

Nickel

MANITOBA CRITICAL MINERALS



Nickel exploration and mining in Manitoba date back to the first discovery of nickel sulphides in the Bird River area in the early 1920s and culminated with the discovery of the world-class Thompson deposit in 1956, which has been mined continuously for almost 70 years.

In Manitoba, nickel sulphide deposits are associated with mafic-ultramafic intrusions and ultramafic lava flows (komatiite), and can be classified as magmatic-type deposits. Major deposits of this type occur along the Paleoproterozoic rifted margin of the Superior province (defined in Manitoba by the Thompson nickel belt, Fox River belt, and Winnipegosis komatiite belt) and in the greenstone belts of the Archean Superior province (Bird River and Island Lake belts) and Paleoproterozoic Trans-Hudson orogen (Lynn Lake and Flin Flon-Snow Lake belts). Continued exploration successes and favourable, yet underexplored, geology indicate high potential for new nickel discoveries.

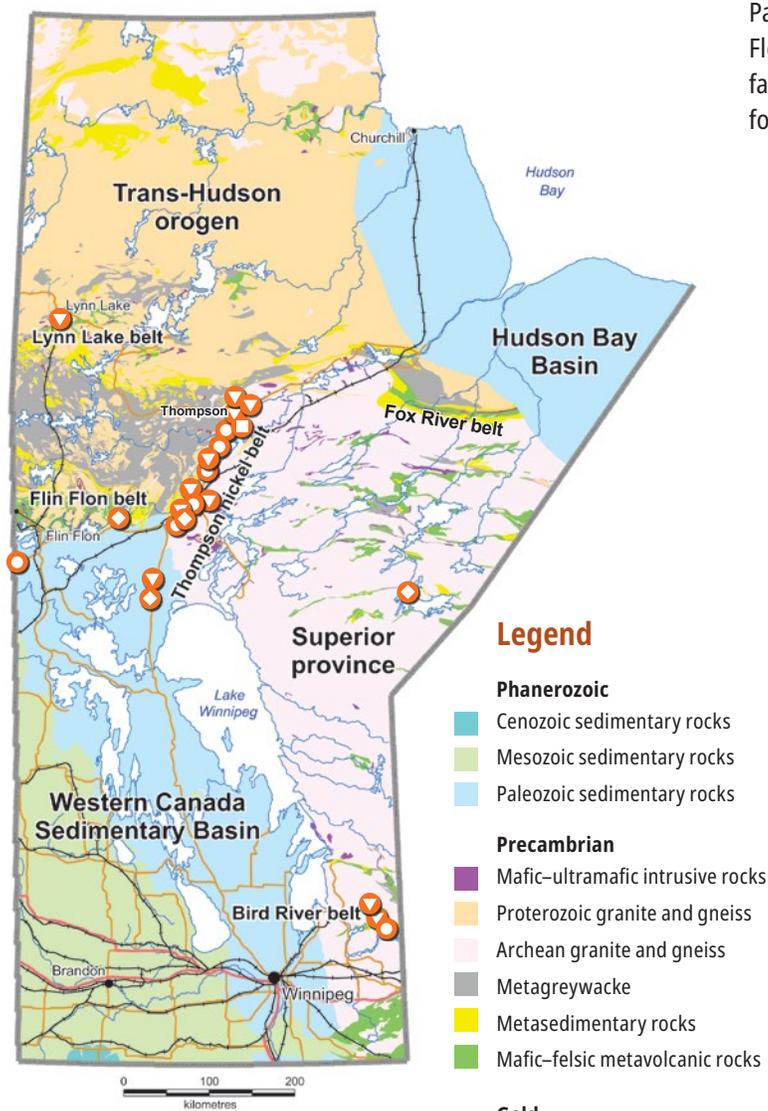
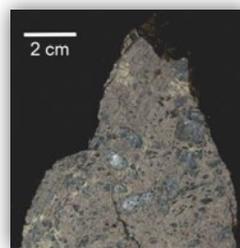
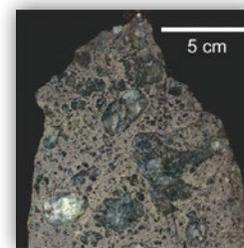


Figure 1: Geological map of Manitoba showing locations of selected nickel sulphide deposits.



Sulphide ore, Thompson T1



Sulphide ore, Thompson T3-1D



Massive sulphide ore, Thompson



Surface showing, Mayville



Massive sulphide, Mayville

Legend

Phanerozoic

- Cenozoic sedimentary rocks
- Mesozoic sedimentary rocks
- Paleozoic sedimentary rocks

Precambrian

- Mafic-ultramafic intrusives rocks
- Proterozoic granite and gneiss
- Archean granite and gneiss
- Metagreywacke
- Metasedimentary rocks
- Mafic-felsic metavolcanic rocks

Gold

- ◻ Current Producer
- ◐ Past Producer
- ◑ Advanced Project
- ◔ Exploration project

Thompson Nickel Belt (TNB)

The TNB is situated along the northwestern margin of the Archean Superior province. It contains several major nickel sulphide deposits, most notably the world-class Thompson deposit which is associated with Paleoproterozoic (1.88 Ga) ultramafic intrusions within platformal sedimentary rocks along the rifted margin of the Archean craton. High-grade massive to semimassive nickel sulphide ores occur in the ultramafic rocks or adjacent sulphidic sedimentary rocks and were subjected to amphibolite-facies metamorphism and polyphase deformation during the Trans-Hudson orogeny, resulting in extensive modification of primary textures and ore-host relationships.

The Thompson, Birchtree and Pipe deposits have produced more than 150 Mt of nickel sulphide ore grading 2.32% Ni, 0.16% Cu, 0.046% Co and 0.83 g/t platinum-group elements (PGE). Continued success in near-mine exploration, as exemplified by the 'T3-1D' extension of the Thompson deposit, demonstrates the exceptional potential of the TNB.

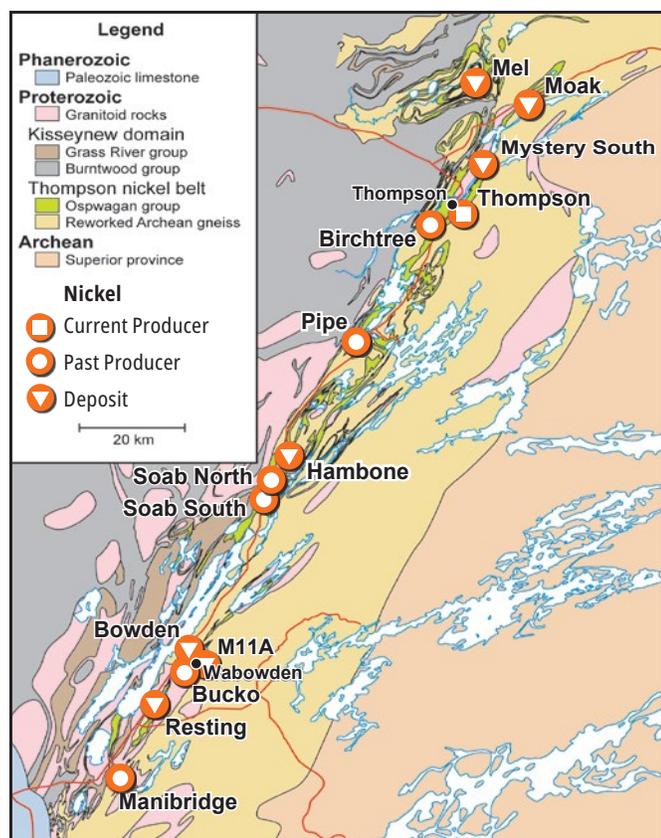


Figure 2: Geological map of the Thompson nickel belt.

Lynn Lake Greenstone Belt

Nickel deposits in the Lynn Lake district are hosted by 1.87 Ga gabbroic stocks that intrude 1.91–1.89 Ga volcanic-arc rocks of the Lynn Lake belt in the Paleoproterozoic Trans-Hudson orogen. The Lynn Lake mine produced 22.2 Mt of ore averaging 1.02% Ni and 0.54% Cu during the period 1953–1976, making it the fourth largest nickel producer in Canada after the Sudbury, Thompson and Voisey's Bay mining districts. The Lynn Lake nickel project contains a residual mineral resource of 16.3 Mt grading 0.72% Ni, 0.33% Cu and 0.033% Co.

Archean Greenstone Belts

The Archean Bird River belt of the western Superior province contains several significant deposits and occurrences of magmatic Ni-Cu-PGE and stratiform Cr-PGE. Major deposits are hosted by the Bird River sill and associated mafic-ultramafic intrusions, which were emplaced at ca. 2.74 Ga into MORB-like basalt flows near the base of the Bird River belt. The Bird River sill includes the past-producing Dumbarton and Maskwa West mines (2.7 Mt @ 1.02% Ni, combined), the active Makwa project (7.9 Mt @ 0.57% Ni and 0.13% Cu), and several undeveloped chromite deposits. The correlative Mayville intrusion, located on the northern arm of the belt, includes the active Mayville project (31.8 Mt @ 0.18% Ni and 0.45% Cu) and one undeveloped chromite deposit. The Nickel Island deposit of the Island Lake belt is hosted by komatiite and/or peridotite ultramafic rocks. An inferred mineral resource for the deposit consists of 8.48 Mt grading 0.82% Ni and 0.08% Cu.

Flin Flon-Snow Lake Greenstone Belt

The Paleoproterozoic Flin Flon belt is well known for its world-class volcanogenic massive sulphide deposits, but also contains several nickel sulphide occurrences associated with mafic-ultramafic intrusions. The Namew Lake deposit, hosted by a metamorphosed pyroxenite sill beneath a thin cover of Paleozoic sedimentary rocks south of Flin Flon, contained a preproduction reserve of 2.58 Mt grading 2.4% Ni, 0.9% Cu, 0.5 g/t Pd and 0.7 g/t Pt. The Rice Island deposit is hosted by a gabbronorite body that intruded greywacke turbidite deposits. The deposit contains an indicated resource of 4.29 Mt grading 0.74% Ni, 0.49% Cu, 0.03% Co, 0.06 g/t Au, 0.02 g/t Pt and 0.03 g/t Pd, and an inferred resource of 3.4 Mt grading 0.89% Ni equivalent. Nickel sulphide and PGE occurrences are also associated with the 1.88 Ga Mikanagan Lake gabbro sills in the Flin Flon arc assemblage and the Reed Lake layered mafic-ultramafic intrusion of the Elbow–Athapapuskow ocean-floor assemblage, indicating significant regional potential for nickel sulphide deposits.



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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