

GeoFile 5-2024 ReadMe

Updates to the Manitoba Mineral Deposits Database

by M.L. Rinne
Manitoba Geological Survey
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Abstract

This GeoFile contains updates to Manitoba's Mineral Deposits Database, including recently compiled and revised data relating to mines, large mineral prospects, and other findings. In combination with other geoscientific data, these results can be used to inform mineral potential assessments, exploration targeting, or land-use planning. Further updates to this compilation will be published as work proceeds by region.

Résumé

Ce géodossier contient des mises à jour de la base de données sur les gisements minéraux du Manitoba, y compris des données récemment compilées et révisées concernant les mines, les grandes zones de prospection de gisements minéraux et d'autres découvertes. Utilisés avec d'autres données géoscientifiques, ces résultats peuvent être utilisés pour parfaire l'évaluation d'un potentiel minier, mieux cibler les zones d'exploration ou informer l'aménagement du territoire. D'autres mises à jour de cette compilation seront publiées au fur et à mesure de l'avancement des travaux, région par région.

DIGITAL DATA

Zip file geofile5.zip contains the following content:

- GeoFile_5-2024_ReadMe.pdf (this file)
- GeoFile_5-2024.xlsx (mineral occurrence data in parts of NTS 52–54, 62–64)

Introduction

The Mineral Deposits Database (MDD) serves as the primary inventory of mineral occurrence data in Manitoba. Beginning in 2020, the Manitoba Geological Survey (MGS) has been updating the MDD in order to remove errors or insignificant results from the previous version, to improve spatial coverage, to expand the number of commodities captured, and to compile relevant geochemical data in a way that can be easily queried or filtered for mineral potential assessments or other purposes.

Preliminary mineral occurrence data in this update are provided in the Excel® table named GeoFile_5-2024.xlsx. Most of the mineral occurrence data are derived from industry assessment reports. For more information regarding the MDD update project, including an explanation of the project rationale, sources of data, and the data collection methods used, see Rinne (2021).

Overview

A total of 19 609 mineral occurrence records are included in this update, with locations shown in Figure 1.

Mineral occurrences compiled in the MDD are generally limited to observations or geochemical data from outcrop, drill-core, mine sites, or (less commonly) boulders. This database is not designed to capture other sample media such as soils, till or vegetation, though rare cases such as visible gold grains reported in sediment may qualify as discretionary occurrences.

Relevant geochemical results (in general, any bedrock values exceeding thresholds defined in Table 1) are recorded for each occurrence wherever available; see “Geochemical data columns” described later. These data can reveal spatial variations of some commodities, can be filtered to exclude lower values, and can feed directly into mineral potential assessments and related products.

Column names

Columns in the Excel® table (GeoFile_5-2024.xlsx) are explained below. In response to client requests for more preliminary mineral occurrence data, many columns are only partially completed. Missing data will be populated or changed as future iterations of the dataset (GeoFile 5) are published.

NTS 50k area

The National Topographic System (NTS) 1:50 000 map sheet in which the occurrence is located.

MDD number

A unique identifier to be assigned to every mineral occurrence in Manitoba, beginning with the NTS 50k area (e.g., 54D/16) followed by a 3- or 4-digit number. The ordering of numbered occurrences in each NTS block is arbitrary, and numbers have not yet been assigned in some regions where preliminary data

are being reviewed. Missing numbers in some sequences correspond to irrelevant or insignificant entries that were deliberately removed from the previous (2009) version of the MDD.

Occurrence classification

“Occurrence” – Denotes a mineral occurrence that meets one or more of the mineral or geochemical occurrence criteria defined in Table 1. Refer to Rinne (2021) for more information regarding the selection of these criteria.

“Occurrence with resource estimate” – Describes an occurrence with published grade and tonnage estimates (not necessarily NI 43-101 compliant), typically limited to better developed mineral prospects or deposits.

“Discretionary occurrence” – Assigned to features or results that do not strictly meet the requirements in Table 1 but are deemed to be of possible interest to MDD users, such as tentative or unconfirmed observations of important rock types, or potentially significant mineral findings that lack geochemical data. Users may wish to omit these records from mineral occurrence maps.

“Occurrence (2009 version; under review)” – Mineral occurrence records in the previous MDD (Conley et al., 2009), which have not yet been fully incorporated into the updated database. As updates proceed, these records will be modified (mostly with additions of geochemical data, text descriptions, or adjusted location information), or in some cases deleted.

“Mine” – Currently operating mines in Manitoba (three in Manitoba as of September, 2024: Tanco, Thompson, and Lalor).

“Mine (inactive)” – Inactive mine sites, ranging from small historical workings to larger operations currently under care and maintenance. Many of the inactive mine entries contain resource and/or production estimates. Some historical mine data are entirely lacking information apart from location and name.

“Mine infrastructure” – Mine components such as elevator shafts, servicing larger deposits such as the Thompson mine. These points are currently classified as separate mine sites in the GIS Map Gallery (Manitoba Economic Development, Investment, Trade and Natural Resources, 2024). In the MDD, they are classified as mine-related infrastructure; this prevents counting single deposits as multiple mines, if the deposit is mined from several access points.

“Mine sample” – Ore samples, commonly sulphide mineral separates, collected from selected mine sites. Mostly taken from ore study compilations (e.g., Jonasson et al., 2009), these results are most relevant in the context of byproduct recovery studies, or to trace the deportment of critical minerals in specific deposit types. Mine samples are assigned the MDD number of the deposit from which they have been sampled.

“Quarry” – Surface excavation sites relating mostly to industrial minerals or commodities such as building stone, peat, clays or coal. Quarry records in the MDD are mostly taken from Mineral Inventory Cards. Note the current MDD was not intended for and

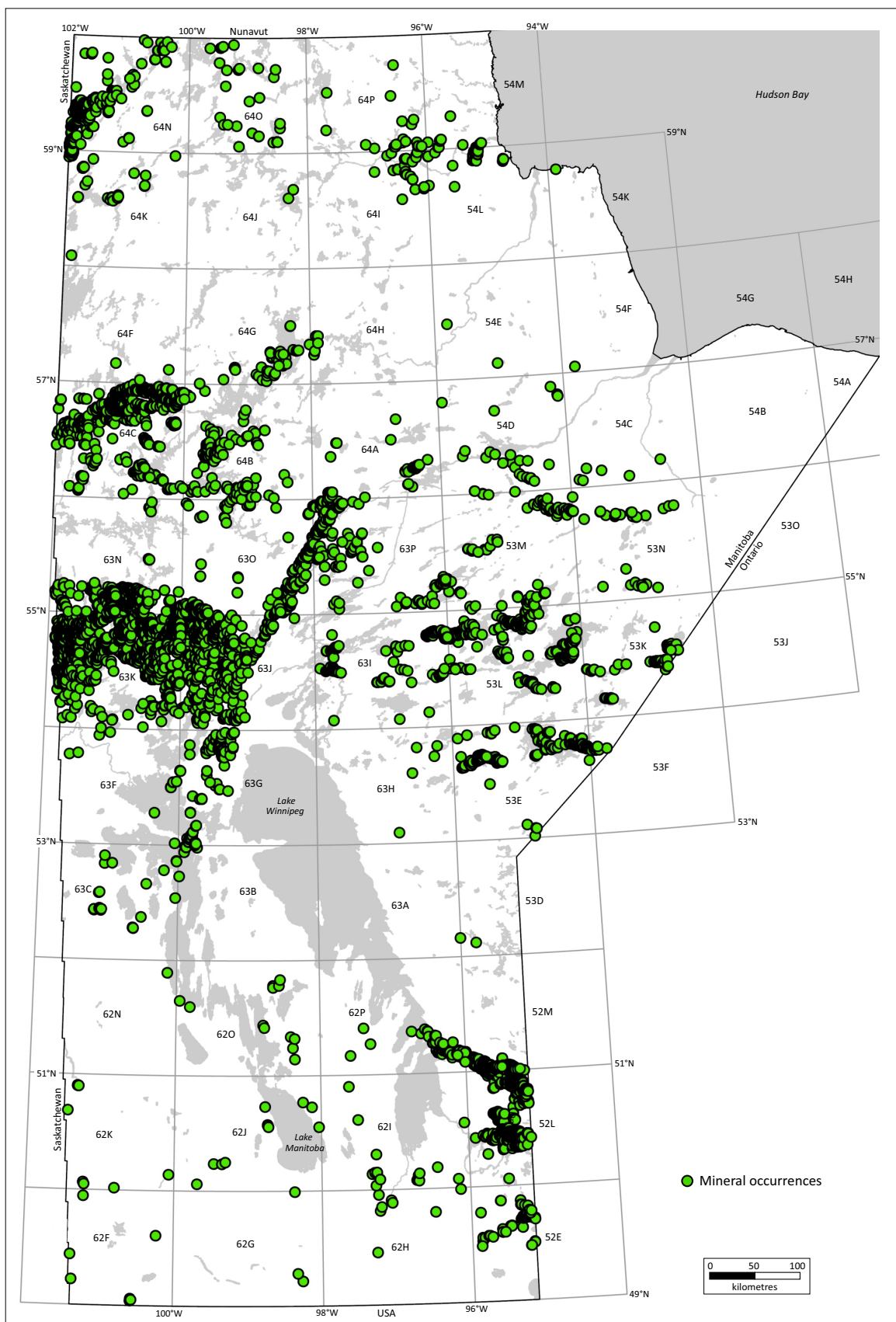


Figure 1: Map showing updated mineral occurrence locations in Manitoba. All points shown here are provided in *GeoFile_5-2023.xlsx*, though many are preliminary data that may change in future updates.

Table 1: Minimum grade or mineral criteria for occurrence classification in the MDD.

Commodity	Minimum grade or mineral content for occurrence classification	Commodity	Minimum grade or mineral content for occurrence classification
Ag	>35 ppm (>1 opt ¹)	Ni	>800 ppm
Au	>0.5 ppm (>0.015 opt ¹) OR visible gold	Pb	>10 000 ppm
Al	Bauxite or gibbsite present	PGE ³ (Pt + Pd + Rh + Ir + Ru + Os)	>0.5 ppm total PGE
As	Evaluation ²	P	>10% P ₂ O ₅
B	>10 000 ppm (>1%) OR minerals present (e.g., ulexite, borax)	Potash	>7.5% potash
Ba	>30 000 ppm Ba OR >5% barite	Rb	>1000 ppm
Be	>50 ppm OR minerals present (e.g., beryl, bertrandite)	Re	>10 ppm
Bi	>500 ppm	REE ⁴ (lanthanides + Sc, Y)	>0.3% total rare-earth oxides OR minerals present (e.g., monazite) OR La, Ce, Nd, Sc or Y >500 ppm OR Pr, Sm, Gd, Dy, Er or Yb >50 ppm OR Eu, Tb, Ho, Tm or Lu >10 ppm
Graphite	>5% OR present as coarse flakes or seams	Sb	>500 ppm
Co	>200 ppm	Se	>100 ppm
Coal (metallurgical)	Evaluation ²	Si	Quartzite >5 m thick OR high-purity silica sand
Cr	>10 000 ppm (>1.5% Cr ₂ O ₃)	Sn	>1000 ppm
Cs	>1000 ppm OR minerals present (e.g., pollucite)	Sr	>50 000 ppm (>5%) OR minerals present (e.g., celestite)
Cu	>2500 ppm	Ta	>100 ppm OR minerals present (e.g., tantalite, pyrochlore)
Diamond	Mineral present	Te	>100 ppm
F	>1% F OR >2% fluorite	Th	>250 ppm OR minerals present (e.g., monazite)
Fe	>12.5% (>16.1% FeO or >17.9% Fe ₂ O ₃) AND unit >5 m thick	Ti	>7.5% TiO ₂ (>45 000 ppm Ti)
Ga	>100 ppm	Tl	>100 ppm
Ge	>30 ppm	U	>250 ppm (>0.03% U ₃ O ₈) OR minerals present
Gypsum	>40%	V	>1000 ppm
He	>0.3 mol. % (from natural gas production)	W	>500 ppm
Hf	>150 ppm	Zn	>1000 ppm
In	>5 ppm	Zr	>5000 ppm
Li	>1000 ppm Li (>0.2% Li ₂ O) OR minerals present (e.g., spodumene, lepidolite, petalite) OR >30 ppm Li in brines	Other (e.g., carbonatite, kimberlite and related rocks, semi-precious gemstones, high-purity limestone)	Evaluation ²
Mg	>10% magnesite (MgCO ₃) OR >15% brucite (Mg(OH) ₂) OR >10% carnallite		
Mn	>50 000 ppm (>6.5% MnO)		
Mo	>200 ppm		
Nb	>200 ppm OR minerals present (e.g., columbite, pyrochlore)		

¹ opt, Troy ounces per short ton² Requires review by a geologist to determine whether the occurrence is significant³ PGE, platinum-group element⁴ REE, rare-earth element

does not yet provide comprehensive data for all industrial minerals or quarried commodities in Manitoba.

Sample medium

Qualifies the material sampled or described. Categories in this update include: Surface outcrop; Subsurface bedrock (i.e., drill-core or underground mine samples); Boulder (particularly relevant in the Wollaston domain); Natural gas well (in some helium occurrences); Sediment (panned); Till (in one case describing visible gold grains retrieved from till in boreholes); Lake sediment (one case of visible gold); and Beach clasts (one discretionary occurrence relating to clasts of amber).

Mineral deposit model

Provides a mineral deposit classification, essentially following the classification scheme of Hofstra et al. (2021), with some modifications including the addition of deposit types for coal, brine, silica sand, and unconventional diamond deposits. In cases where data are insufficient to assign a specific deposit type (such as Bimodal-mafic volcanogenic massive sulphide/VMS), a more general Hofstra “deposit group” (such as VMS) may be assigned. As updates proceed, most occurrences are likely to remain unclassified as they lack the data or context needed to infer a deposit model.

MDD name; Alternate MDD name

The name(s) of the mineral occurrence, usually informal (e.g., “Mountain Rapids fluorite occurrence”). In the interest of compiling and releasing occurrence information as quickly as possible, these fields are left blank in most new occurrence entries.

Easting (NAD83 Z14), Northing (NAD83 Z14)

Occurrence coordinates, all projected to NAD83 Zone 14.

Location qualifier

“Actual” – Denotes well-constrained location data (Easting and Northing columns) based on sample coordinates listed in assessment reports, detailed sample location maps, or GPS coordinates of MGS samples. Location error is likely between five and one hundred metres in most cases.

“Estimated” – Location data from sample location maps with a moderate degree of confidence (typically from maps lacking sufficient detail). Location error is likely within a few hundred metres in most cases.

“Roughly estimated” – Locations are not well-constrained, based mostly on text descriptions of locations or regional-scale sample maps. Location error may be up to a few kilometres in some cases. Depending on the data available, some of these locations may be refined in future updates.

“Drill collar location” – Mineral occurrences in drillcore are shown at collar (top of hole) locations, rather than projected vertically to

surface. Most drill collar locations were compiled by past assessment geologists over several decades, and may differ from actual drill locations; as in other parts of this database, users should verify critical information.

Commodities or feature of interest

Contains a comma-separated list of commodities in each mineral occurrence. In most cases, this is simply a list of elements in which the occurrence minimum values have been exceeded in the sample(s); in some cases the listed features also include potentially significant rock types (e.g., lamprophyre, carbonatite) or minerals (e.g., coarse graphite in drillcore).

Data source

Lists assessment report numbers or other sources relating to the occurrence. Other sources in this release include preliminary maps by the Geological Survey of Canada and MGS geochemical data releases.

Scans of industry assessment reports (most with 5-digit report numbers) can be accessed through the Manitoba government’s iMaQs online portal (<https://manitoba.ca/iem/mines/imaqs/index.html>) or GIS Map Gallery viewing tools (<https://manitoba.ca/iem/geo/gis/index.html>). “Mineral Inventory Card” records can be found at <https://manitoba.ca/iem/info/library/bmgintro.html>.

Comments / occurrence description

Text descriptions are taken mostly from previous mineral occurrence entries (Conley et al., 2009) or Mineral Inventory Cards, updated or edited where necessary. In the interest of compiling and releasing occurrence information as quickly as possible, this field is blank in most new occurrence entries.

Sample ID

Sample identification number from original report(s). Other identifying information (e.g., trench number or local grid coordinates) may be provided in cases where a sample ID is not clearly indicated.

Drillhole ID

Name or identification number of the drillhole intersecting the occurrence, if applicable.

Geochemical data columns

Geochemical data are recorded in alphabetical order from columns “Ag (opt)” through “Zr (ppm).” Unspecified units as in the “Ni (unspecified)” column are from reports in which concentration units are not indicated, though the appropriate unit can usually be inferred from context. The right-most column named “Other” captures mineral occurrence or related geochemical data that are not listed elsewhere; most entries in this column relate to mineral

observations, such as coarse graphite in drillcore or rare-element minerals in pegmatite occurrences.

Cautions and limitations

Although the MDD is designed to capture geochemical data, it is not a carefully curated geochemical database. It includes data from many sources covering approximately a century of mineral exploration work in Manitoba, some of which involved questionable lab methods or poor quality control.

Mineral occurrence data are biased toward commodities that are more frequently assayed. For example, nickel and gold assay results are commonly listed in assessment reports, whereas palladium or cesium contents are not as commonly analyzed or reported.

Among occurrences with resource estimates, most of the grade and tonnage figures described are decades old; unless stated otherwise, these historical resource estimates are unlikely to be compliant with NI 43-101 reporting requirements.

Depending on the quality of the source, the location error for some mineral occurrences can be significant (see “Location qualifier” for more information). Users are advised to consult original source reports or maps listed in the table, especially if working at a detailed scale or if the intent is to visit an occurrence location by foot.

Caution should be exercised with boulder samples, as they have likely been transported by glaciers and are not representative of an in situ bedrock occurrence.

Errors in the current database are likely to include mistakes inherited from the original sources, overlapping or redundant

information that has not yet been consolidated or removed in some regions, optical character recognition errors, and typos. Users should verify any critical information.

References

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