saskatchewan is the most prolific potash producer in the world: it routinely generates about 1/3 of annual global production, and is home to over 40% of the world's recoverable ore reserves (USGS, 2020);
- We have the largest high-grade uranium deposits in the world with an annual production capacity of 65 Mlb U_3O_8;
- We have new helium production wells, and 2 million hectares disposed for helium exploration and development;
- The Hoidas Lake REE deposit has NI 43-101 Measured and Indicated Resource estimates of 2.85 Mt @ 2.4% Total REE; and
- We have the potential for lithium production from the Western Canadian Sedimentary Basin.

Strong Potential

In addition to world class potash and uranium deposits, there are numerous under-developed critical mineral deposits in Saskatchewan, including the Hoidas, Alces and Archie lakes REE projects as well as the multi-elemental MAW zone project. Numerous magmatic PGE-Cu-Ni sulphide occurrences are present in the Love Lake area (Korvin, Swan and What deposits), and Cu-Ni–rich layered mafic intrusives, with variable amounts of uniquitous Co, occur in the Axis-Currie Lakes regions, north of Lake Athabasca. Unconformity-related and vein-type polymetallic deposits including Vanadium, Cobalt and other technology metals are located throughout the Athabasca Basin and in the Uranium City area. These deposits include: Millennium (REE [especially Sc and Dy], Mo, W); Tamarack (Mo, Co, V); Fox Lake (REE, Co, Ni, V, Mo, Bi, Cd, W, Li); Midwest Lake (Ni, Co); Dawn Lake (Co, Ni); West Bear East (Co, Ni) and the Cigar Lake Mine (Co, Ni) in the Athabasca Basin, and the former Fish-Hook Bay (V, Co, Pt), Nicholson Bay (REE, V, Co, Ni, W along with PGE and Au), Lorado (V) and Ace (V) mines in the Beaverlodge Domain.

For more information

Saskatchewan Geological Survey
Ministry of Energy and Resources, Government of Saskatchewan
p: 306-787-2585 email: skgeosurvey@gov.sk.ca

Saskatchewan Mining and Petroleum GeoAtlas
www.saskatchewan.ca/GeoAtlas

References:
United States Geological Survey, Geoscience Australia and Geological Survey of Canada (2020): *International geoscience collaboration to support critical mineral discovery*; United States Geological Survey, Mineral Resources Program, Fact Sheet 2020-3035, 2p. doi.org/10.3133/fs20203035
USGS Potash Data Sheet: *https://pubs.usgs.gov/periodicals/mcs2020/mcs2020-potash.pdf*

Saskatchewan Canada

Critical Minerals in Saskatchewan

Mine Status

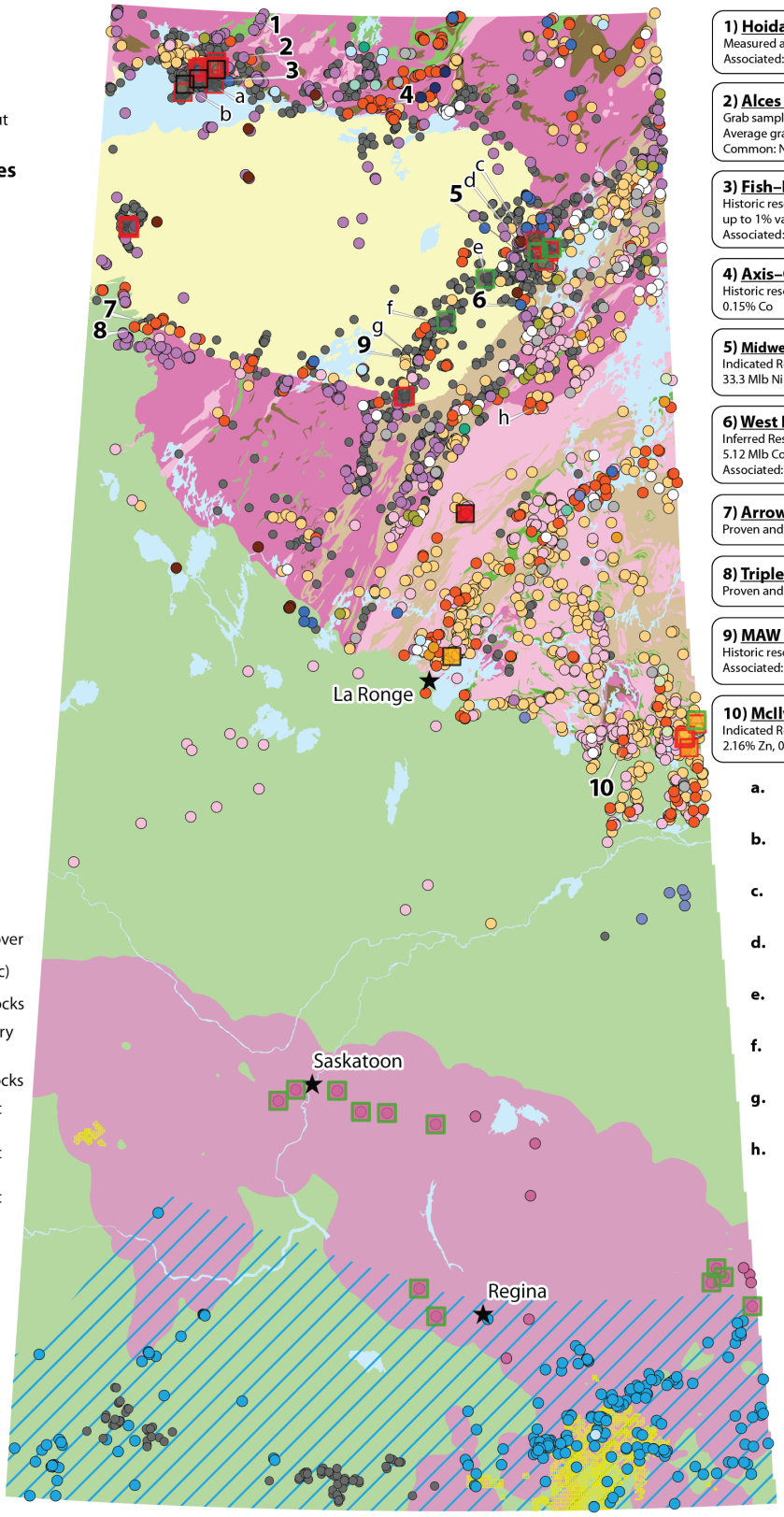
- Producing Mine
- Past-producing Mine with Reserves/Resources
- Past-producing Mine without Reserves/Resources

Critical Mineral Occurrences

- Chromium
- Cobalt
- Copper
- Fluorspar
- Gallium
- Graphite
- Helium
- Lithium
- Manganese
- Molybdenum
- Nickel
- Niobium
- PGE
- Potash
- REE
- Tantalum
- Tin
- Titanium
- Tungsten
- Uranium
- Zinc
- Lithium Potential
- Helium Potential
- Potash Potential

Geology

- Phanerozoic sedimentary cover
- Athabasca Basin (Proterozoic)
- Paleoproterozoic plutonic rocks
- Paleoproterozoic sedimentary rocks
- Paleoproterozoic volcanic rocks
- Archean to Paleoproterozoic plutonic rocks
- Archean to Paleoproterozoic sedimentary rocks
- Archean to Paleoproterozoic volcanic rocks



1) Hoidas Lake: REE Deposit
Measured and Indicated Resource: 2.85 Mt @ 2.4% TREO
Associated: P, Ag, Ap, Au, Cu, Th

2) Alces Lake: REE Occurrence
Grab samples ranging up to 32% TREO
Average grade: 16.65 wt% TREO*
Common: Nd, Pr, Dy, Tb

3) Fish–Hook Bay: U-V Deposit
Historic resource: 100 000 tonnes @ 0.22% U_3O_8 and up to 1% vanadium
Associated: Au, Fe, Pb, Pt

4) Axis–Currie Lake: Ni-Cu-Co Deposit
Historic resource: 3.4 Mt @ 0.6% Ni, 0.6% Cu and 0.15% Co

5) Midwest Lake Main Zone: U-Ni-Co Deposit
Indicated Resource: 39.9 Mlb U_3O_8 @ 4.00%, 33.3 Mlb Ni @ 4.37%, 2.6 Mlb Co @ 0.37%

6) West Bear: Co-Ni Deposit
Inferred Resource: 1.223 Mt containing 5.12 Mlb Co @ 0.19% and 5.66 Mlb Ni @ 0.21%
Associated: Pb, U, Ag, As, Cu

7) Arrow: U Deposit
Proven and Probable Reserves of 239.6 Mlb @ 2.37% U_3O_8

8) Triple R: U Deposit
Proven and Probable Reserves of 81.4 Mlb @ 1.61% U_3O_8

9) MAW Zone: REE Deposit
Historic resource: 0.46 Mt @ 0.21% Y_2O_3
Associated: P, As, Co, Cu, Ni, Pb, U, Zn

10) McIlvenna Bay: Cu-Zn Deposit
Indicated Resource: 39.1 Mt grading 1.2% Cu, 2.16% Zn, 0.41 g/t Au and 0.14 g/t Ag

a. Nicholson Bay: U Mine†
Associated: REE, V, Co, Ni, W with PGE and Au

b. Lorado–Ace: U Mines†
Associated: V

c. Dawn Lake: U Deposit
Associated: Co, Ni

d. Tamarack: U Deposit
Associated: Mo, Co, V

e. Cigar Lake: U Mine
Associated: Co, Ni

f. Fox Lake: U Deposit
Associated: REE, Co, Ni, V, Mo, Bi, Cd, W, Li

g. Millennium: U Zone
Associated: REE (especially Sc and Dy), Mo, W

h. Love Lake Complex
Swan, Korvin, and What deposits
Associated: Ni, Cu, PGE

Reserves and Resources reported are NI 43-101–compliant, unless otherwise noted as Historic.

*The Alces Lake average grade was calculated from 302 combined surface channel and diamond-drill hole samples with >4 wt% TREO out of a total of 997 samples with >0.1 wt% TREO.

†Past-producing mine.

N

0 50 100 200 km

Additional data are available on the *Saskatchewan Mining and Petroleum GeoAtlas*

saskatchewan.ca/invest

Saskatchewan Canada