

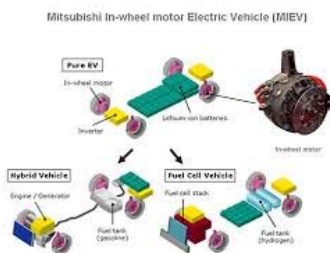


# January 2020 U.S. - Canada Critical Minerals Action Plan: Opportunities for Saskatchewan

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## What is a Critical Mineral?

- Critical minerals include metals, non-metals and mineral compounds that are economically important and subject to risks of supply
  - key components of many high tech applications.
- Individual countries develop lists of critical minerals on the basis of relative importance of specific minerals to industrial and/or security needs and a strategic assessment of supply risks.
  - Lists of critical minerals are reviewed periodically and may change
  - Increasing global demands for critical minerals, specifically with respect to uses in technologies, present growth opportunities for countries with critical mineral resources.





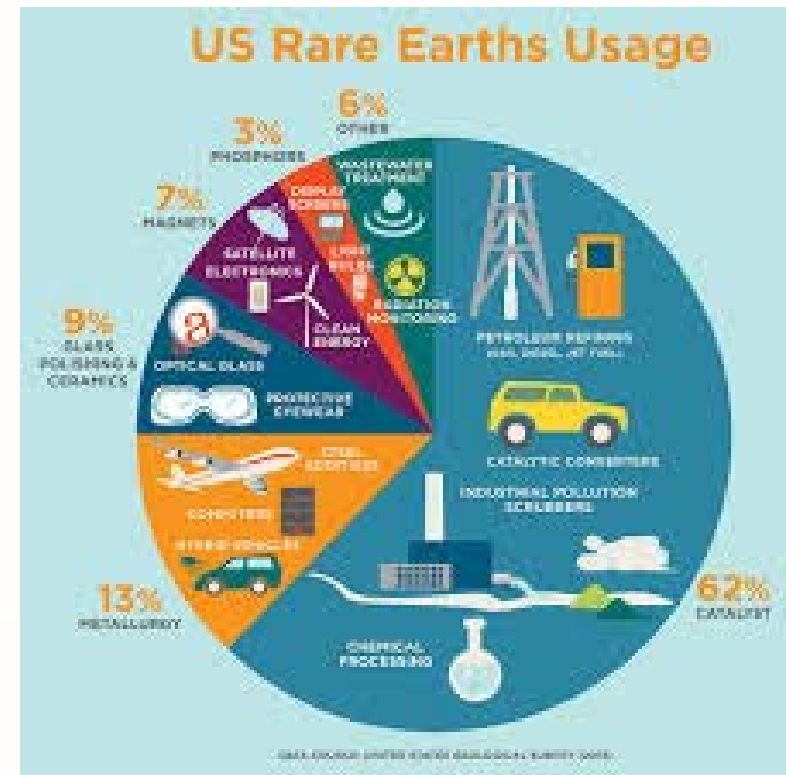
## Critical Minerals (USA)<sup>1</sup>/ Critical Raw Materials (EU)<sup>2</sup>

Mineral	USA/EU	Mineral	USA/EU	Mineral	USA/EU
Al (bauxite)	★	Germanium	★ ★	REE	★ ★
Antimony	★ ★	Graphite (nat)	★ ★	Rhenium	★
Arsenic	★	Hafnium	★ ★	Rubidium	★
Barite	★ ★	Helium	★ ★	Scandium	★ ★
Beryllium	★ ★	Indium	★ ★	Silicon Metal	★
Bismuth	★ ★	Lithium	★	Strontium	★
Borate	★	Magnesium	★ ★	Tantalum	★
Cesium	★	Manganese	★	Tellurium	★
Chromium	★	Niobium	★ ★	Tin	★
Cobalt	★ ★	PGM	★ ★	Titanium	★
Coking Coal	★	Phosphate	★ ★	Tungsten	★ ★
Fluorspar	★ ★	Phosphorous	★ ★	Uranium	★
Gallium	★ ★	Potash	★	Vanadium	★ ★
				Zirconium	★

1. USA Dept. of Interior "Final List of 35 Critical Minerals 2018; 83 Fed Reg. 23295: 2018; 2. EU list of 27 Critical Raw Materials, COM(2017) 490 final

## USA Critical Minerals: Supply Dynamics

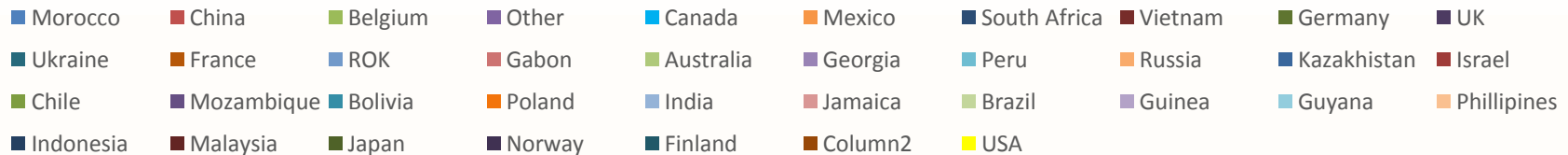
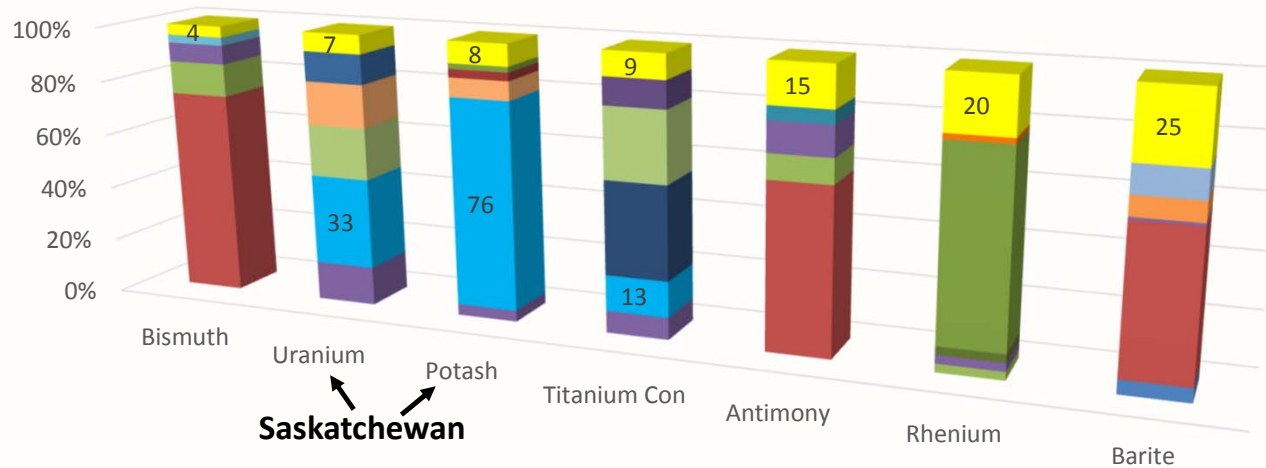
- In 2017, USA was:
  - import-reliant (imports > 50% of annual consumption) for 31 of the 35 minerals designated as Critical<sup>1</sup>
    - China was a source for 19
    - Canada was a source for 13
    - Saskatchewan was a source of 2
  - 100% import reliant to supply its demand for 14 of those Critical minerals
    - Canada was a source for 7



1. Department of the Interior, "Final List of Critical Minerals 2018", 83 Fed. Reg. 23295; 2018

# USA Critical Minerals – Net Import Reliance 96% - >75%

Sources of Critical Minerals for which USA was 96% - > 75% reliant in 2017



1. USA Dept. of Interior "Final List of 35 Critical Minerals 2018; 83 Fed Reg. 23295: 2018

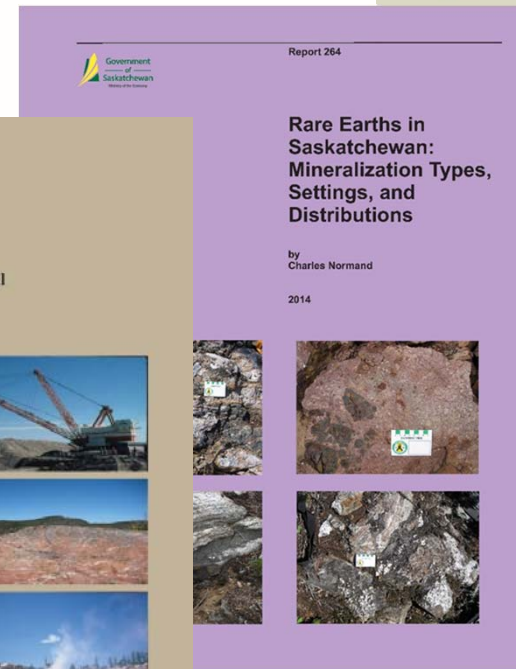
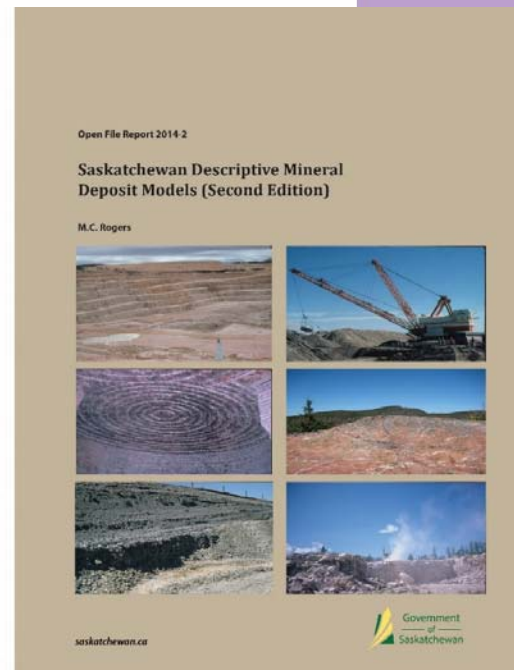
## Saskatchewan Critical Minerals Occurrences (22) Including those for which there's Reserves, Resources and Current/Historic Production

- Arsenic ■
- Beryllium ■
- Cobalt ● ■
- Fluorspar ■
- Gallium ■
- Graphite (natural) ▲ ■
- Helium ◆ ▲ ■
- Lithium ■
- Magnesium ■
- Manganese ■
- Niobium ■
- Platinum Group Metals (PGM) ▲ ■
- Potash ◆ ●
- Rare earth elements (REE) ● ■
- Rubidium ■
- Scandium ■
- Tantalum ■
- Titanium ▲ ■
- Tungsten ■
- Uranium ◆ ●
- Vanadium ■
- Zirconium ■

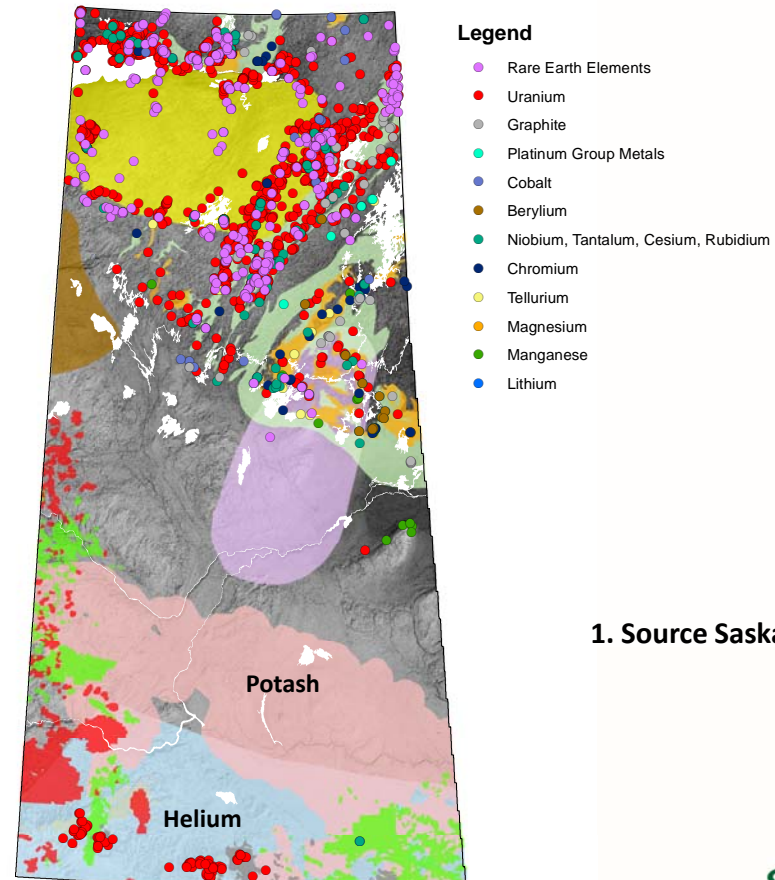
◆ Current Production , ▲ Previous Production, ● Defined Reserves (43-101), ● Defined Resources (43-101), ▲ Historical Resources (non 43-101 compliant), ■ Occurrences (may not be economic; includes elements that are contained in other minerals)

# Saskatchewan Critical Minerals Potential: Saskatchewan Geological Survey (SGS) Maps, Reports and Data Support Exploration

- Publications:
  - Maps and reports
  - Databases\*:
    - Mineral Deposit Index
    - Assessment Files
    - Geochronology
    - Geochemistry
    - Geophysical surveys
  - \* (Available via Mining and Petroleum GeoAtlas)
- Geoscience expertise
  - SGS geologists available for consultation/ field visits
  - Mineralized core and sample collections
  - Marketing



# Example of Data Extracted from Saskatchewan Mineral Deposit Index Showing Occurrences (coloured dots) of 15 Critical Minerals <sup>1</sup> Plus areas of Potash and Helium



1. Source Saskatchewan Minerals Deposits Index



# Rare Earth Elements<sup>1</sup> (REE) Occurrences: Example of Data that can be acquired from various datasets available from the SGS

## Variety of Rare Earth Deposit Types:

- Unconformity associated types
- Vein type
- Sandstone hosted
- Pegmatite hosted

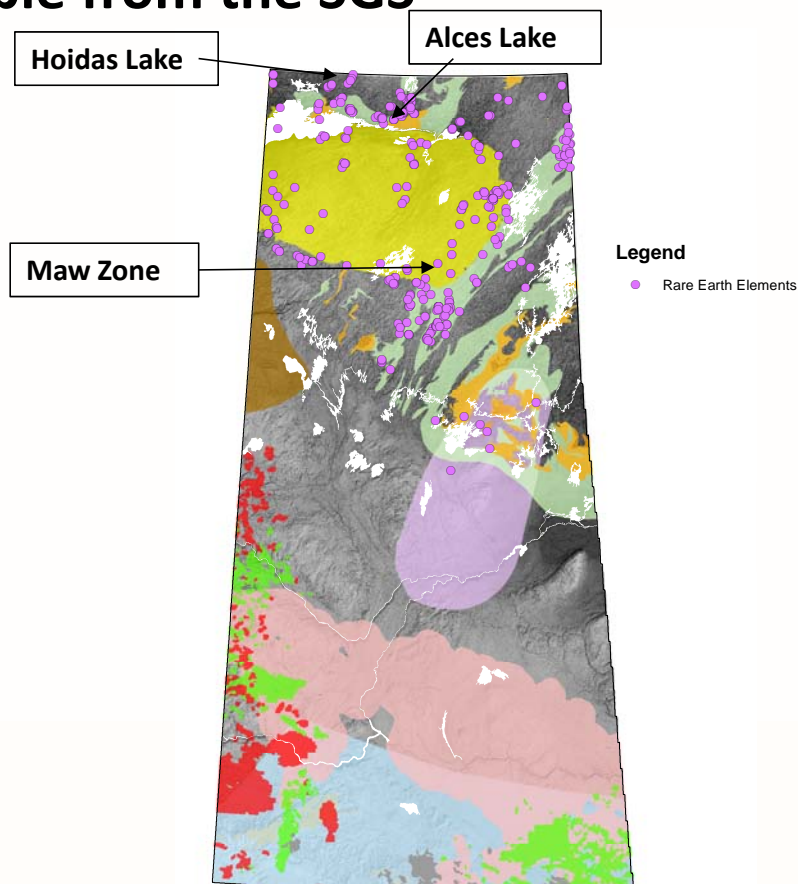
### Hoidas Lake – NI 43-101 Resources

Category	Tonnes	TREE	TREO
Measured	963,808	2,142	2,568
Indicated	1,597,027	1,958	2,349
Inferred	286,596	2,207	2,139

Source: Great Western Minerals Group Limited

**Maw zone:** contains a 1985 historical reserve of 336 000 tonnes grading 0.25% yttrium oxide

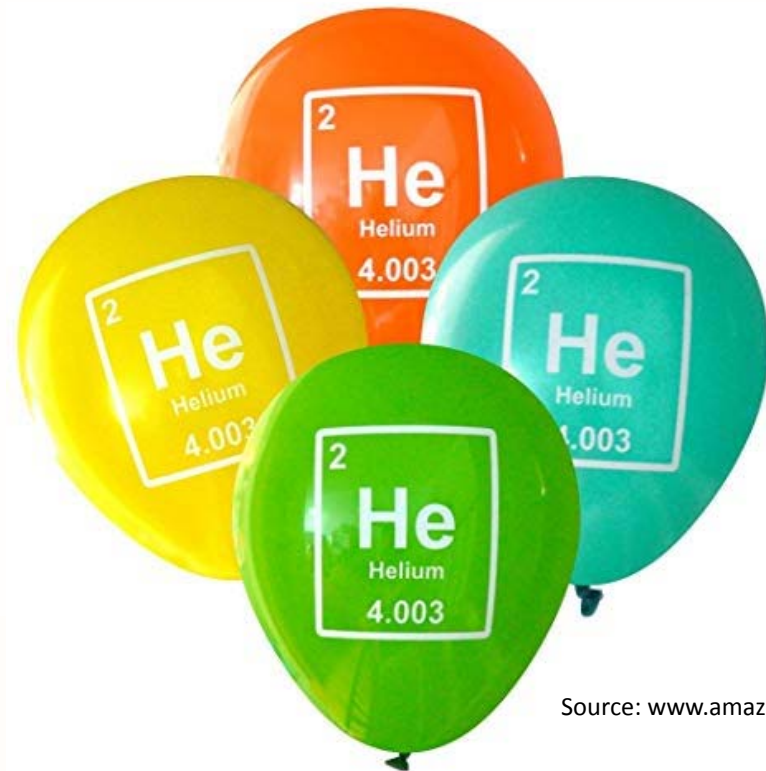
**Alces Lake:** Appia Minerals: REEs: Neodymium (ND), Praseodymium (PR), Dysprosium (DY) and Terbium (TB); also Gallium



## Critical Minerals – Next Steps for SGS

### SGS Current/ Future Programs:

- Ongoing work in WCSB on helium and lithium potential
- New projects on cobalt and manganese potential
- Ongoing engagement with GSC/NRCan on geoscience initiatives/policy development
- Synergies with South Australia
- Profiling Saskatchewan's Critical Mineral Potential



Source: [www.amazon.com](http://www.amazon.com)

# Thank you!



Photo: North American Helium