Helium

MANITOBA CRITICAL MINERALS

Helium is a non-toxic, chemically inert, light element with a low density, low boiling point and high thermal conductivity. These properties make it the ideal element for a multitude of uses, from cryogenic applications to a coolant for superconductors such as the magnets used in magnetic resonance imaging (MRI) machines. Helium is best known for its use in balloons, but its unique properties make it irreplaceable for many critical uses and applications in several other industries.

The **Manitoba Geological Survey** conducts province-wide geoscience studies and mapping at the deposit and basin scale to improve the understanding of helium occurrences and distribution in the Williston Basin in southwestern Manitoba.

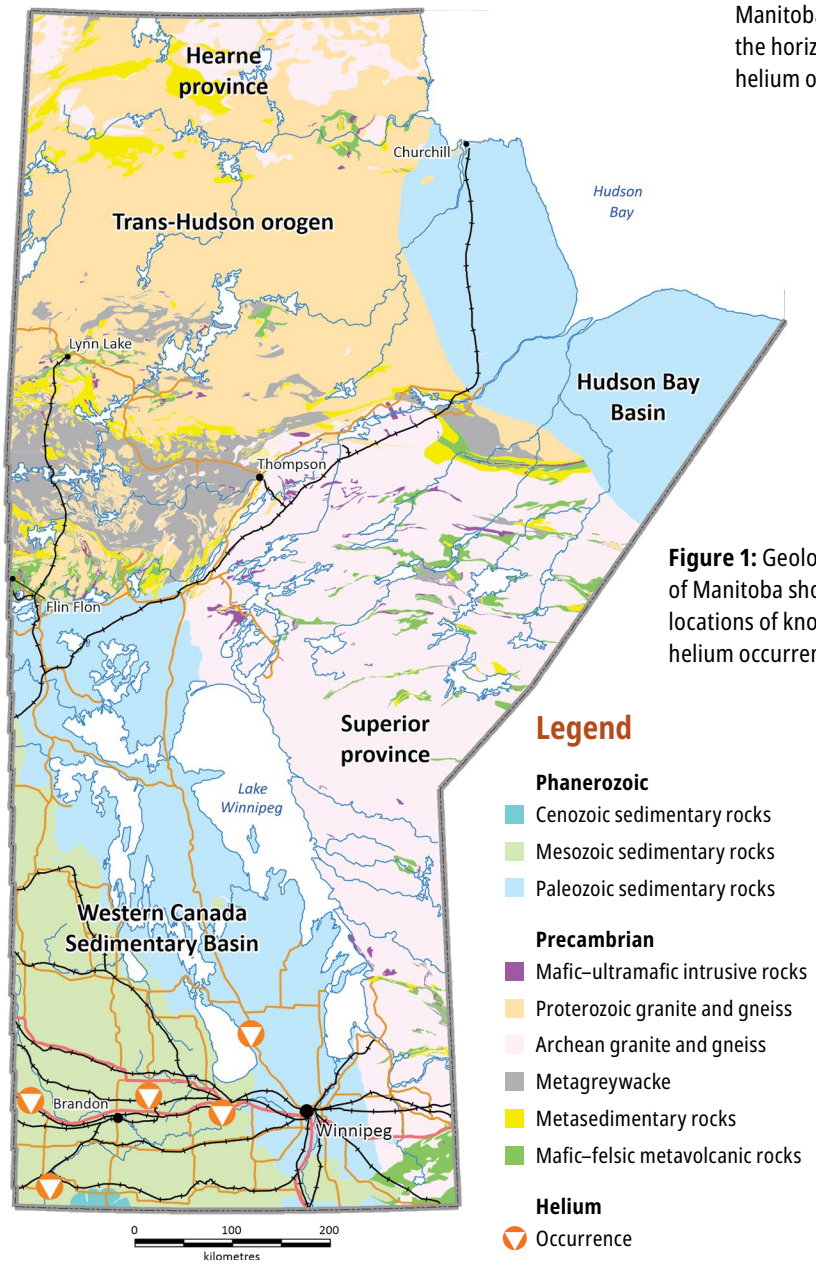
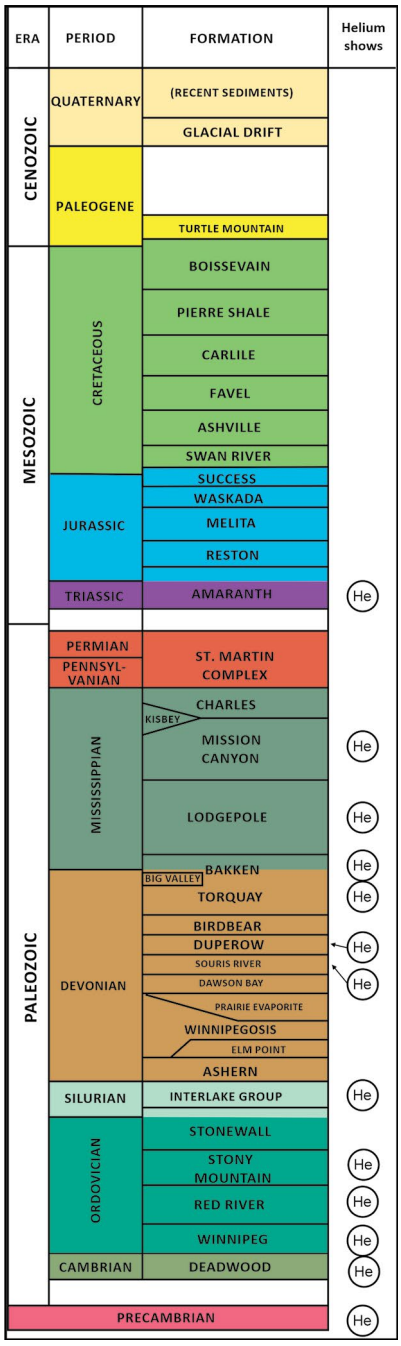


Figure 1: Geological map of Manitoba showing locations of known helium occurrences.

Figure 2: Stratigraphic chart of the Williston Basin in southwestern Manitoba showing the horizons that have helium occurrences.



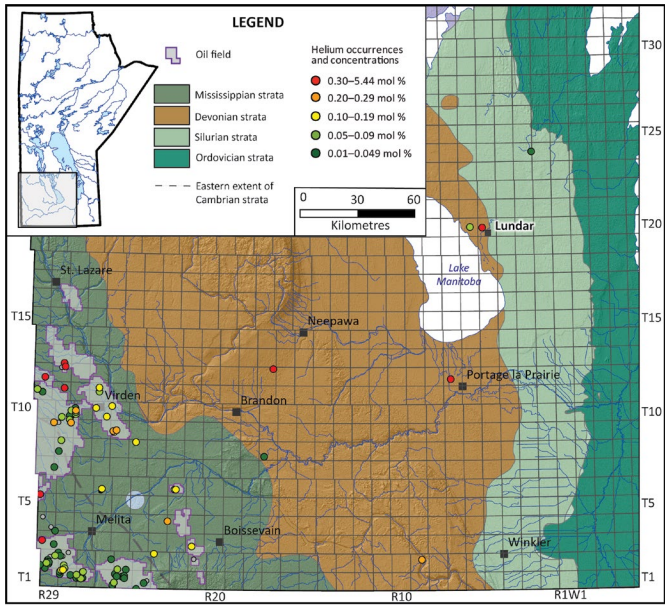
Manitoba

Figure 3: Assorted colours of helium-filled balloons.

Southwestern Manitoba is geologically well-positioned for economic helium deposits within the sedimentary strata of the Williston Basin. Helium is generated primarily through the radioactive decay of uranium- and thorium-bearing minerals in crystalline Precambrian basement rocks and in detrital sedimentary rocks such as shales.

Helium concentrations ranging from 0.30 to 2 mol per cent have been identified in oil and gas wells. The highest helium values are found in older, deeper formations such as the Cambrian Deadwood Formation and Ordovician Red River Formation.

Helium diffuses easily in the absence of a tight seal. Therefore, upward migration of this light gas is common, providing exploration opportunities in shallower horizons. Secondary trapping horizons and exploration targets include the Ordovician Stony Mountain Formation, Silurian Interlake Group and the Mississippian to Devonian Bakken—Torquay formation interval.



Exploration

Lundar

Exploration for helium was initially conducted in the vicinity of the community of Lundar in 1962 on the east side of Lake Manitoba. Hemisphere Helium Corporation drilled two wells where fluid samples returned helium concentrations of 0.2–2.0 mol per cent from the lower sandstone member of the Winnipeg Formation.

Figure 4: Digital elevation map showing Paleozoic strata subcrop edges and the distribution of gas analyses and helium occurrences in southwestern Manitoba.

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

Learn more at **manitoba.ca/minerals**

Contact Information

Manitoba Business, Mining, Trade and Job Creation
360-1395 Ellice Avenue, Winnipeg, Manitoba, R3G 3P2
Phone: **204-945-1119**; toll free: **1-800-223-5215**
Email: **minesinfo@gov.mb.ca**