

In Brief:

- The MGS has uncovered approximately 26 200 new or previously unrecognized mineral occurrences in Manitoba
- Preliminary compilation of Ni, Co, Cr, Pt and Pd occurrence data shows spatial association with greenstone belts
- Further updates will allow for more advanced assessments of critical mineral potential

Citation:

Rinne, M.L. 2022: Progress report on the Manitoba Mineral Deposits Database; *in* Report of Activities 2022, Manitoba Natural Resources and Northern Development, Manitoba Geological Survey, p. 1–4.

Summary

Continued improvements to Manitoba’s Mineral Deposits Database have resulted in the identification of thousands of new mineral occurrences located throughout the province. In this report, an overview of updates to the Mineral Deposits Database is provided, followed by a preliminary look at occurrences of Ni, Co, Cr, Pt and Pd for which location data has been compiled so far. Because the new Mineral Deposits Database is designed to capture a wide range of commodities including critical minerals, the Manitoba Geological Survey anticipates that further updates will allow for more comprehensive assessments of Manitoba’s critical-mineral potential.

Introduction

Mineral occurrence data are an essential component of well-informed land-use plans, mineral development strategies and related mineral potential assessments. These data are also frequently used by the private sector to inform their mineral exploration decisions. Since the beginning of the Mineral Deposits Database (MDD) update in 2020, the Manitoba Geological Survey (MGS) has uncovered approximately 26 200 new or previously unrecognized mineral occurrences in Manitoba. Sample co-ordinates and other necessary information have been captured for approximately one third of the new occurrences so far, and more results are anticipated as assessment reports and sample-location maps continue to be processed.

Although much work remains to make all the mineral occurrence data publicly accessible, the MDD results collected to date provide some preliminary indication of regional mineral potential. For example, in this report, the spatial distribution of Ni, Co, Cr, Pt and Pd occurrences in Manitoba show clear relationships with the underlying geology and, in some areas, the (mostly new) occurrences could be sufficient to lead to new exploration targets. Generally speaking, these preliminary examples serve to demonstrate how the MDD and similar compilations can be used to evaluate critical-mineral potential.

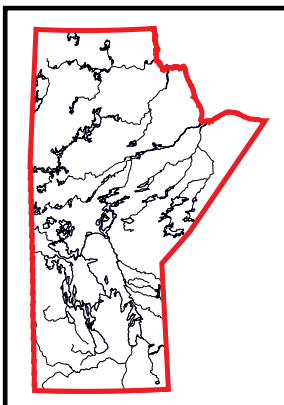
Results to date

The MDD update project is effectively an exercise in software-assisted data mining from scanned industry assessment reports, supplemented with other sources. Details concerning the methods and software used to identify new mineral occurrences, along with explanations of the criteria and terminology used in the MDD, are provided in Rinne (2021a).

Approximately 26 200 occurrences have been thus far tentatively identified in Manitoba based on geochemical results or phrase-matching results (Figure GS2022-1-1). Among these new occurrences, however, only about 8000 currently have been compiled with adequate location information (i.e., sample co-ordinates). The process of georeferencing the location of each sample, which commonly requires retrieving original sample maps, is the main reason why progress has been slow in adding location information to the MDD; the MGS is looking into options to expedite this task.

The MDD updates are shared publicly through GeoFile 5-2022 (Rinne, 2022), which supersedes a previous Data Repository Item (Rinne, 2021b). The most recent public version of GeoFile 5-2022 contains MDD updates within NTS 53E, F and all parts of Manitoba north of latitude 57°N. Occurrences will continue to be added to this GeoFile as updates progress by region.

Because new MDD entries include relevant assay data, spatial variations in elements such as Co or Ni can be explored by filtering occurrence data by grade or commodity type (e.g., Figure GS2022-1-2). Although the occurrences shown in Figure GS2022-1-2 again represent but a small portion of the total to be included in future MDD updates, there is sufficient spatial coverage to reveal regional trends. For example, elevated Co and Cr contents have been reported throughout both the Superior and Churchill provinces and trace a linear trend through both the Thompson nickel belt (TNB) and the western part of the Fox River belt (Figure GS2022-1-2a). Several volcanogenic massive sulphide



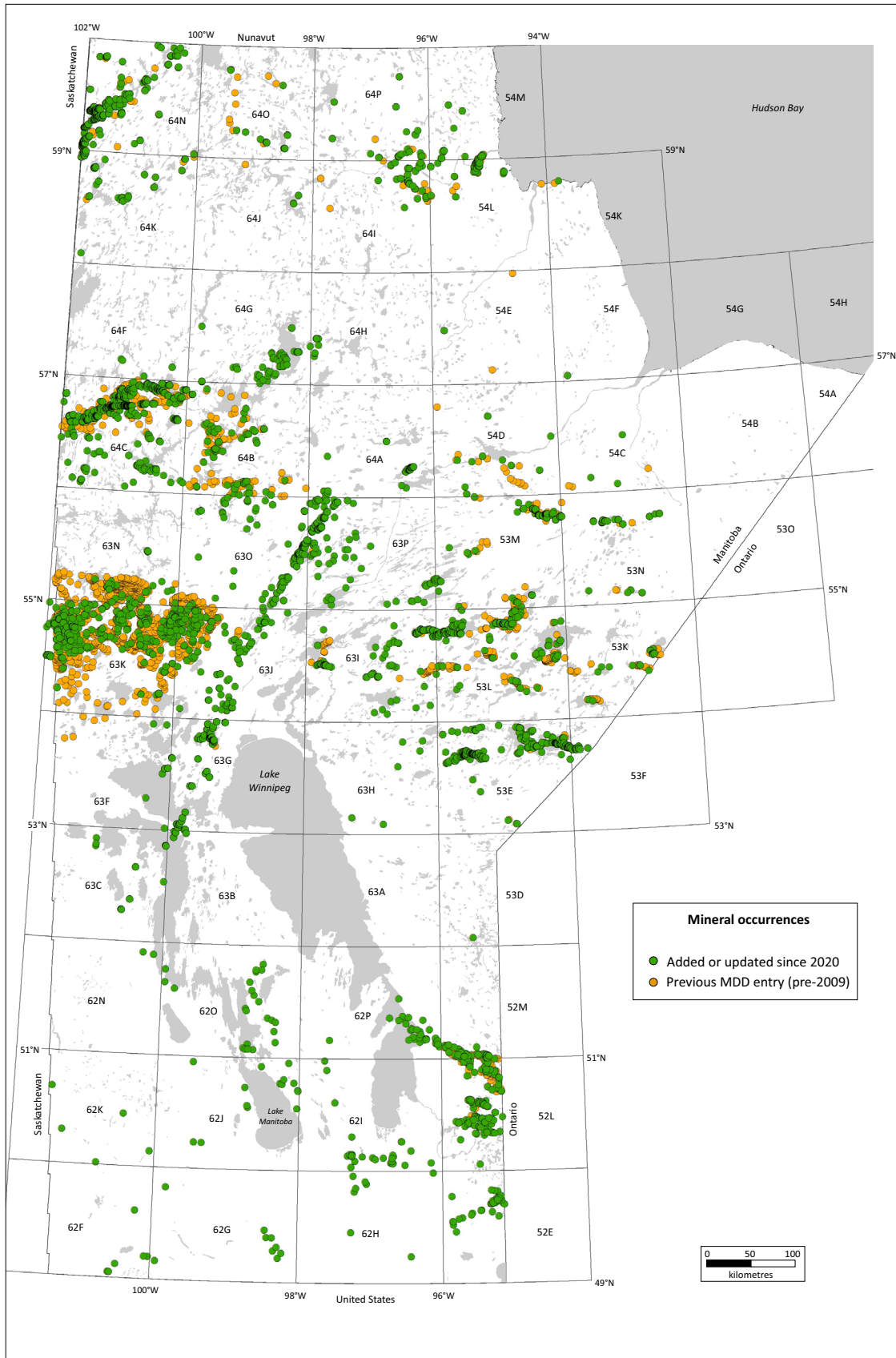


Figure GS2022-1-1: Preliminary map of mineral occurrences added to the Manitoba Mineral Deposits Database (MDD) since 2020. Occurrences shown here represent approximately one third of total occurrences found to date; the remainder, although identified from assessment reports, have yet to be located spatially. Users should therefore note that future versions of this map will differ significantly once MDD updates have been completed. As of September 2022, occurrences in NTS 53E, F and all parts of Manitoba north of latitude 57°N have been released in Rinne (2022).

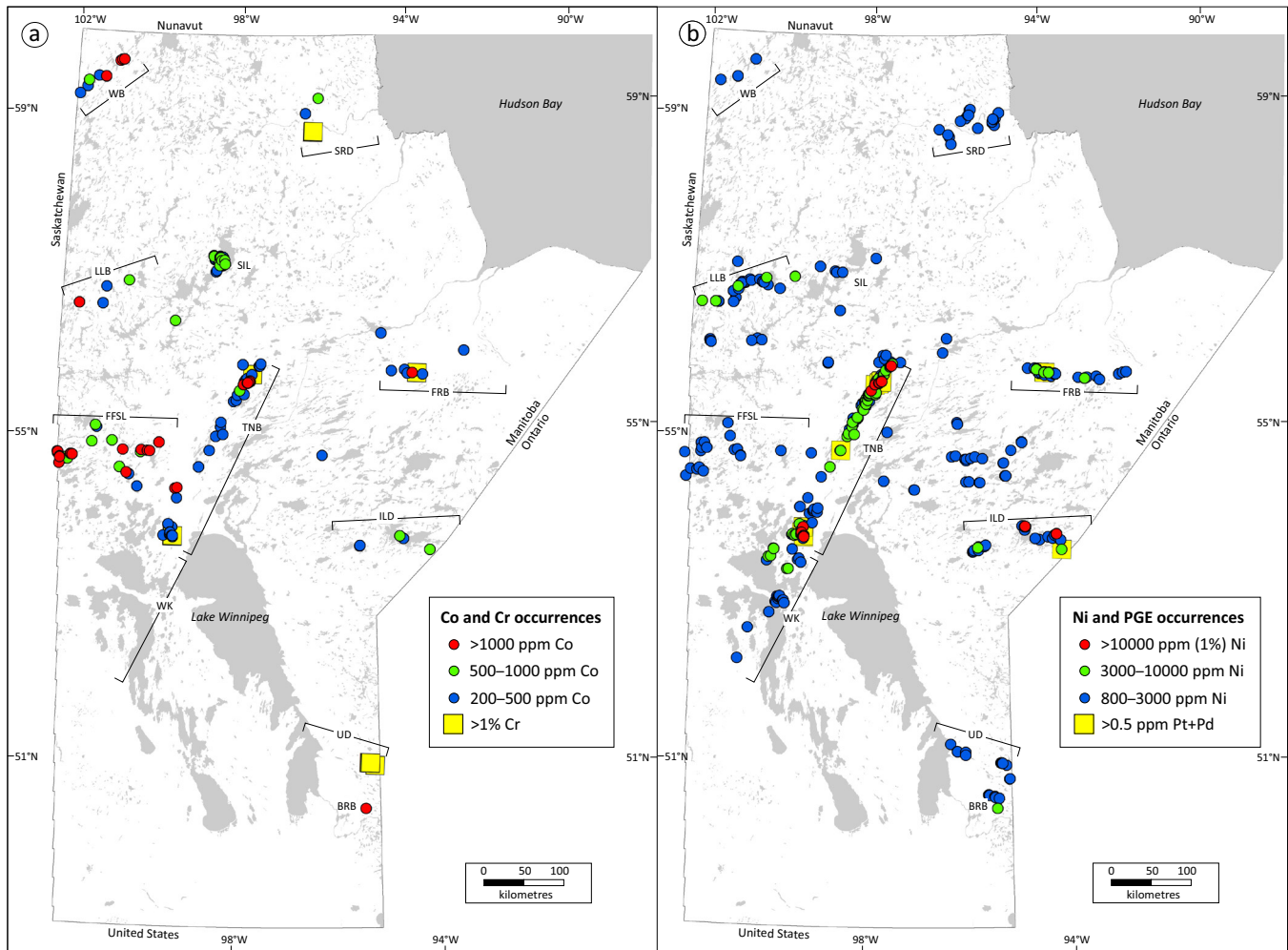


Figure GS2022-1-2: Preliminary maps of mineral occurrences in Manitoba, limited to **a)** samples with elevated Co and Cr contents; and **b)** Ni and Pt+Pd occurrences. This figure is based on a preliminary collection of data from the new Mineral Deposits Database entries shown in Figure GS2022-1-1; as in the previous figure, only data for which location data has been collected are shown. Mine site locations and geology are omitted for clarity. Abbreviations: BRB, Bird River belt; FFSL, Flin Flon–Snow Lake belt; FRB, Fox River belt; ILD, Island Lake domain; LLB, Lynn Lake belt; SIL, Southern Indian Lake; SRD, Seal River domain; TNB, Thompson nickel belt; UD, Uchi domain; WB, Wollastosis komatiites.

(VMS) ore samples across the Flin Flon–Snow Lake area also contain high Co contents comparable to some deposits from which Co is extracted (e.g., Slack et al., 2017), perhaps implying potential for local Co byproduct from these ore deposits. Anomalous Co contents are also scattered across parts of the Seal River domain, the Wollastosis basin and an as yet unexplained cluster of Co-bearing basalt outcrops across part of the Southern Indian Lake area (Figure GS2022-1-2a).

Nickel, which is commonly included in assay results listed in most assessment reports, reveals similar regional trends (Figure GS2022-1-2b). Even though most of the new Ni occurrences in MDD updates are presently lacking location data (and are therefore omitted from the map), the number of occurrences shown in Figure GS2022-1-2b is in many locations sufficient to reveal linear belts, corresponding mostly to greenstone belts such as the Lynn Lake, Island Lake or Bird River belts. Elevated Ni results also clearly trace the Fox River belt and TNB extending into the buried segments of the Winnipegosis komatiite belt.

Platinum-group elements (PGE) such as Pt and Pd are not as commonly reported in assessment files. Occurrences of Pt and Pd for which locations have currently been compiled relate to TNB deposit ores, part of the western Fox River sill, and an occurrence in the Island Lake region at Rose Lake (Figure GS2022-1-2b). There is limited information concerning the Rose Lake occurrence (Rose Lake is too small to display at the map scale); drilling in the area reportedly intersected sulphide-mineralized pyroxenite and gabbro and later surface assays near Rose Lake returned 0.5 ppm Au, 0.06% Co, 1.94% Cu, 0.75% Ni, 0.48 ppm Pd and 0.41 ppm Pt (Assessment File 92726, Manitoba Natural Resources and Northern Development, Winnipeg).

Economic considerations

By extracting key information from historical documents, the ongoing MDD update project is filling important gaps in Manitoba’s mineral occurrence data and mineral potential assessments. A more comprehensive mineral occurrence dataset directly sup-

ports land-use and related economic development planning (e.g., parks and infrastructure planning within government, geological survey project planning or community economic development strategies) and may trigger renewed or new exploration interest in certain areas.

Mineral occurrence criteria were selected to ensure that critical minerals—resources deemed essential to Canada’s economic security and for the transition to a low-carbon economy (Natural Resources Canada, 2021)—are fully captured in MDD updates. In addition to improving data coverage around known deposits, further compilation of critical-minerals data from established mining areas may also reveal overlooked potential for byproduct extraction from some ores. Results of the MDD update have demonstrated that not only are there many potentially significant critical-mineral occurrences hidden among historical assay results and rock descriptions, but also that these are not limited to established mining districts.

Acknowledgments

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