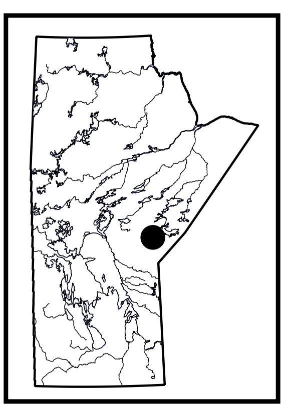
GS2019-1

Results of bedrock mapping at Knight Lake, east-central Manitoba (parts of NTS 53E11, 12, 13, 14)

by M.L. Rinne

In Brief:
- Regional silicification and calcite alteration spatially associated with a number of known gold occurrences
- Gold mineralization hosted in a conjugate array of late brittle-ductile shears
- Widespread unit previously mapped as andesite confirmed to be silicified basalt

Citation:
Rinne, M.L. 2019: Results of bedrock mapping at Knight Lake, east-central Manitoba (parts of NTS 53E11, 12, 13, 14); *in* Report of Activities 2019, Manitoba Agriculture and Resource Development, Manitoba Geological Survey, p. 1–9.



Summary

The Manitoba Geological Survey resumed 1:20 000 scale bedrock mapping of the Bigstone Lake greenstone belt in the Knight Lake area. Field observations and geochemical analyses confirm that widespread units previously described as andesite are regionally silicified basalt. The extensive silicification and calcite alteration mapped through the eastern part of the belt is spatially associated with several known gold occurrences. Building on results from the 2017 field season, gold mineralization in the area is hosted primarily in a conjugate array of late brittle–ductile shears evident at both regional and outcrop scales. The completion of the 2019 field season marks the end of the planned mapping campaign, with results indicating strong potential for widespread and locally high-grade gold mineralization in the Bigstone Lake greenstone belt.

Introduction

The Manitoba Geological Survey (MGS) resumed 1:20 000 scale mapping of the bedrock geology of the Bigstone Lake greenstone belt (BLGB). The primary aims of this mapping program were to

- document the supracrustal rocks of the BLGB through systematic mapping of unvisited areas along with remapping of some areas last visited in the 1980s; and
- provide a modern assessment of mineral potential in the area, including investigations of volcanogenic massive sulphide, magmatic Ni-Cu-PGE and lode-gold mineralization.

A related objective of the 2019 mapping program was to examine structural controls and alteration in the vicinity of known gold occurrences at Knight Lake, particularly in areas burned by a wildfire in 2017. Investigations in 2019 revealed that the recent wildfire exposed very little new outcrop (except for some granodiorite ridges); most of the inland burn areas were found to contain partially scorched but mostly standing forest with an intact ground layer of soil and superficially charred moss. The 2019 field season marks the completion of planned MGS field work on the BLGB. An open file release of geochemical data from the project is planned following receipt of results from the analysis of the 2019 field samples.

Regional geology

The BLGB forms part of the Island Lake domain of the northwestern Superior Province. The western half of the BLGB, around Bigstone Lake, was mapped by the MGS during the 2016 and 2017 field seasons (Rinne et al., 2016; Rinne, 2017). The eastern half of the BLGB, around Knight, Wass and Clam lakes, is contiguous with the western part but offset by a thin corridor of regional southeast-trending dextral shears (Figure GS2019-1-1). Results of shoreline and inland mapping completed in the Knight Lake area during the 2019 field season are summarized in this report.

The oldest and stratigraphically lowermost units around Knight Lake occupy the northern and southern flanks of the BLGB (Figure GS2019-1-1). This mirrors the belt-scale syncline pattern in the western part of the belt around Bigstone Lake (Rinne et al., 2016), allowing for straightforward stratigraphic correlations between rock units in the Knight Lake and Bigstone Lake areas. Rocks of the BLGB have been metamorphosed to upper-greenschist to lower-amphibolite facies; the 'meta' prefix is omitted from this report for brevity.

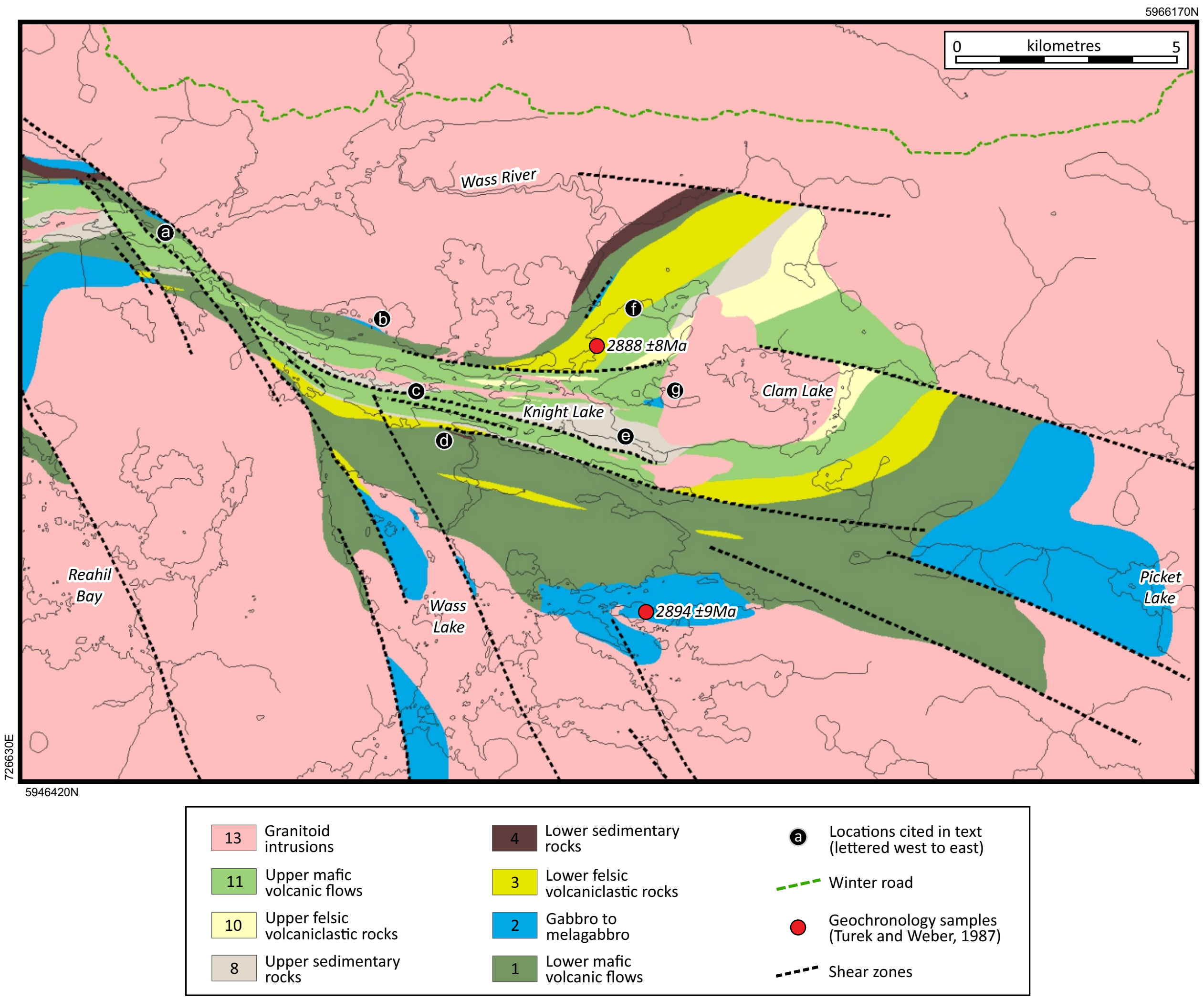


***Figure GS2019-1-1:** Bedrock geology of the Knight Lake area, simplified from Preliminary Map PMAP2019-1 (Rinne, 2019)[1]. Some features, such as fold axial traces, have been omitted for clarity and are indicated in Rinne (2019). Missing numbers in the unit legend correspond to units either not encountered in the Knight Lake area (peridotite, pyroxenite, komatiite and mafic–ultramafic lapilli tuff) or too small to display at the map scale (late tonalite and diorite intrusions). Units shown in the vicinity of Clam Lake, Picket Lake and Wass Lake are based mostly on a compilation of mapping by McIntosh (1941), Ermanovics (1975) and Neale (1985), along with bedrock intercepts in drillcore (Assessment Files 91147, 92263, 92302, Manitoba Agriculture and Resource Development, Winnipeg). The regional shear zones (black dashed lines) correspond to distinct topographic lineaments, visible in satellite or airphoto imagery (with shears typically marked by darker, conspicuously linear valleys). Corner UTM coordinates are in NAD83, zone 14.*

The unit numbers used in this report correspond to unit numbering in Rinne (2019). The numbering is discontinuous because of units not encountered in the Knight Lake area, namely peridotite, pyroxenite, komatiite, and mafic–ultramafic lapilli tuff, and of units too small to depict, specifically tonalite and diorite intrusions.

Lower stratigraphic sequence

Rocks of the lower stratigraphic sequence are assigned to the Hayes River Group; published U-Pb ages from the lower sequence indicate emplacement at ca. 2.9 Ga (Figure GS2019-1-1; Turek and Weber, 1987).

Lower mafic volcanic flows (unit 1)

Lower mafic volcanic flows are the most abundant unit in the eastern half of the BLGB, exposed along the northern and southern shores of Knight Lake as well as the northern part of Wass Lake (Figure GS2019-1-1). The rocks are grey-green on most weathered and fresh surfaces. Aphyric and variolitic pillows are predominant, with rare

[1] The units discussed in this report correspond to those shown on Preliminary Map PMAP2019-1 (Rinne, 2019), and Figure GS2019-1-1 represents a simplified version of this map.

quartz- and calcite-filled pillow shelves indicating way-up toward the centre of Knight Lake. Massive, plagioclase-phyric basalt is less common, along with rare interflow hyaloclastite breccia and garnetiferous mudstone in beds <40 cm thick. Interflow chert-magnetite iron formation was also noted by Noranda Exploration Company Limited at an unspecified location in the southwestern part of Knight Lake (Assessment File 94022).

Gabbro to melagabbro (unit 2)

Relatively thin (<200 m) gabbro intrusions were encountered near the northern margin of the BLGB near Wapatinasing Narrows (Figure GS2019-1-1, location a), in small islands in the northern part of Knight Lake (location b) and in a highly strained corridor in the northeastern part of Knight Lake (west of location f). Larger intrusions (~1–3 km thick) were documented by previous workers along the southern flank of the BLGB, including at Wass Lake and Picket Lake (Figure GS2019-1-1). The large gabbro unit at Picket Lake corresponds to a large magnetic-high feature and was noted in outcrop by Herd et al. (1987). A small body of gabbro west of Clam Lake (location g) was mapped inland by Ermanovics (1975) and was not visited in 2019. With the limited information available, this gabbro occurrence is provisionally assigned to the lower gabbro–melagabbro unit, but its stratigraphic position suggests it may instead represent either a late mafic dike or a massive portion of the upper mafic flow unit.

At Knight Lake, gabbro is equigranular and homogeneous at the outcrop scale, apart from strain partitioning. Fresh and weathered surfaces are grey-green to dark green and show approximately equal parts pyroxene (chlorite- and actinolite-replaced) and plagioclase <2 mm across. Contacts with adjacent units were not observed in 2019, although intrusive contacts with the lower mafic flow unit were noted at Bigstone Lake (Rinne, 2017). Turek and Weber (1987) also described inclusions of the lower mafic flow unit within a large gabbro intrusion in the northeastern part of Wass Lake. A sample of the same gabbro intrusion returned a U-Pb age of 2894 ±9 Ma (Figure GS2019-1-1; Turek and Weber, 1987).

Lower felsic volcaniclastic and volcanic rocks (unit 3)

Felsic rocks are intercalated with the lower mafic flow unit at several locations and consist mostly of tuff to lapilli tuff, with less abundant monomictic volcanic breccia. The felsic volcaniclastic rocks are exposed along much of the southern shore of Knight Lake, parts of the northeastern shore (near location f in Figure GS2019-1-1) and in inland areas south of Knight Lake and Clam Lake. The rocks have pale cream to light grey weathered surfaces and grey or light grey fresh surfaces, commonly with conchoidal fractures. Ash to lapilli tuffs along the southwestern shores of Knight Lake contain black, glassy lenses or wisps up to 4 mm long that are interpreted as fiamme (Figure GS2019-1-2a); such outcrops were therefore identified as welded tuff.

Plagioclase-phyric dacite forms a minor component of the lower felsic unit in the northeastern corner of Knight Lake. The dacite contains an aphanitic and massive groundmass, unlike most tuff outcrops that show weak stratification. Although interpreted as a dome or flow within a thicker felsic tuff-dominated package, contacts were not observed and it is possible that the dacite represents a later dike (e.g., a porphyritic member of unit 12 described below).

Turek and Weber (1987) reported a U-Pb zircon age of 2888.2 ±8 Ma from a sample of plagioclase-phyric tuff from the northern shore of Knight Lake, in a location corresponding with the lower stratigraphic sequence (Figure GS2019-1-1). The same data were reportedly recalculated by Parks et al. (2014) to an age of 2852 Ma, although supporting data and errors were not provided with this revised age determination.

Lower sedimentary rocks (unit 4)

Mappable packages of the lower sedimentary unit were found only in the highly strained northeast-trending segment in the northeastern part of Knight Lake (northwest of location f in Figure GS2019-1-1) and near a series of rapids in the southern part of Knight Lake (location d). The grey rocks consist of planar-bedded quartzofeldspathic greywacke to mudstone in highly strained beds <10 cm thick, with ambiguous way-up indicators. An intrusive contact with granodiorite was noted in the northeastern part of Knight Lake, but contacts with adjacent supracrustal units were not observed.

Upper stratigraphic sequence

Rocks of the upper stratigraphic sequence occur in the centre of the BLGB and are provisionally assigned to the Island Lake Group (Rinne et al., 2016). Insufficient zircon yields from samples of upper felsic supracrustal rocks (with corresponding Zr contents of 6–19 ppm) have so far impeded age constraints on the emplacement of the upper sequence.

Upper sedimentary rocks (unit 8)

Sedimentary rocks are widely distributed throughout the upper stratigraphic sequence (Figure GS2019-1-1), and consist of greywacke-mudstone turbidites, ungraded

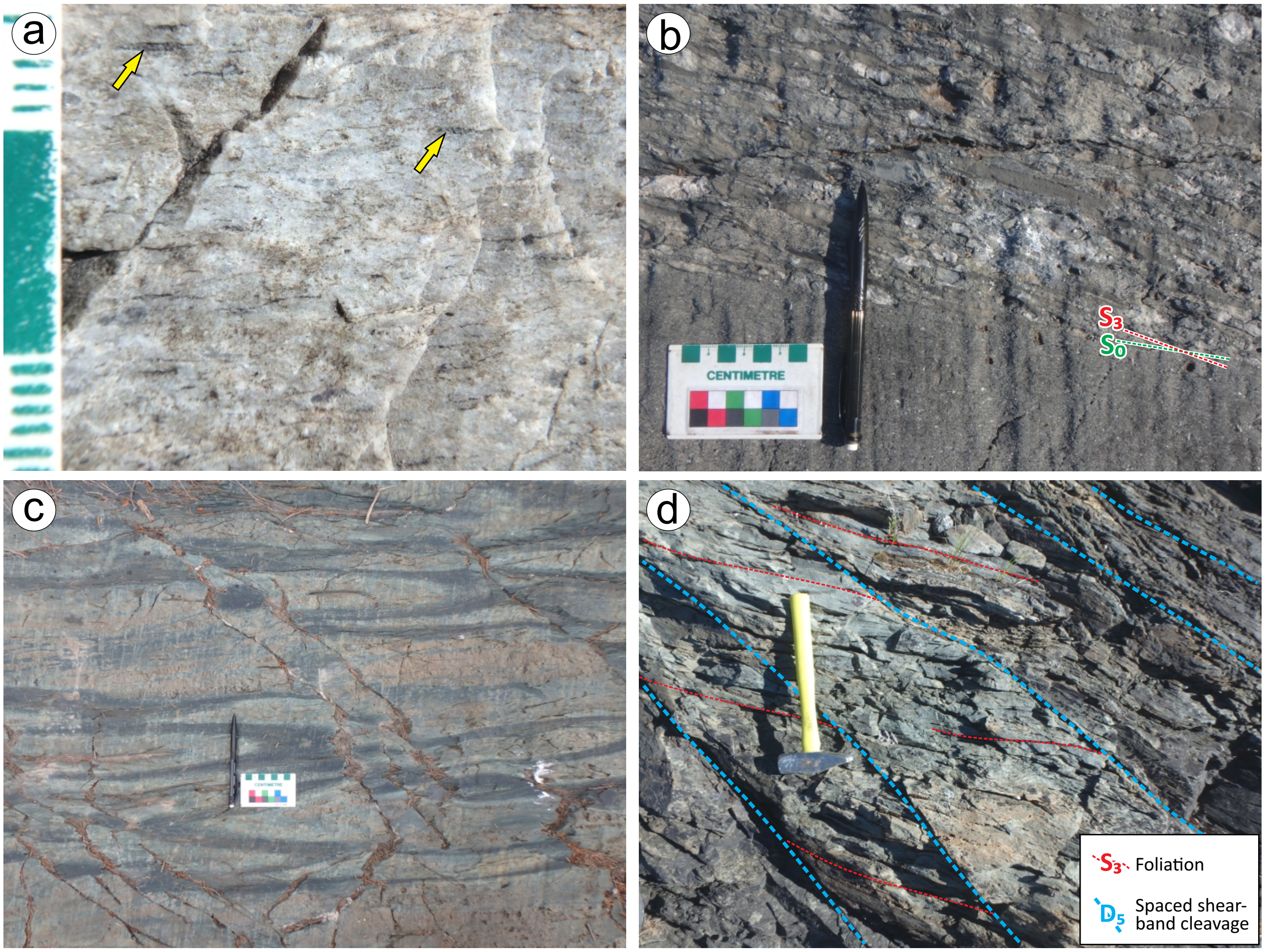


***Figure GS2019-1-2:** Outcrop photographs of Bigstone Lake greenstone belt units mapped in 2019, showing **a)** welded felsic ash tuff containing features interpreted as fiamme (thin black features; two examples are marked with arrows); **b)** ungraded coarse sandstone (bottom) and polymictic conglomerate (top), showing a nearly transposed angular relationship between bedding (S_0; parallel to sandstone–conglomerate contact) and S_3 foliation with clast flattening; **c)** silicified and calcite-altered pillow basalt with darker grey selvages and minor dextral offsets; **d)** silicified and intensely foliated basalt proximal to a late shear zone, showing S_3 foliation dragged and offset by D_5 shear-band cleavage planes. North is to the top in panels b–d.*

coarse sandstone and polymictic conglomerate. Planar-bedded and normally graded greywacke-mudstone turbidites 5–40 cm thick are the most common. In the least-altered outcrops, the rocks are light grey to grey-green on weathered surfaces and grey (sandstone) to dark grey (mudstone) on fresh surfaces. Most clasts are <0.5 mm across, but thin pebbly bases are common, with sparse quartz clasts up to 5 mm across.

A few beds of ungraded, coarse quartz sandstone 5–80 cm thick were documented in spatial association with polymictic conglomerate. The rocks are similar in colour to the greywacke and contain abundant subrounded to subangular clasts 0.5–1.5 mm across, supported in a fine-grained, semipelitic sandstone matrix that locally contains dark grey muddy lenses. Clasts consist of approximately 70% quartz, 20% plagioclase or pale grey potassium feldspar and 10% pale cream-coloured aphanitic fragments possibly derived from a felsic volcanic source. The ungraded coarse sandstone is most common in the central and eastern parts of the BLGB (Rinne, 2017).

Polymictic conglomerate was observed mostly at the eastern end of Knight Lake (Figure GS2019-1-1; location e), along with two isolated occurrences within turbidite-dominated packages along the southern shore of Knight Lake (south of location c) and in the high-strain corridor between Bigstone and Knight lakes (south of location a). The conglomerate occurs in beds ranging from 3 cm to greater than 2 m in thickness (in the case of single beds occupying whole outcrop exposures), with well-rounded clasts dominantly <2 cm but reaching up to 40 cm in length in some outcrops. The clasts are elongated parallel to S_3 foliation (Figure GS2019-1-2b) and consist of white crystalline quartz (20–50% of clasts); pale cream-coloured to light grey aphanitic felsic clasts (20–60%); dark grey mudstone (5–10%, locally cut by quartz veins truncated at clast margins); and rare greywacke, basalt and medium-grained granitic clasts. The clasts make up between 5 and 40% of the rock and are supported in a coarse matrix identical to the ungraded, coarse quartz sandstone described above. Bedding contacts with ungraded coarse sandstone were observed at several locations and are commonly nearly parallel to S_3 foliation and clast flattening (Figure GS2019-1-2b).

Upper felsic volcaniclastic rocks (unit 10)

Mappable packages of upper felsic volcaniclastic rocks are limited mostly to the central and northeastern parts of Knight Lake and Clam Lake (Figure GS2019-1-1). The rocks are pale grey-beige, massive to crudely stratified tuff to lapilli tuff and locally grade into rare layers of monomictic felsic volcanic breccia with fine-grained plagioclase-phyric fragments up to 10 cm long. Contacts with adjacent supracrustal units were not observed at Knight Lake, but conformable contacts with the upper sedimentary unit were noted at Bigstone Lake (Rinne et al., 2016).

Upper mafic volcanic flows (unit 11)

The upper mafic volcanic flow unit dominates the upper stratigraphic sequence (Figure GS2019-1-1). Least-altered outcrops are grey-green to dark grey-green on weathered and fresh surfaces, and are compositionally identical to the lower flow unit. Strongly elongated varioles and vesicles are only locally preserved due to the intense strain in much of the Knight Lake area. At Bigstone Lake, vesicles were found to be more common in the upper mafic flows than in the lower mafic flows (Rinne et al., 2016). However, at Knight Lake the higher strain hinders textural distinctions between lower and upper mafic flows in outcrop. In most of the area shown in Figure GS2019-1-1, the location of the regional contact between the lower and upper mafic flow units is estimated to preserve stratigraphic continuity with the western half of the BLGB. This contact occurs at or above the lowermost occurrence of pebbly turbiditic sandstone and conglomerate, and stratigraphically below the first appearance of abundant vesicles (which are only locally preserved). Along both northern and southern shores of Knight Lake, the estimated lower contact of the upper volcanic flow unit also broadly corresponds with the locations of regional shear structures.

At Knight Lake, most outcrops of the upper mafic flows are silicified and calcite altered (±epidote and fuchsite). In cases of 'moderate' alteration (as identified in the field on the basis of overall colour, hardness and reaction to hydrochloric acid), the rocks have a light grey-beige colour on weathered surfaces and a grey or grey-green colour on fresh surfaces (Figure GS2019-1-2c). The regional extent of alteration is indicated in Figure GS2019-1-3a and appears to be spatially associated with an east-southeast-trending zone of higher strain through the centre of Knight Lake.

In areas previously mapped by the MGS (Neale, 1985), the altered basalt was identified as andesite. However, mapping in 2019 revealed several examples of gradational variations from relatively unaltered basalt to light grey, altered basalt, in some cases within uninterrupted outcrop exposures. Geochemical analyses of the silicified basalt, including one sample collected in 2017 from the northern shore of Knight Lake, yielded Zr/Ti ratios of 0.007 to 0.011 and Co contents of 30–52 ppm. In conjunction with the gradational changes from basalt to altered basalt described above, these results point to a silicified basalt as opposed to a primary andesite composition.

Intrusive rocks

Tonalite to dacite dikes (unit 12)

At Knight Lake, several aphyric dikes were identified in the field as dacite. These light grey dikes are interpreted as aphanitic equivalents to the fine-grained tonalite dikes documented at Bigstone Lake (Rinne et al., 2016; Rinne, 2017) and range from 5 cm to 3 m in thickness. As in all other dikes documented in the BLGB, they predate the D_3 deformation event (they are commonly tightly folded about F_3 fold axes and are overprinted by axial-planar S_3 foliation) as well as regional calcite alteration.

Granitoid intrusions (unit 13)

Granodiorite to granite batholiths surround the BLGB, along with smaller intrusions that mostly crosscut upper stratigraphic units at Knight Lake and Clam Lake (Figure GS2019-1-1). The rocks are typically medium-grained and equigranular to weakly porphyritic, and vary in colour from white or light grey to light pink. Fine-grained mafic xenoliths, in places partially assimilated with amoeboid shapes and diffuse margins, are more common near the margins of the intrusions. They range from a few centimetres to 5 m across and are interpreted to have been sourced from the adjacent mafic flow units. Granodiorite dikes are also common throughout the BLGB and are most abundant near batholith margins.

Diorite dikes (unit 14)

Porphyritic diorite dikes crosscut several units in the Knight Lake area but are not mappable at 1:20 000 scale. They are light grey or light grey-green on fresh and

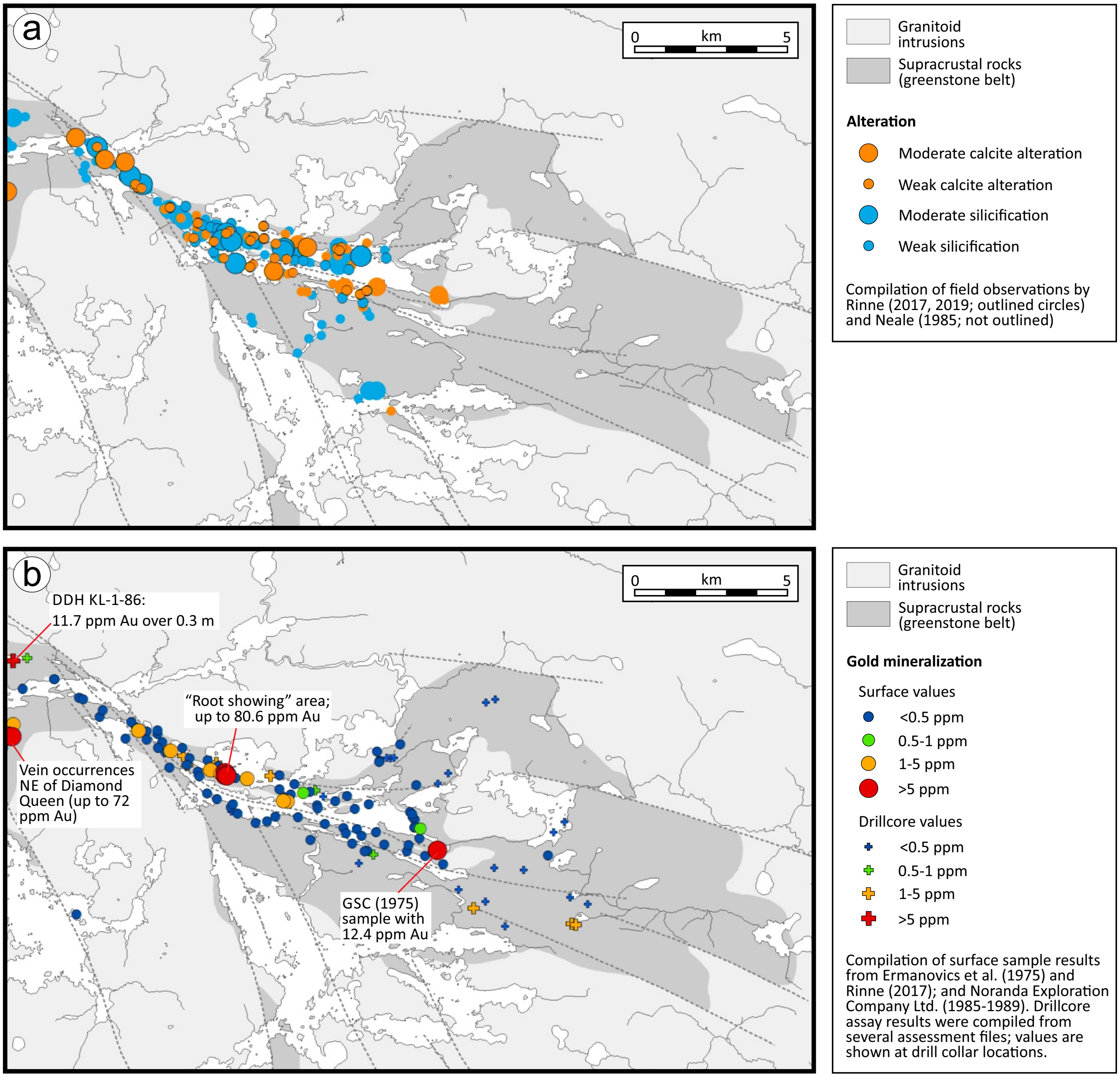


Figure GS2019-1-3: *Maps of the eastern part of the Bigstone Lake greenstone belt (same area as in Figure GS2019-1-1), showing* ***a)*** *locations of calcite alteration and silicification documented by qualitative field assessments carried out by Neale (1985) and Rinne (during the 2017 and 2019 field seasons);* ***b)*** *locations of known gold mineralization at surface and in drillcore, with selected high-grade occurrences labeled.*

weathered surfaces, and typically contain approximately 30% subhedral hornblende and approximately 10% plagioclase phenocrysts 0.5–10 mm across in a light grey, very fine-grained groundmass. In 2019, a plagioclase- and hornblende-phyric diorite dike was found to have crosscut a large granodiorite intrusion. The relative timing of the diorite and granitoid units was adjusted accordingly. In the Bigstone Lake area, the plagioclase- and hornblende-phyric diorite dikes were also found to have crosscut tonalite dikes and were crosscut by rare mafic dikes (the latter representing the latest intrusive phase documented in the BLGB; Rinne, 2017).

Structural geology

The BLGB records a complex structural history, as summarized in Rinne et al. (2016). Evidence for the D_1, D_2 and D_4 events (pre-existing fabric developed in breccia clasts, early isoclinal folding expressed in structural facing reversals and late open folds, respectively) was not recognized during the 2019 field season, except for possible early foliation in conglomerate clasts. Most of the map-scale patterns at Knight Lake and most of the structures measured in outcrop relate to the D_3 and D_5 events described below.

D_3 deformation

A well-developed, penetrative, near-vertical S_3 foliation is readily identified in almost all supracrustal outcrops, with an overall eastward but variable strike that broadly parallels the supracrustal unit contacts in Figure GS2019-1-1. Limited way-up indicators in the Knight Lake area also point to a belt-scale F_3-syncline axial trace that trends east through the upper stratigraphic units, flanked by a series of at least two regional F_3 anticlines and synclines (Rinne, 2019). Although parasitic isoclinal F_3 folds with near-vertical plunges were noted in several outcrops throughout the BLGB, the regional F_3-fold architecture is not well constrained outside of areas containing turbiditic sandstone and pillow shelves.

D_5 deformation

The D_5 deformation event is characterized by late brittle–ductile shears that range from outcrop (Figure GS2019-1-2d) to regional (Figure GS2019-1-1) scale. In the Knight Lake area, D_5 dextral shears dominantly strike southeast, whereas the sinistral shears dominantly strike northeast. The shears are classified as brittle–ductile structures because they include both a discrete offset plane (brittle faulting) and a wider zone of deflection or drag of pre-existing fabric across the shear (ductile deformation).

Both dextral and sinistral shear sets were measured throughout the BLGB, but southeast-striking dextral shears are most prevalent in outcrop, particularly near the western end of Knight Lake. Outcrops within the higher strain corridor that separates the eastern and western halves of the BLGB (i.e., the thin zone of dextral offset panels around location a in Figure GS2019-1-1) commonly show either a southeast-striking and steeply dipping dextral crenulation cleavage or a spaced dextral shear-band cleavage (Figure GS2019-1-2d).

Although sinistral shears were found in the Bigstone Lake area to have offset the dextral shears, at Knight Lake they were found to both pre- and postdate the dextral shears. The simplest explanation for this relationship is that the late brittle–ductile shears form a mutually cross-cutting conjugate array that formed in response to the same stress field. Sinistral shears previously assigned to a tentative D_6 event (Rinne et al., 2016; Rinne, 2017) are therefore re-assigned to the earlier D_5 deformation event. This interpretation, which involves a single (though possibly prolonged) episode of late brittle–ductile deformation, is also the simplest scenario that would account for the occurrence of the same gold-bearing vein assemblages in both the dextral and sinistral shear sets.

Gold mineralization

Known gold occurrences in the Knight Lake area were mostly discovered during mapping and trenching by Noranda Exploration Company Limited in the late 1980s, with the highest grade of 80.6 ppm Au recovered near the 'Root showing' labeled in Figure GS2019-1-3b (Assessment File 94511). Noranda workers noted shear-hosted pyrite, arsenopyrite, sphalerite and galena in the Root showing area, along with chlorite and calcite alteration (Assessment File 94022). Much of the Root showing area has revegetated (and more recently burned) since the Noranda trenching. Traverses of the area in 2019 did not reveal significant vein or sulphide occurrences other than a gossanous float sample.

In 2017, several previously undocumented gold-bearing veins were sampled approximately 1.5 km northeast of historical gold occurrences known as the Diamond Queen veins (near the area labeled at the western side of Figure GS2019-1-3b). The veins contain quartz±calcite, pyrite, chalcopyrite, galena, arsenopyrite, chlorite, fuchsite, epidote, and (in one vein) visible gold. They range from <1 cm to 2 m thick and were found in both the sinistral and dextral shear sets (Rinne, 2017).

In 2019, inland investigations of historical gold occurrences and potentially related topographic lineaments in the Knight Lake area did not reveal occurrences of visible gold. However, the area was found to contain several examples of D_5 shear-hosted veins containing similar assemblages (quartz±calcite, pyrite, chlorite, fuchsite, epidote and likely tourmaline). In outcrops of granodiorite, the veins are also commonly rimmed by diffuse and recessively weathered chlorite-calcite halos a few centimetres wide. The veins range from 1 to 40 cm in width and were found in both sinistral and dextral shears. Although assay results from the 2019 field season are pending, the distribution of gold occurrences found to date indicates widespread and locally high-grade gold mineralization in the BLGB (Figure GS2019-1-3b).

Alteration

Mapped alteration patterns in the Knight Lake area show an overall east-southeast-trending zone of calcite alteration and silicification, extending from the eastern part of Bigstone Lake through the centre of Knight Lake (Figure GS2019-1-3a). Unlike the multiple (and in places spatially distinct) alteration assemblages identified at Bigstone Lake, the alteration at Knight Lake shows little separation between zones of silicification (±epidote, chlorite) and calcite (±fuchsite, minor sericite) alteration. Instead, most outcrops in the centre of Knight Lake show additions of both silica and calcite.

The regional calcite alteration and silicification is both pervasive (diffuse, very fine grained) and texturally selective (e.g., quartz and calcite after pillow selvages). The alteration is also commonly accompanied by isolated patches of bright green fuchsite, along with submillimetre calcite veinlets and the shear-hosted quartz-calcite-pyrite veins described above. The presence of an orange carbonate mineral was noted in a few outcrops near the centre of Knight Lake (near location c in Figure GS2019-1-1) and it was tentatively identified as ankerite. More detailed mapping of the alteration zones may provide vectors to lode-gold mineralization in the area, especially with respect to potentially ore-proximal occurrences of Fe-carbonates or abundant sericite (e.g., Groves et al., 1998).

Exploration implications

Results of the 2017 mapping program confirmed that topographic lineaments in the BLGB (shallow, mostly vegetated linear valleys, ranging from metres to tens of metres in width) correspond to late brittle–ductile shears that host gold-bearing veins (Rinne, 2017). Although the 2019 investigations of topographic lineaments at Knight Lake were largely unsuccessful in terms of sample recovery, workers of Noranda Exploration Company Limited did note that most of the gold-bearing zones in the Knight Lake area were found “along topographic lows … beneath shallow overburden” (Assessment File 94011). These findings present an opportunity given that: 1) zones of shallowly buried shear-hosted mineralization would have been easily overlooked by previous workers in the BLGB; and 2) the geometry and density of topographic lineaments can be applied toward a targeted-drilling or shallow-trenching campaign, particularly in the context of other information such as alteration zonation.

Economic considerations

The bedrock geology of the BLGB demonstrates broad potential for both ultramafic-hosted Ni-Cu (±Co, Cr, PGE) mineralization and volcanogenic massive sulphide mineralization (Rinne et al., 2016). The mafic–ultramafic lapilli tuff identified in the southern part of Bigstone Lake (Rinne et al., 2016) could also be further investigated with respect to its similarities with the diamond-bearing alkaline volcaniclastic rocks discovered at Knee Lake (Anderson, 2017). Felsic intrusions surrounding the BLGB may even be prospective for Archean porphyry-style Cu-Mo mineralization as in the Island Lake greenstone belt (Bella Lake pluton). However, the most obvious potential for economic mineralization in the BLGB, based on the results of renewed mapping and compilation work, is in orogenic lode-gold mineralization.

Detailed exploration work in the BLGB was last undertaken between 1986 and 1993 (e.g., Assessment Files 94359, 94022, 94035). Recent mapping results in the BLGB, along with information compiled from past work in the area (such as shown in Figure GS2019-1-3b), would readily support surface and subsurface exploration for gold mineralization near the known occurrences, including new structural targets and related exploration suggestions outlined in Rinne (2017).

Acknowledgments

The author thanks K. Roberts for his capable and cheerful assistance during an unusually smoke-filled field season, E. Anderson and M. Schreckenbach for their expediting assistance; C. Epp for his assistance with sample preparation; C. Couëslan and C. Böhm for their reviews; A. Santucci for her assistance with mapping software; and staff and pilots of Wings Over Kississing for crew transport and resupply flights.

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