

Copper-zinc

Manitoba is home to world-class deposits and high mineral potential in extensive underexplored terrains.
Learn more at manitoba.ca/minerals

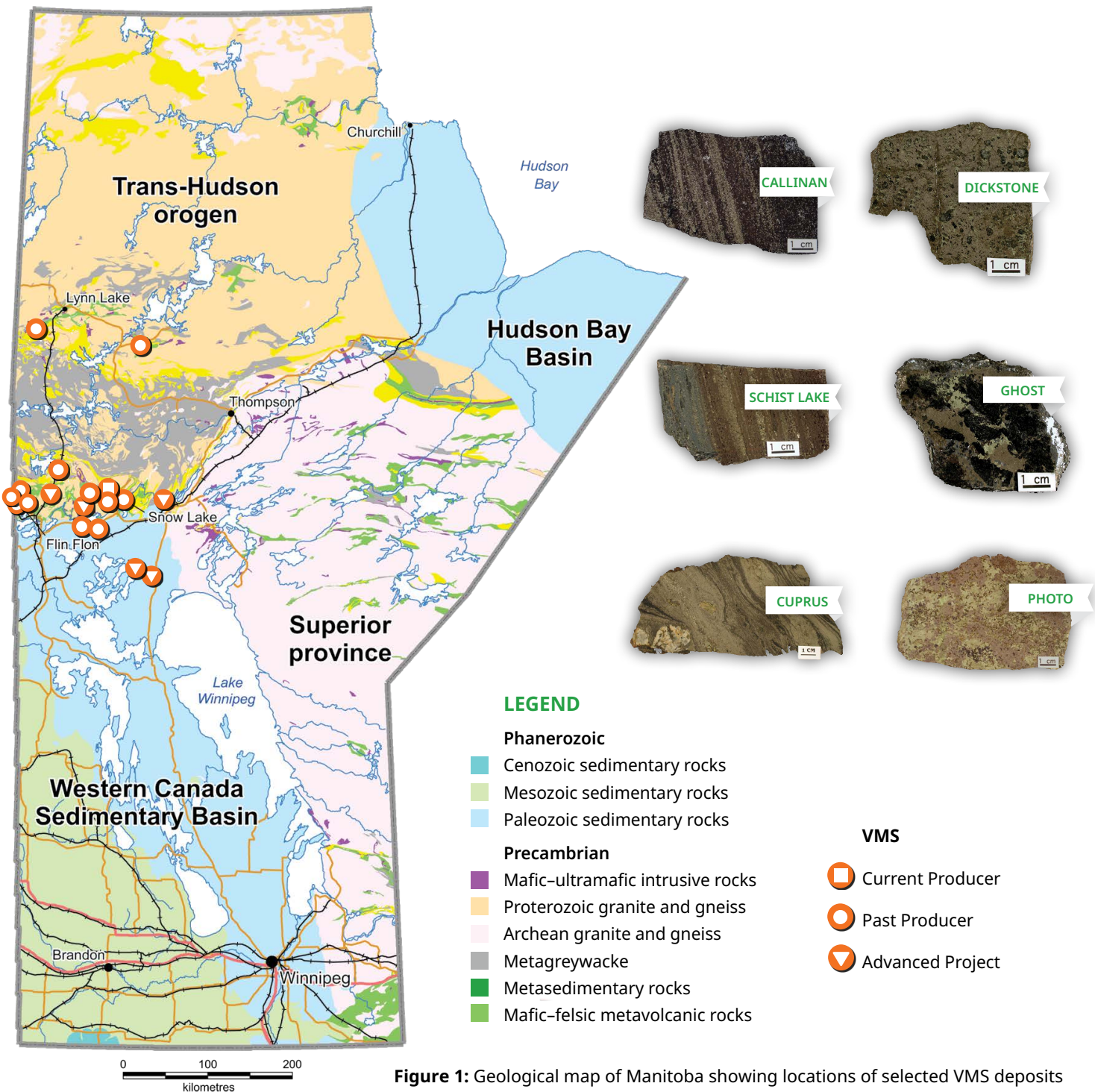


Copper-zinc in Manitoba

COPPER-ZINC production from volcanogenic massive sulphide (VMS) deposits in Manitoba dates back to the first discovery at Flin Flon in 1914. Since then, the Paleoproterozoic Flin Flon domain has been firmly established as one of the most prolific VMS districts worldwide. Despite nearly a century of systematic exploration, new VMS deposits continue to be found, including the world-class Lalor deposit of Hudbay Minerals Inc. which saw initial production in August 2012. The total resource at Lalor stands at over 27 Mt grading 0.7% Cu,

5.1% Zn, 2.8 g/t Au and 27.3 g/t Ag, further demonstrating the exceptional potential of the district.

IN MANITOBA, world-class polymetallic (base- and precious-metal) VMS deposits are clustered in several significant mining districts around the margins of the Kiseynew domain in the Paleoproterozoic Trans-Hudson orogen. This provides considerable scope for both regional and district-scale exploration.



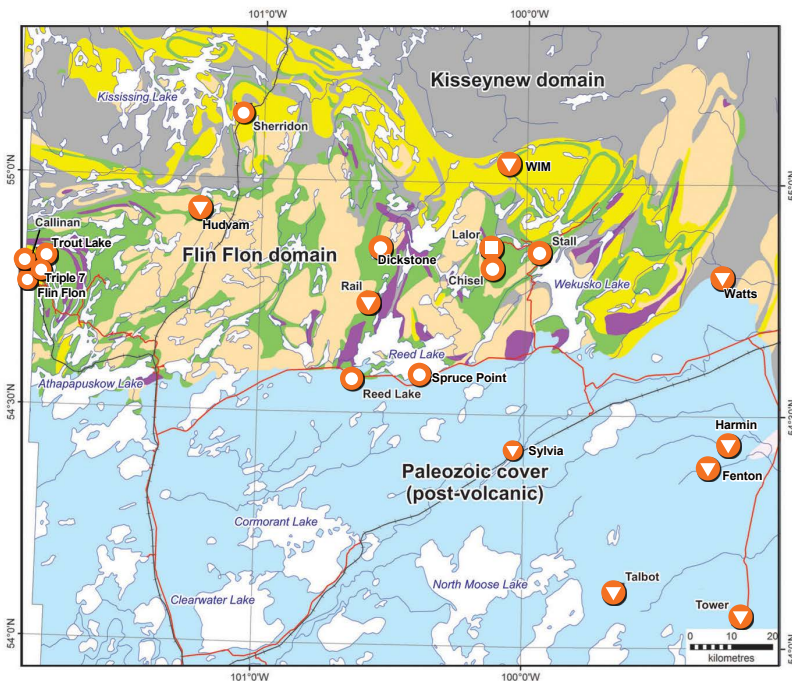


Figure 2: Geological map of the Flin Flon domain

Flin Flon Domain

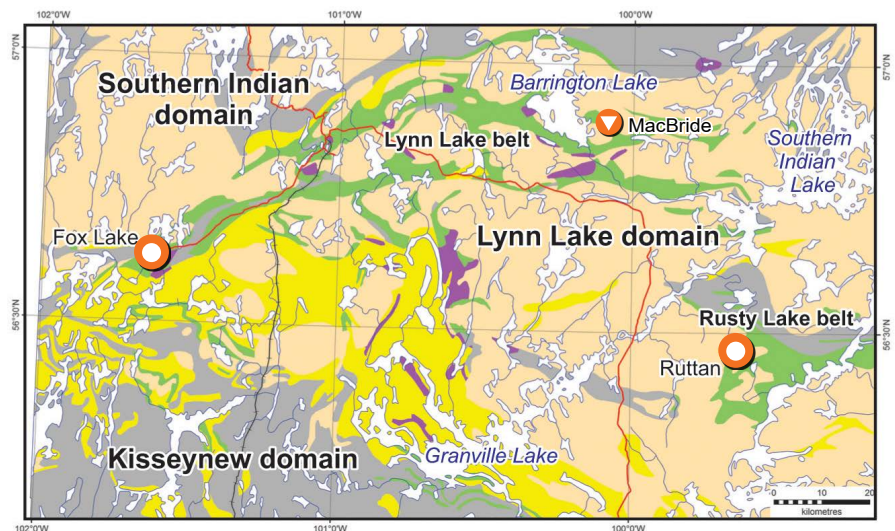
The Paleoproterozoic Flin Flon domain contains 31 developed VMS deposits, from which more than 170 Mt of sulphide ore have been mined or are under development. The well-documented association of these deposits with isotopically juvenile, 1.92–1.88 Ga, volcanic-arc assemblages provides a powerful predictive tool for exploration. Exceptionally high Au contents of many of these deposits, including Flin Flon (62.5 Mt @ 2.7 g Au/t) and Lator (8.8 Mt @ 4.6 g Au/t in the Au zone), make them particularly attractive exploration targets. In addition, recent discovery of high-grade zinc-copper-gold mineralization by extending a historical drillhole past the 1000 m level in the Pine Bay area further demonstrates the deep exploration potential of the belt.

The exposed portion of the Flin Flon domain is 250 km long by 75 km wide, but extends over 150 km further south beneath a thin, geophysically transparent cover of Paleozoic sedimentary rocks. The sub-Paleozoic portion of the belt, which is at least twice the size of the exposed portion, contains along-strike equivalents of VMS-hosting assemblages and is believed to have similar mineral potential. Exploration in this portion of the belt has led to several high-grade VMS discoveries, including the Tower deposit and the past-producing Reed Lake deposit.

Lynn Lake Domain

Juvenile volcanic-arc assemblages in the Paleoproterozoic Lynn Lake domain are similar in age, chemistry and tectonic affinity to those hosting major VMS deposits in the Flin Flon domain. Historical production includes 12 Mt from the Fox Lake deposit in the Lynn Lake belt and 55 Mt from the Ruttan deposit in the Rusty Lake belt. Several smaller deposits, such as Barrington Lake and Frances Lake, have been delineated, but have seen limited recent exploration.

Figure 3: Geological map of the Lynn Lake domain



Kiskeynew Domain

Turbiditic metasedimentary rocks of the Kiskeynew domain were deposited in the back-arc basin to the volcanic arc represented by the Flin Flon and Lynn Lake domains. Toward the northern and southern margins of the Kiskeynew domain, these metasedimentary rocks are thrust-imblicated with high-grade volcanic-arc assemblages of the adjacent domains, which locally include significant VMS deposits, most notably in the Sherridon district. Although complicated by the intense structural and metamorphic overprint, the margins of the Kiskeynew domain remain very attractive targets for VMS exploration.

Superior Province

The northwestern portion of the Archean Superior province in Manitoba contains extensive greenstone belts of similar age, chemistry and tectonic affinity to those hosting major VMS deposits elsewhere in the Superior province, including the world-class Noranda and Kidd Creek camps. However, this area has not seen any systematic VMS exploration in recent years, despite containing significant occurrences of base-metal sulphide mineralization, most notably at Oxford Lake. These belts are considered to be relatively underexplored in comparison to major greenstone belts elsewhere in the Superior province.

Selected Copper-zinc (Gold, Silver) Deposits in Manitoba

Deposit	District	Ownership	Discovery	Resource*		Resource Grade		
			(year)	(Mt)	(% Cu)	(% Zn)	(g Au/t)	(g Ag/t)
Flin Flon (PP)	Flin Flon	Hudbay Minerals Inc.	1915	62.5	2.2	4.1	2.7	41.3
777 (PP)	Flin Flon	Hudbay Minerals Inc.	1993	21.9	2.6	4.4	2.1	26.9
Trout Lake (PP)	Flin Flon	Hudbay Minerals Inc.	1976	21.6	1.7	5.0	1.6	16.0
Hudvam (AP)	Flin Flon	Hudbay Minerals Inc.	1926	1.5	1.0	1.5	3.3	4.5
Callinan (PP)	Flin Flon	Hudbay Minerals Inc.	1984	7.8	1.4	4.0	2.1	24.6
Pine Bay (PP)	Flin Flon	Callinex Mines Inc.	1967	1.1	2.8	-	-	-
Stall (PP)	Snow Lake	Hudbay Minerals Inc.	1956	6.4	4.4	0.5	1.4	12.3
1901 (AP)	Snow Lake	Hudbay Minerals Inc.	2019	2.1	0.25	9.67	0.87	30.7
Lalor (P)	Snow Lake	Hudbay Minerals Inc.	2007	27.1	0.7	5.1	2.8	27.3
Chisel (PP)	Snow Lake	Hudbay Minerals Inc.	1956	7.2	0.5	10.6	1.8	44.8
WIM (AP)	Snow Lake	Hudbay Minerals Inc.	1962	3.9	1.7	0.3	1.6	6.7
Reed Lake (PP)	Snow Lake	Hudbay Minerals Inc.	2007	2.2	3.6	0.6	0.4	5.7
Dickstone (PP)	Snow Lake	Glencore Canada Corp.	1935	1.1	2.4	3.4	0.3	12.0
Spruce Point (PP)	Snow Lake	Hudbay Minerals Inc.	1973	1.9	2.4	2.1	1.7	19.5
Watts (AP)	Snow Lake	Hudbay Minerals Inc.	1995	6.6	1.9	2.6	0.7	25.6
Tower (AP)	Snow Lake	Rockcliff Metals Corp.	2000	1.0	4.7	1.3	0.9	23.7
Talbot (AP)	Snow Lake	Hudbay Minerals Inc./ Rockcliff Metals Corp.	2003	2.2	2.3	1.8	2.1	36.0
Rail (AP)	Snow Lake	Rockcliff Metals Corp.	1958	1.2	2.7	0.9	0.8	8.9
Bur (AP)	Snow Lake	Rockcliff Metals Corp.	1984	3.02	1.69	6.13	0.02	4.48
Ruttan (PP)	Rusty Lake	Trevali Mining Corp.	1969	82.8	1.4	1.6	0.5	13.1
MacBride (AP)	Lynn Lake	Rockcliff Metals Corp.	1975	1.8	0.3	8.8	0.1	4.5
Fox Lake (PP)	Lynn Lake	Willeson Metals Corp.	1961	13.2	2.0	2.4	0.3	10.3
Sherridon (PP)	Sherridon	Sendero Mining Corp.	1922	7.7	2.4	2.3	0.6	19.0

* Resource estimates include past-production, current reserves and resources as applicable; users should verify critical information
ABBREVIATIONS: AP, advanced project; g Ag/t, grams silver per tonne; g Au/t, grams gold per tonne; Mt, million tonnes; P, producer; PP, past-producer

Current Producers

- Lalor (Hudbay Minerals Inc.)

Advanced Projects

- Tower (Rockcliff Metals Corp.): 1.0 Mt resource
- Talbot (Hudbay Minerals Inc., Rockcliff Metals Corp.): 2.2 Mt resource
- Rail (Rockcliff Metals Corp.): 1.2 Mt resource
- 1901 (Hudbay Minerals Inc.): 2.1 Mt resource

Mining, Oil and Gas Industry Overview

- \$3.4 billion in estimated value of production, a 45% increase since 2021
- \$1.7 billion in real value added, accounting for approximately 2.6 per cent of the province's real GDP and 4.3 per cent of all domestic merchandise exports
- Direct employment of approximately 3480 people, with an additional 2035 individuals employed by sector support activities
- 2023 estimated mineral exploration and deposit appraisal spending intentions at \$163.8 million
- 225 new wells drilled in 2022

Source: Natural Resources Canada



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**Manitoba Economic Development,
Investment, Trade and Natural Resources**

Minerals, Petroleum and Geoscience

Phone: 204-945-1119

Email: minesinfo@gov.mb.ca