New perspectives on the mineral potential of the Reed and Wekusko Lake areas, west-central, Manitoba (Parts of NTS 63K and 63J)

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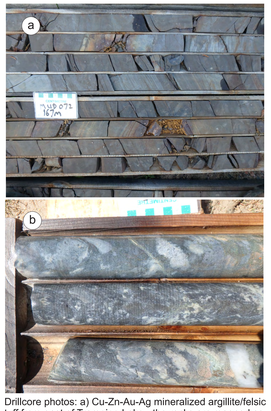
VMS mineralization

Exploration for volcanogenic massive sulphide (VMS) deposits has traditionally focused in areas containing juvenile arc volcanic rocks. However, recent work suggests:

- Early successor arc volcanic rocks have the potential to contain VMS mineralization (e.g. Ordóñez-Calderón et al. 2016), rocks such as the Schist-Wekusko assemblage[1] should be re-evaluated for VMS.
- Volcanic stratigraphy with potential to host VMS occurs east of Tramping Lake[2] (e.g. MUD072; AF 74711).
- MORB-like basalt intrudes the Spruce Point VMS deposit suggesting possible arc-rifting, arc and MORB-like rocks may be intercalated to the north and east[3].
- Drillcore south of Reed Lake indicates that rocks[4] west of McClarty Lake maybe related to the rocks that host the Spruce Point VMS deposit.
- Prospective stratigraphy[5] extends south of the Kofman deposit but has received limited testing (e.g. drillhole 94-15, AF 72778; CP-11-017, AF 63J1159).
- Sulfide facies iron-formation within the Burntwood group stratigraphy at Reed Lake may provide geological context for the Bur (Zn-Cu-Pb) deposit and indicate that it may be favorable for Sedex-type mineralization (see poster T7).
- High-metamorphic grade rocks previously assigned to Burntwood group host several VMS deposits (e.g. Bur[6], Watts River[7], Harmin[8] and Fenton[9]).

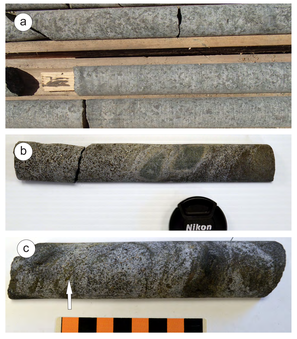


Drillcore photos: a) Cu-Zn-Au-Ag mineralized argillite/felsic tuff from east of Tramping Lake - the rocks are mapped as gabbro, MUD072, 167.0m; b) silica-epidote altered felsic tuff breccia drillcore approximately 2.5km south of the Kofman deposit (sections of the felsic rocks contain up to 2100 ppm Zn and 740 ppm Cu), 94-15, 123.7-127m.

Magmatic sulphide mineralization

The Reed and Wekusko Lake area contain several minor magmatic sulphide deposits (Wine[10], Jackfish[11], Rice Island[12] and other un-named occurrences[13]) and has the potential to contain significant economic deposits.

- First order exploration attributes are the interaction of mafic magma with sulphide bearing sedimentary and/or volcanic rocks.
- Subsidary structures adjacent to large scale faults could act as feeder conduits for late gabbros (e.g. Rice Island[12]).
- Multiple pulses of magma and intrusion geometry play an important role forming the deposits.
- Large layered gabbro complexes that intrude sulphide-bearing volcanic and sedimentary rocks beneath Phanerozoic cover could represent targets for magmatic sulphide[14] (Ni-Cu) deposits and are known to host magmatic sulphides (i.e. Blackduck deposit[15]).



Drillcore photos of gabbro: a) coarse grained gabbro from west of the Blackduck Ni-Cu deposit FARE-8, 236 m; b) mela-gabbro with andesite xenoliths, 138-24 163.0m; c) mela-gabbro with disseminated sulphides (arrow), 138-24, 165.0 m.

Acknowledgements

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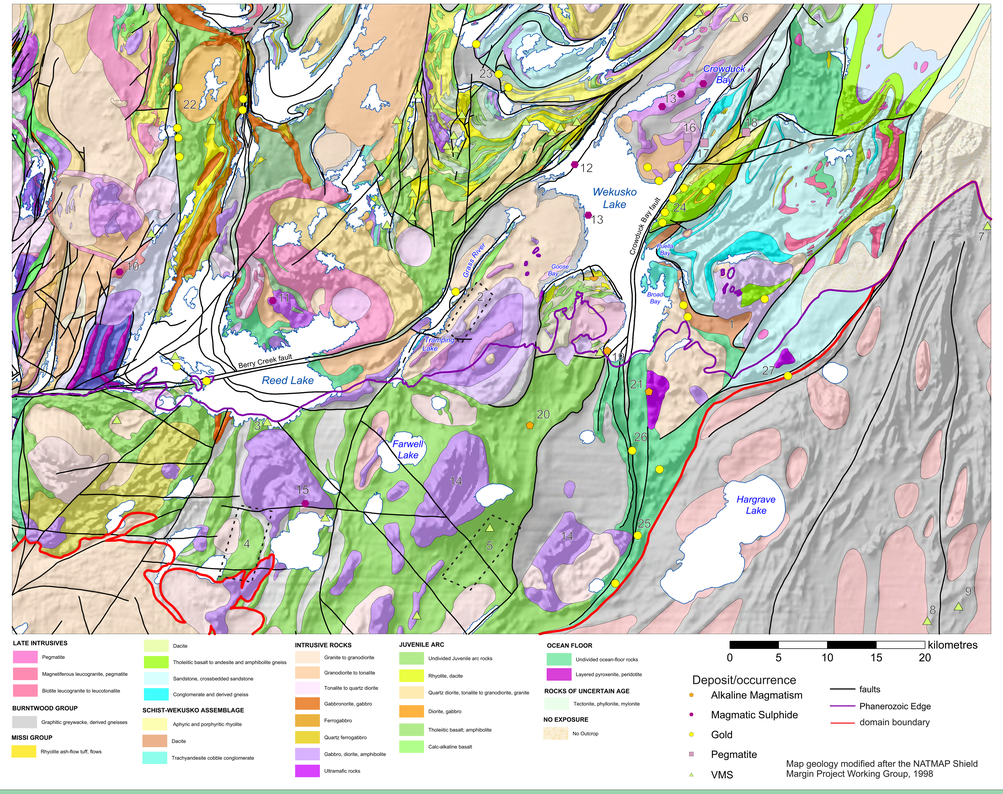


Map geology modified after the NATMAP Shield Margin Project Working Group, 1998

Wekusko Lake pegmatite field

Historically 3 groups of Li-bearing pegmatites are described as part of the Wekusko Lake pegmatite field: Sherritt Gordon[16], Violet-Thompson[17] and Green Bay[18] (Černý et al., 1981). Work carried out by the MGS and colaborators has identified (see GS2017-5 for more details):

- Elevated Li, Rb and Cs occur in adjacent mafic metavolcanic country rocks, these maybe a useful exploration guide for rare-element pegmatites.
- Li-rich amphibole (holmquistite) in country rocks indicates proximity to Li-bearing pegmatite.
- Lithium pegmatites are zoned and differentiated with the mineral chemistry of feldspar and muscovite providing measures of pegmatite fractionation.
- Several more pegmatites weren't examined in detail, but the above mentioned features could help expand the areas with rare-metal potential.

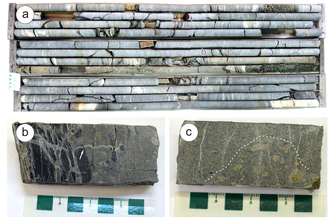
Photographs of Dike 1 from the Green Bay group: a) very coarse-grained spodumene crystals in outcrop (photo courtesy of M. Fedikow), b) drillcore showing abundant spodumene from Dike 1 pegmatite, and c) microphotograph of holmquistite (Li-bearing amphibole) from country rock adjacent to Dike 1 - holmquistite may be found up to 20 m away from a Li-bearing pegmatite (Černý et al., 1981).

Alkaline magmatism

Alkaline intrusive rocks were first recognized in drillcore in 1983 at the south of Wekusko Lake[19] (AF 70569). Two new dolomite-phlogopite bearing intrusive rocks crosscut Paleoproterozoic rocks in historical drillcores CP-11-008[20] and KUS303[21] beneath the sub-Phanerozoic cover south of Wekusko Lake. Basic features include (see GS2017-8 for more details):

- Contains macrocryst and groundmass dolomite, phlogopite, spinel and ilmenite.
- Preliminary data indicate hypabyssal kimberlite rather than magnesiocarbonatite; the area of mantle magmatism may be greater than 50 km^2.

Drillcore photos of intrusive dike CP-11-008: a) brownish-grey intrusive rock with sharp contacts, 307.75-308.10 m; b) sharp contact between felsic lapilli tuff and the intrusive rock, 307.70-307.75 m; c) internal structural heterogeneity of the intrusive rock, defined by layers rich in dolomite segregations, phlogopite macrocrysts and xenoliths, 307.75-307.90 m.

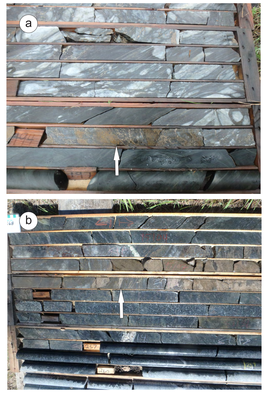


Drillcore photos of intrusive dike KUS303: a) main intrusive intercept (227-229 m); b) gradation from clast-supported to matrix-supported breccia at the intrusive rock contact – arrow points to a late-stage carbonate-filled vein, 227.0 m; c) locally concentrated phlogopite macrocrysts (outlined by dashed line), 227.10 m.

Gold mineralization

Major structures and associated subsidary faults help to localize gold mineralization in the exposed region of the eastern Flin Flon belt (e.g. Northwest Reed-Northstar shear zone[22], McLeod Road-Birch Lake thrust fault[23], Crowduck Bay fault[24]).

- The sub-Phanerozoic extension of the Crowduck Bay fault contains a number of gold occurrences (e.g. HAR-181[25]; 0.41 g/t 194-195.08, m AF 74942; WEK-94-2[26]; 1.56 g/t 113.2-113.8 m and 0.9 g/t 113.8-114.1 m, AF 94654).
- Sulphide and silicate facies iron formation may represent primary hosts and/or chemical traps for gold mineralization (e.g. KUS368[27]; 2.1 g/t from 121-122 m and 3.6 g/t from 249-251 m, AF 74705).
- Faults that juxtapose rocks of contrasting metamorphic grade may provide a path for deep-sourced mineralized fluids (e.g. fault along the east shore of McClarty Lake, the transition from Clearwater domain to the Kisseynew and East Kisseynew domains



Drillcore photos: a) brecciated and dismembered smoky grey quartz in mafic wacke - net textured pyrrohotite (arrow) along the margin contains 0.41 g/t Au over 194-195.08 m, HAR-181, 194.0m, b) Au-bearing semi-massive pyrrohotite (arrow), KUS368, 249.0-252.0 m.

References

NATMAP Shield Margin Project Working Group 1998: Geology, NATMAP Shield Margin Project area, Flin Flon belt, Manitoba/Saskatchewan; Geological Survey of Canada, Map 1968A, scale 1:100 000.

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