GEOLOGICAL SURVEY OF CANADA
OPEN FILE 7856

Targeted Geoscience Initiative 4: Canadian Nickel-Copper-Platinum Group Elements-Chromium Ore Systems — Fertility, Pathfinders, New and Revised Models

Revised geological framework for the McFaulds Lake greenstone belt, Ontario

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2015

Recommended citation
Metsaranta, R.T., Houlé, M.G., McNicoll, V.J., and Kamo, S.L., 2015. Revised geological framework for the McFaulds Lake greenstone belt, Ontario, *In:* Targeted Geoscience Initiative 4: Canadian Nickel-Copper-Platinum Group Elements-Chromium Ore Systems — Fertility, Pathfinders, New and Revised Models, (ed.) D.E. Ames and M.G. Houlé; Geological Survey of Canada, Open File 7856, p. 61–73.

Publications in this series have not been edited; they are released as submitted by the author.

Contribution to the Geological Survey of Canada's Targeted Geoscience Initiative 4 (TGI-4) Program (2010–2015)

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ABSTRACT

The McFaulds Lake greenstone belt (MLGB) is an extensive (>200 km long), arcuate-shaped, Meso- to Neoarchean, greenstone belt located in the central part of the Oxford-Stull domain of northern Ontario. The MLGB records a history of episodic volcanism, sedimentation, ultramafic-felsic intrusive activity and tectonism spanning from at least 2.83 to 2.66 Ga. Supracrustal rocks are tentatively subdivided into 7 tectonostratigraphic assemblages based on mapping, U-Pb geochronology, and geophysical interpretation. Mafic and ultramafic intrusive rocks comprise at least two distinct suites: a mafic-dominated, large layered intrusive suite represented by the Highbank-Fishtrap intrusive complex that was emplaced at ca. 2810 Ma, and an ultramafic to mafic intrusive suite termed the Ring of Fire intrusive suite. The latter comprises an ultramafic-dominated subsuite with significant Cr-Ni-Cu-PGE mineralization, and a mafic-dominated subsuite that contains significant Fe-Ti-V-(P) mineralization that was emplaced at ca. 2734 Ma.

INTRODUCTION

Regional bedrock mapping and diamond-drill core re-logging has been carried out in the "Ring of Fire" (RoF) region by the Ontario Geological Survey and the Geological Survey of Canada since 2010 through a cooperative research program (Targeted Geoscience Initiative, TGI-4). A primary focus of this work was to improve our understanding of the geology of the McFaulds Lake greenstone belt (MLGB) and to investigate the mafic-ultramafic intrusions that host the Cr-Ni-Cu-PGE-Fe-Ti-V-P orthomagmatic mineralization in the region. Mapping in the RoF region is hampered by extensive overburden, as well as flat-lying Paleozoic cover in its eastern portions. However, the discovery of numerous mineral deposits and occurrences in the RoF region has generated a significant new source of geoscience information through the diamond drilling conducted over the past several years. This contribution highlights the most recent advances in our understanding of the geology and the stratigraphy of the McFaulds Lake greenstone belt (MLGB) based on compilation of data from more than 1500 cored diamond drillholes, relogging of core, outcrop mapping, and new results of U-Pb geochronology.

TECTONOSTRATIGRAPHIC FRAMEWORK FOR THE McFAULDS LAKE GREENSTONE BELT

The MLGB has been tentatively subdivided into 7 distinct tectonostratigraphic assemblages based on their main lithological characteristics, new U-Pb zircon age constraints (new high-precision magmatic ages were generally determined by ID-TIMS; detrital zircon from metasedimentary rocks were determined by LA-ICP-MS) and geophysical interpretation (Figs. 1, 2). The geology of these assemblages is briefly reviewed, from oldest to youngest in the following section. Examples of typical rock types are shown in Figure 3.

Butler Assemblage (ca. 2828 Ma)

The supracrustal successions in the Butler assemblage (BA) can be divided into a western and an eastern part, which are separated by a large tonalitic intrusion. The western part comprises a succession dominated by felsic to intermediate metavolcanic rocks characterized by intense hydrothermal alteration. Metamorphosed mineral assemblages commonly contain garnet, muscovite, orthoamphibole, staurolite, and cordierite. Volcanogenic massive sulphide (VMS) occurrences are a conspicu-

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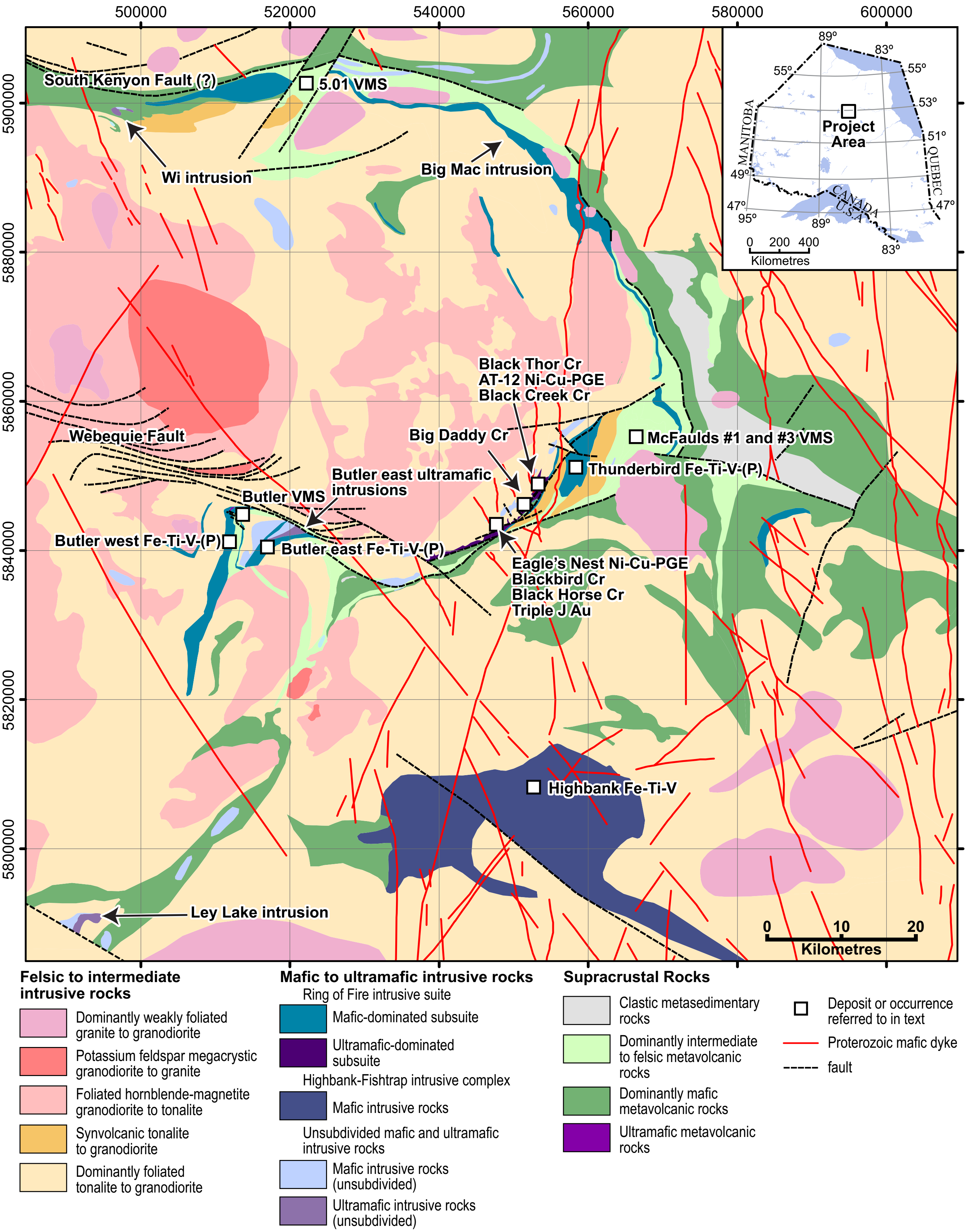

Figure 1. Simplified geological map of the McFaulds Lake greenstone belt showing the location of mineral deposits in the "Ring of Fire" region.

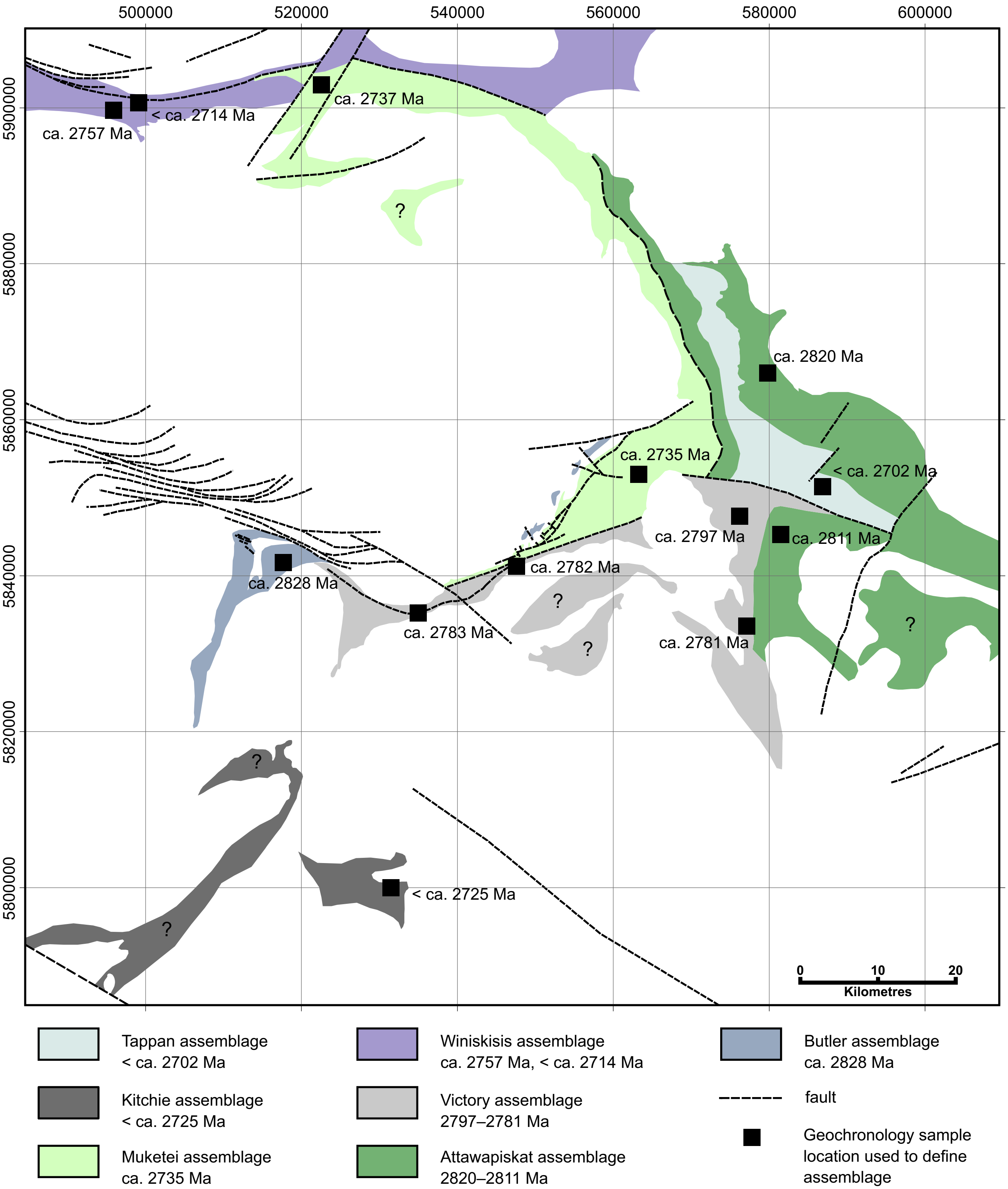

Figure 2. Simplified tectonostratigraphic framework of the McFaulds Lake greenstone belt.


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ous component of this part of the BA. The eastern part of the BA comprises mafic metavolcanic rocks with lesser magnetite-chert iron formation and minor felsic metavolcanic rocks with an age of ca. 2828 Ma, based on new data from this study. Mafic-ultramafic intrusions are also abundant in this area. This unit may correlate with similar rocks present in the footwall of Cr-Ni-Cu-PGE mineralized intrusions in the central part of the RoF. The BA is folded and strongly deformed by the Webequie fault zone, but in general, appears to face to the east-southeast.

Attawapiskat Assemblage (2820–2811 Ma)

The Attawapiskat assemblage (AA) forms a broadly northwest-striking unit in the eastern part of the MLGB and was previously subdivided by Metsaranta and Houlé (2012, 2013) into three parts: a felsic to mafic metavolcanic succession to the west, a clastic metasedimentary succession in the central part, and a mafic metavolcanic succession to the east. However, this interpretation is revised based on new U-Pb ages obtained from a felsic metavolcanic horizon in the eastern part of the AA that yielded an age of ca. 2820 Ma for the eastern metavolcanic succession. The central metasedimentary unit has been renamed the Tappan assemblage (described below), which contains zircon grains as young as 2702 Ma and is now considered a separate assemblage that may unconformably overlie or be tectonically interleaved with the AA. Rare primary flow features in mafic metavolcanic rocks suggest that the overall stratigraphy faces broadly to the northeast but only a few reliable younging indicators have been observed. In addition, some oxide-facies iron formation, sulphidic-graphitic argillite, chloritized clastic metasedimentary intervals, and feldspar-phyric intermediate intrusions have been reported by Polk (2009) in the northern part of the AA, which suggests a far more complex geological history. Anomalous Cu and Zn concentrations associated with graphitic argillite units were also reported in this area (Polk, 2009).

Victory Assemblage (2797–2780 Ma)

The Victory assemblage (VA) comprises a bimodal sequence of mafic and felsic metavolcanic rocks with minor metasedimentary rocks, including rare oxide-facies iron formation. Subconcordant gabbroic to pyroxenitic sills also occur within this assemblage. The spatial extent of the VA is inferred from geophysical and geochronological signatures. In the central part of the RoF it is bounded on the north side by a regionally extensive shear zone that structurally juxtaposes younger rocks of the Muketei assemblage (described below). East of McFaulds Lake, supracrustal rocks of the VA and AA appear to form a north-south-trending synform, however, the nature of the boundary between these assemblages remains unclear.

Winiskisis Assemblage (ca. 2757 Ma, younger sedimentary component <2714 Ma)

The east-striking Winiskisis assemblage (WA) forms the northern part of the MLGB but its characteristics are poorly constrained, as exposures are limited to a few outcrops and drill-core intersections. A felsic metavolcanic rock from the western part of this assemblage has an age of ca. 2757 Ma, but the assemblage also contains younger <2714 Ma (maximum age based on detrital zircon analyses) sheared, metasedimentary, or metavolcanic rocks based on sampling and geochronology reported by Buse et al. (2009). Relogging a series of diamond-drill cores in the western part of the assemblage revealed the presence of schistose to gneissic, felsic to intermediate rocks (quartz-plagioclase-biotite-garnet schist and gneiss) interpreted as tuffaceous metasedimentary or metavolcanic rocks, and fine- to medium-grained amphibolite interpreted as mafic metavolcanic rocks. In less deformed and metamorphosed areas, supracrustal rocks including interbedded grey wacke and black siltstone/shale, massive and locally normally graded felsic tuffaceous sandstone, aphyric and quartz-phyric felsic metavolcanic rocks, and less commonly mafic flows. Sporadic, thin, silicified zones with pyrite-pyrrhotite mineralization and chert-magnetite iron formation are also present within this succession. The eastern part of the WA is also poorly exposed but appears to be dominated by variably deformed, pillowed mafic metavolcanic rocks with rare local northeast younging indicators. Geophysical data for this unit typically shows a low magnetic signature coupled with an anomalous

Figure 3 (opposite page). Typical rock types from the McFaulds Lake greenstone belt and related mafic-ultramafic intrusions. **a)** Layered hornblende-gabbro and anorthosite of the Highbank-Fishtrap complex. Hammer is 40 cm long. **b)** Magmatic breccia displaying clasts of massive and layered chromitite in a serpentinized peridotite. Pencil is 15 cm long. **c)** Weakly deformed, pillowed mafic metavolcanic rocks from the eastern part of the Winiskisis assemblage exposed near the Ekwan River. Pencil is 15 cm long. **d)** Deformed, pillowed mafic metavolcanic rocks exposed along strike from the Attawapiskat assemblage, a few kilometres to the east of the Ring of Fire map area. Hammer is 40 cm long. **e)** Folded chert-magnetite iron formation interlayered with mafic metavolcanic rocks from the eastern Butler assemblage. **f)** Strong orthoamphibole-garnet alteration of metavolcanic rocks near the Bulter 3 VMS occurrence. Hammer is 40 cm long. **g)** Interbedded sandstone and grey siltstone typical of the Tappan assemblage. Sandstone beds commonly display normal graded bedding. The core in the photo is 3.7 cm in diameter. **h)** Felsic tuff breccia near the 5.01 VMS occurrence, Muketei assemblage. The core diameter is 4.8 cm.

high gravity signature similar to the mafic metavolcanic succession of the AA. Thus, with existing age constraints, it cannot be ruled out that the eastern part of the WA and the AA are correlative based on similar rock types and geophysical signatures.

Muketei Assemblage (ca. 2735 Ma)

The Muketei assemblage (MA) comprises a dominantly felsic to intermediate metavolcanic succession in the central and northern parts of the MLGB. Volcanic rocks in this area were reported to be ca. 2737 Ma (Rayner and Stott, 2005). However, geochronology from this study provides a more precise age constraint age of ca. 2735 Ma. The assemblage contains a number of small VMS occurrences including the McFaulds #1 and #3 deposits. VMS occurrences in the area display strong talc-chlorite-magnetite alteration zones proximal to mineralization and broader distal sericite alteration halos. In the vicinity of VMS occurrences, the assemblage comprises dominantly felsic to intermediate flows and tuffs with minor mafic metavolcanic rocks and oxide-facies iron formation. Stratigraphically above ultramafic to mafic intrusions in the central RoF, a bimodal succession of normal to high-Mg mafic metavolcanic rocks with minor felsic tuffaceous horizons is present (based on scarce drilling). The northern extension of the MA is dominated by felsic to intermediate metavolcanic rocks, based on a series of diamond-drill cores (e.g. Kilbourne 2009, 2010). These units are typically moderately to strongly deformed quartz-biotite ± garnet ± amphibole schist, likely derived from felsic to intermediate tuff, lapilli tuff, quartz-phyric flows and coarse tuff breccia. Subordinate fine-grained amphibolite, which probably represents mafic metavolcanic rocks, are interlayered with these units. Sulphide-mineralized zones, up to several metres thick, were encountered in drill core (e.g. the 5.01 occurrence). Reliable regional younging indicators for this assemblage were not recognized.

Kitchie Assemblage (in part <2725 Ma)

The Kitchie assemblage (KA) is a poorly exposed sequence of supracrustal rocks observed in the vicinity of the Highbank-Fishtrap Lake intrusive complex (HFIC) in the southern part of the RoF area. In outcrop it consists of deformed amphibolitized mafic metavolcanic rocks and metasandstone cut by foliated mafic dykes. A metasedimentary outcrop in this area contains detrital zircon grains as young as ca. 2725 Ma. Reconnaissance logging revealed that the KA is composed primarily of fine- to medium-grained amphibole-plagioclase-biotite ± garnet schist interpreted as mafic metavolcanic rocks, and grey, quartz-plagioclase-biotite ± garnet ± muscovite schist interpreted as felsic to intermediate metavolcanic rocks. Pillow selvages are present locally within mafic metavolcanic rocks. Rare fine-grained, bedded quartz-biotite-plagioclase-garnet schist is also present and is interpreted as metasedimentary rocks. Rare, foliated metagabbroic to metapyroxenitic intrusions crosscut supracrustal rocks of the KA.

Tappan Assemblage (<2702 Ma)

The Tappan assemblage (TA) is a poorly exposed west-northwest striking metasedimentary unit located in the eastern part of the MLGB. Unconformable or fault contacts between the TA and enclosing metavolcanic successions of the AA are inferred as supported by age differences shown by these supracrustal packages. The TA consists primarily of grey, fine- to coarse-grained sandstone interbedded with grey siltstone and black sulphidic mudstone. The overall fine-grain size and occurrences of sedimentary structures (e.g. graded bedding, load features, and rare cross-lamination) are consistent with deposition in a deep-water environment. Detrital zircon geochronology by LA-ICP-MS from a sample of interbedded sandstone and siltstone yielded individual zircon ages as young as 2702 Ma, which provides a maximum age for this assemblage. It is the youngest supracrustal unit to have been identified in the MLGB.

MAFIC AND ULTRAMAFIC INTRUSIONS

Mafic and ultramafic intrusions in the RoF region occur in at least two main age intervals, at ca. 2810 Ma and ca. 2734 Ma. Thus far, the best known Mesoarchean intrusion is the Highbank-Fishtrap Lake intrusive complex (HFIC), which consists of gabbro, anorthositic gabbro, magnetite-bearing gabbro, and rare pyroxenite units (Sappin et al., 2015). It is unclear what it was emplaced into, as existing geochronology for the adjacent KA suggests that it postdates the HFIC and no geochronology exists for surrounding granitoid rocks, although it is crosscut by a ca. 2728 Ma inter-

Figure 4 (opposite page). Examples of different mineralization styles and host rocks in the McFaulds Lake greenstone belt. **a)** Massive sulphide, Eagle's Nest deposit. Coin is 1.8 cm. **b)** Net-textured sulphide mineralization, Eagle's Nest deposit. Coin is 1.8 cm. **c)** Massive chromite, Big Daddy deposit. Core is 4.8 cm in diameter. **d)** Massive and peridotite-clast-rich chromite mineralization, Black Horse deposit. Lense cap is 5.5 cm in diameter. **e)** Massive magnetite mineralization, Thunderbird prospect. Coin is 1.8 cm.**f)** Plagioclase with interstitial magnetite, typical of lower grade Fe-Ti-V mineralized gabbroic intrusions. Pencil is 15 cm long. **g)** Massive pyrite with interbedded, altered, and sulphide-mineralized, black mudstone clast breccia, Bulter 3 VMS occurrence. Pencil is 15 cm long. **h)** Sheared ultramafic and rocks with silicification and quartz-carbonate veining along a Au-barren section of the Triple J shear zone. Pencil is 15 cm long.

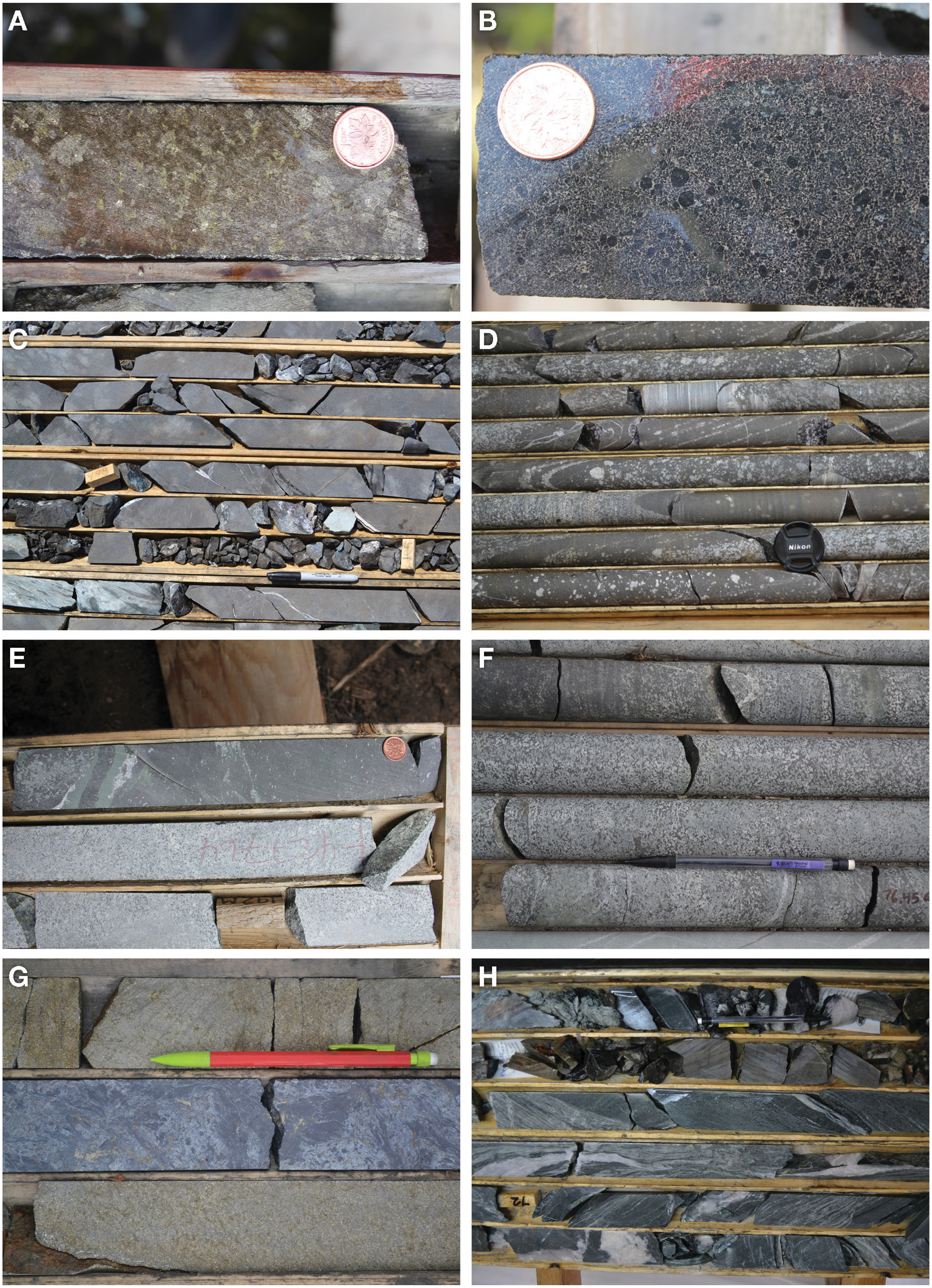
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Table 1. Summary of mineral deposits in the “Ring of Fire” region.

Deposit	Mineral Resources/ Reserves	Tonnage (Mt)	Grade of Mineralization				
Chromite Deposits	*Mineral Resources*			**Cr_2O_3 (%)**		**Cr/Fe**	
Black Thor[1]	Inferred	121.9		27.8			
	Total	**121.9**		**27.8**			
Big Daddy[2]	Measured	23.3		32.1			
	Indicated	5.8		30.1			
	Inferred	3.4		28.1			
	Total	**32.5**		**31.3**			
Black Horse[3]	Inferred	77.2		35.1			
	Total	**77.2**		**35.1**			
Black Creek[4]	Measured	5.3		37.0		1.80	
	Indicated	3.4		38.0		1.80	
	Inferred	1.6		37.8		1.70	
	Total	**10.3**		**37.5**			
Blackbird[5]	Measured	9.3		37.4		2.00	
	Indicated	11.2		34.4		1.95	
	Inferred	23.5		33.1		1.97	
	Total	**43.9**		**34.4**			
Total Mineral Resources in the MLGB		**285.8**		**31.5**			
Magmatic Ni-Cu-PGE Deposits			**Ni** (%)	**Cu** (%)	**Pt** (g/t)	**Pd** (g/t)	**Au** (g/t)
Eagle's Nest[6]	*Mineral Reserves*						
	Proven	5.3	2.0	1.04	1.01	3.45	0.19
	Probable	5.9	1.4	0.72	0.78	2.76	0.18
	Total	**11.1**	**1.7**	**0.9**	**0.9**	**3.1**	**0.2**
	Mineral Resources						
	Inferred	9.0	1.1	1.14	1.16	3.49	0.3
Total Resources & Reserves		**20.1**	**1.4**	**1.0**	**1.0**	**3.3**	**0.2**
Volcanogenic Massive Sulphide Deposits			**Cu** (%)	**Zn** (%)			
	Mineral Resources						
McFaulds #1[7]	Inferred	0.8	3.8	1.10			
	Total	**0.8**	**3.8**	**1.10**			
McFaulds #3[7]	Inferred	0.3	2.1	0.58			
	Total	**0.3**	**2.1**	**0.58**			
Total Mineral Resources in the MLGB		**1.1**	**3.4**	**1.0**			

Sources: [1]Aubut (2010); [2]Aubut (2014a); [3]Aubut (2014b); [4]Murahwi et al. (2011); [5]Murahwi et al. (2012); [6]Burgess et al. (2012); [7]Lahti (2008)

mediate dyke. In contrast, the Neoarchean mafic-ultramafic intrusions, defined as the Ring of Fire intrusive suite (RoFIS), are subdivided into two main magmatic subsuites, an ultramafic-dominated subsuite (see Carson et al., 2015) and a mafic-dominated “ferrogabbro” subsuite (Kuzmich et al. 2015; Sappin et al., 2015) that is more regionally widespread. The ultramafic-dominated subsuite comprises variably serpentinized and/or talc carbonate-altered, dunite, peridotite, chromitite, pyroxenite, and gabbro, whereas the mafic-dominated subsuite comprises variably magnetite-bearing, layered gabbro, anorthosite, anorthositic gabbro, and rare pyroxenite.

Ultramafic-dominated intrusions are also present in other parts of the MLGB. The Wi intrusion occurs in the western part of the WA, crosscuts deformed supracrustal rocks that are interpreted to be ca. 2757 Ma based on new geochronology, and therefore could be similar in age to the RoFIS. It consists principally of undifferentiated, serpentinized, foliated, poorly layered, dunite and peridotite with a variable amount of disseminated chromite. An outcrop of gabbro to pyroxenite on the Winiskisis Channel could be a more evolved part of the intrusion. The Ley Lake intrusion, in the far southwest part of the area, consists primarily of green, foliated, serpentinized dunite and peridotite, in places with disseminated chromite. An outcrop of foliated gabbro is also present nearby. Varieties of mafic and ultramafic rocks are also present in the eastern Butler Lake area and may be correlative with the RoFIS.

MINERALIZATION STYLES

The MLGB and RoF region contain a wide variety of mineralization styles (Fig. 4), which are summarized in Tables 1 and 2. The most economically prospective deposit types are orthomagmatic Cr-(PGE) deposits (e.g. Black Thor) and Ni-Cu-PGE sulphide deposits (e.g. Eagle’s Nest). Defined mineral resources and reserves in the area and significant occurrences, such as

Table 2. Select mineral occurrences and example drill core intersections in the "Ring of Fire" region.

Occurrence Name	Primary Commodity	Example of Intersections from Drill Core
Fe-Ti-V Occurrences		
Thunderbird[1]	V	164.9 m of 0.36% V_2O_5, including 45.9 m 0.51% V_2O_5
		241.4 m of 0.37% V_2O_5, including 59.8 m averaging 0.54% V_2O_5
Butler[2]	V	36 m of 0.54% V_2O_5, 0.46% TiO_2 and 23.78% Fe
		4.2 m of 1.17% V_2O_5, 7.97% TiO_2, and 40.73% Fe
Highbank[3]		0.75% V_2O_5 over 5.2 m, including a higher grade interval of 0.98% V_2O_5 over 2.2 m
Lode Gold Occurrences		
Triple J[4]	Au	1.1 m averaging 12.65 grams per tonne gold
		10.0 m of 1.72 grams per tonne gold, including 4.4 m of 3.43 g/t gold
VMS Occurrences		
Butler VMS[5]	Cu-Zn	41.5 m of 0.4 Cu, 3.26% Zn and 6 g/t Ag
		14.0 m of 0.56% Cu, 1.83% Zn and 11.31 g/t Ag
		167 m of 0.39% Cu and 1.13% Zn
		17 m of 1.0% Cu and 0.12 g/T Au
		26.7 m of 0.6% Cu and 0.35% Zn
		8 m of 4.68% Zn, 0.46% Cu and 7.7 g/t Ag
5.01 occurrence[6]	Cu-Zn	102 m of 6.5% Zn, 0.44% Cu, 0.19% Pb, and 3 g/t Ag, including 26 m 13.8% Zn, 0.50% Cu, 0.05%Pb, and 2 g/t Ag

[1]Noront resources press release dated July 29, 2009 - http://norontresources.com/?p=802 (assessed Dec 31 2014)

[2]MacDonald Mines Exploration Ltd., news release, May 11, 2011 - http://www.macdonaldmines.com/news/2011/79-macdonald-mines-announces-vanadium-assays-from-butler-lake-project-in-the-ring-of-fire (accessed Jan 2, 2015)

[3]Northern Shield Resources Inc., Highbank Lake property, www.northern-shield.com/properties/highbank [accessed September 27, 2012]

[4]Noront Resources Ltd. News release dated Oct 27 2009 - http://norontresources.com/?p=785 (accessed Dec 31, 2014)

[5]MacDonald Mines Ltd. News release dated May 11, 2011 www.macdonaldmines.com/news/2011/79-macdonald-mines-announces-vanadium-assays-from-butler-lake-project-in-the-ring-of-fire assessed January 2, 2015

[6]Metalex Ventures Ltd., www.metalexventures.com/html/james_bay.html accessed January 2, 2015

AT-12 (Ni-Cu-PGE), are restricted to the ultramafic-dominated RoFIS intrusions (Table 1). Fe-Ti-V-(P) mineralization is more widespread within mafic-dominated intrusions (e.g. HFIC, Butler, and Thunderbird intrusions) that belong to both the ca. 2810 Ma and ca. 2734 Ma suites. Fe-Ti-V-(P) mineralization (Table 2) occurs generally as thin layers of semi-massive to massive oxides and/or thicker zones of heavily disseminated oxide-rich gabbroic rocks.

VMS occurrences are quite common in the MLGB, although only two deposits have been defined (Table 1). These occurrences are present in most of the identified tectonostratigraphic assemblages in the area, and their distribution is broadly comparable to other large greenstone belts (e.g. Abitibi) where VMS-style base metal mineralization is widespread spatially and temporally.

The MLGB is not well known for its potential for lode gold mineralization. However, a number of gold occurrences are localized along the Triple J fault zone in the central part of the RoF. The Triple J fault, a southwest-striking structure that appears to dip ~55° towards the northwest, separates ultramafic-dominated intrusions from tonalitic basement between the Blackbird and the Black Horse chromite deposits. This deformation zone is generally characterized by variably thick, highly altered ultramafic rocks (i.e. talc-carbonate schist) with abundant quartz-carbonate veining.

A number of kimberlitic intrusions occur beneath Paleozoic cover, mainly in the eastern part of the area, which indicates the potential to host economic concentrations of diamond. These kimberlite intrusions are Mesoproterozoic (1.1 Ga) based on geochronology reported in Heaman et al. (2004).

IMPLICATIONS FOR REGIONAL EXPLORATION

The prospectivity of ultramafic- and mafic-dominated intrusions of the RoFIS to host a variety of orthomagmatic Cr-(PGE), Ni-Cu-PGE, Fe-Ti-V-(P) deposit types has been well established by recent discoveries. However, the spatial and temporal distribution of these intrusions is not fully understood and further characterization should be undertaken. For example, additional ultramafic intrusions, such as the Wi intrusion, Ley Lake intrusion, and a few intrusions in the Butler Lake area, are poorly exposed and not well characterized. These intrusions, which appear to have crystallized from Cr-rich magmas based on the presence of disseminated visible chromite, may be correlative with the ultramafic-dominated intrusion of the RoFIS and therefore are prospective to host Ni-Cu-PGE and Cr mineralization. Furthermore, the presences of numerous Ni-Cu-(PGE) occurrences (e.g. AT-12 occurrence) within the ultramafic-dominated intrusions of the RoFIS highlight the potential for this type of mineralization, especially in the central area. Large areas of gabbroic intrusions prospective for Fe-Ti-V-(P) mineralization have been identified based on limited drilling and geophysical interpretation and remain attractive for additional Fe-Ti-V-(P) discoveries.

Prospectivity for VMS-style mineralization is high in many areas of the MLGB, as suggested by the presence of significant alteration systems, synvolcanic intrusions, and the number of occurrences occurs across the belt. Further investigation in the Butler Lake area and in the vicinity of the McFaulds #1 and #3 deposits is needed to characterize the detailed stratigraphy and alteration systems associated with these volcanic successions, as well as their structural setting, and to better target future exploration programs for this style of mineralization. Much more exploration and drilling are required to fully assess and effectively target additional VMS-style discoveries in these areas, particularly at depth, as the lack of exposure makes targeting more challenging.

Only limited gold exploration has been conducted in the RoF region. Further investigation is warranted to better understand the distribution and controlling factors on gold distribution in the Triple J shear zone. In addition, a number of large-scale regional faults (e.g. Webequie fault zone, and the extension of the South Kenyon Fault zone in the northern part of MLGB) have yet not been significantly explored for gold.

FORTHCOMING WORK

This contribution is offered as an interim summary of our current geological knowledge in the RoF region. Several regional-scale geological maps (1:100 000 scale) for the entire RoF region complemented with more detailed geological maps in the vicinity of known deposits and in the Butler area are also forthcoming. In conjunction with maps, compilations of field and drill-core data, whole rock geochemistry, and a summary of U-Pb geochronological data will be also released. New geological knowledge acquired by the OGS and the GSC in the RoF area highlights knowledge gaps in our understanding of the architecture and evolution of the MLGB, therefore further investigations are still warranted.

ACKNOWLEDGEMENTS

Thanks are extended to all mining companies involved in the RoF area. In particular we would like to thank: Richard Fink and Michael Orobona (Cliffs Natural Resources), Andrew Mitchell, David Shinkle, Ryan Weston, Daron Slaney and Randy Abraham (formerly Cliffs Natural Resources), Don Hoy and Martin Tuscherer (formerly Freewest Resources/Cliffs Natural Resources), Ralph MacNally, Eric Mosley, Matt Downey (Noront Resources), Mike Flanagan and Peter Smith (Fancamp Exploration), Moe Lavigne (KWG Resources), Quentin Yarie, Jacob McKinnon, Craig Sherba, Craig Hunt, and James Masters (MacDonald Mines), David Palmer (Probe Mines), Jim Voisin (UC Resources), David Clarke (Canterra Minerals), Nathalie Hansen, Éric Hébert and Ian Lawyer (Melkior Resources), and Christine Vaillancourt and Ian Bliss (Northern Shield Resources) for their generous assistance, numerous discussions, permission to access properties/diamond-drill cores, and corporate geological databases.

Jim Franklin, Larry Hulbert, Jim Mungall, and Greg Stott are thanked for valuable discussions and insight into the geology of the RoF area. Thanks also to Mike Lesher, Heather Carson, Kaveh Merhmanesh, Naghmeh Farhangi, Jack Spath, Pete Hollings, Ben Kuzmich, Anne-Aurélie Sappin, Jordan Laarman, Desmond Rainsford, Pierre Keating, and Mark Pilkington. Mike Hamilton, and Don Davis (U. of Toronto), and Robert Lodge, and Joe Petrus (Laurentian U.) are thanked for preliminary geochronological analyses. Hearst Air Service, Leuenberger Air Service, Thunder Airlines, Nakina Air Service, and the Ministry of Natural Resources are thanked for float plane and helicopter services. Elijah Jacob, Jonas Whitehead, Travis Spence, Leah Wabasse, and Chris McKay are thanked for assisting with various aspects of our work in Webequie. Jean-François Beausoleil, Cedric Mayer, and James Nopper provided excellent field assistance. We are also grateful to Jack Parker (OGS) and Léopold Nadeau (GSC) for timely and comprehensive reviews that helped us improve the final version of this contribution.

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