

Bedrock Geology of the northern Laird Lake-White Lake-Steephill Lake Areas – West Sheet (Parts of NTS 64D/03 and 63M/14) at 1:20 000 scale

Preliminary Geological Map (2017)

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The area was mapped by Samantha R. Van De Kerckhove, Dylan M. Deck and Ryan M. Morelli, in the summer of 2017, with the assistance of Nikolas Wicharuk, Jared Squire, Renee Larsen, and Kirsten Cunningham.

This map was printed from the geologist's digital file. Geological data were processed using Microsoft Access, and ArcView 10.x software. Base maps were compiled from CanVec 1:50 000 scale digital cartographic maps produced by Natural Resources Canada. Grid coordinates are NAD 83 CSRS98 UTM zone 13. The map was processed overall using ArcView 10.x software.

The map is issued in a package with the Summary of Investigations 20 17 Volume 2, Saskatchewan Geological Survey, and is available separately from http://www.publications.gov.sk.ca/deplist.cfm?d=310&c=199.

This map accompanies the following publication:

Van De Kerckhove, S.R., Morelli, R.M. and Deck, D.M., Geological characterization of the northern Laird Lake, White Lake and Steephill Lake area of the northern Glennie Domain, west -central Reindeer Zone in Summary of Investigations 20 17 Volume 2, Saskatchewan Geological Survey, Sask. Ministry of the Economy, Misc. Rep. A-8,17p.

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Legena *Intrusive rocks:*

Pegmatitic Syenogranite: locally alkali feldspar granite; light pink to orange-pink; pegmatitic (= 3 cm); homogeneous; massive; graphic intergrowth texture of quartz and K-feldspar is common; biotite (2-10)ⁱ is present and locally, magnetite (0 to 10); typically low MSⁱⁱ readings (0-0.25) unless magnetite is present; spectrometer readingsⁱⁱⁱ are typically high: 260-800, 3500 TCPS^{iv}; where observed, contacts are sharp and crosscutting ranging from straight-wall to irregular; pegmatite syenogranite make up many small intrusions throughout the entire map area, but they are rarely expansive or continuous enough to form map units at 1:20,000 scale.

Syenogranite: locally alkali feldspar granite; light pink to pink, medium to coarse grained; homogeneous; massive; biotite (2-15), locally fine magnetite (0 to 5); variable MS readings (0.1-11.93); spectrometer: 110-1050, 2800 TCPS; where observed, contacts are sharp and crosscutting ranging from straight-wall to irregular; syenogranite forms a few small intrusions throughout the entire map area.

Leucogranite: white to light pink; typically coarse grained, but can be medium to very coarse grained locally; weakly to moderately foliated; biotite (5-10), plagioclase (5-15), allanite (<1) ± graphite; although allanite does not make up the main mineral assemblage it is often coarse, up to 1 cm; trace amounts of graphite are found locally where leucogranite intrudes psammopelite or pelite; C^{Vi}: 5-15; low MS (=1) apart from one intrusion on the east edge of Steephill Lake where Lg is adjacent to PSy, which yields moderately high MS (2-44); variable spectrometer readings: 70-3200 TCPS, likely due to inconsistent distribution of allanite within the unit; forms cm-, m-scale and km-scale layers and lenses throughout the map area with increasing abundance towards the east; interpreted to have derived from anatectic melt.

Gneissic Granite: light pink and grey; medium grained; gneissic; biotite (5·10) and locally hornblende (0 to 15); where present, hornblende is typically relatively late porphyroblasts; CI: 5·25; highly variable MS; interpreted as injected metamorphic melt product; forms km-scale intrusions and commonly mm-to cm-scale stringers and layers within earlier diorite intrusions

Gh Hornblende-bearing Granite: foliated granite in which hornblende is deformed, i.e. primary or predates the predominant foliation.

Diatexitic Granite-Granodiorite: brown, grey or tan; inequigranular, very fine to very coarse grained seriate-like texture; anhedral to subhedral phenocrysts interpreted as in situ leucosome; typically quartzofeldspathic with up to 25% biotite, but locally very biotite rich (>50%); locally contains trace graphite, garnet and/or pyrite; Cl: 8-70; low MS (typically <1); forms decimeter- to kilometre-scale intrusions; contains relatively undeformed resistors of compositionally dissimilar rocks; interpreted to have formed from anatectic melt of a granitic or sedimentary rock; dissimilar texture to that of any other anatectic granites (e.g. unit Lg).

Ultramafic intrusive rocks: ranges from plagioclase-bearing pyroxene hornblendite to hornblendite, but is likely a metamorphosed pyroxenite; black to dark green; massive to weakly foliated; remnant coarse to very coarse grained texture, though many of the coarse crystals are actually fine grained aggregates; hornblende (45-95), diopside (5-50), interstitial plagioclase (1-10); the coarse hornblende crystals are likely pseudomorphed after subhedral pyroxene crystals; CI: 90-99; variable MS (0-29); spectrometer: 40-90 TCPS.

Leucogabbro: white and black; medium to very coarse grained; foliated to gneissic; some cm-scale mafic layers; plagioclase (37-82), hornblende (15-60), and garnet (3-10) porphyroblasts up to 4 cm in diameter; garnet porphyroblasts locally have an internal fabric oblique to rock foliation; typical CI: 15-20; low MS (<1); spectrometer: 25-90 TCPS; cuts supracrustal rocks at the east edge of the map and also unit GDi.

Leucotonalite: white to light blue-grey; medium to coarse grained; foliated to gneissic; exhibits

ribboned/anastomosing quartz and plagioclase texture; plagioclase (35-70), quartz (15-55), biotite (5-20); CI: 5-20; typically low MS (<1); potentially sourced from anatectic melt.

Quartz diorite-Diorite: grey, black and white; fine to medium to coarse grained; homogeneous, massive to weakly foliated; locally porphyroblastic (hornblende); hornblende (5-20), ± magnetite; CI: 10-20; variable

MS (2-65); indistinct and gradual contacts with GDi suggest the units are related or are textural variations of the same rock.

Diorite-Granodiorite: locally quartz diorite, tonalite and quartz monzodiorite; grey with pink or white leucosomes; medium grained; well foliated to gneissic; locally lineated; migmatite, typically stromatic, locally net-structured; mm-to cm-scale *lit par lit* injected leucosomes make up to 20% of rock; hornblende (5-25), biotite (0-15), ± magnetite; CI: 10-35; highly variable MS (0.01-300); commonly contains mafic

suggest the units are related or are textural variations of the same rock.

Diorite-Granodiorite, xenolith dominated: xenoliths, most commonly fine grained mafic rocks, clustered together within GDi and mantled by leucosome.

xenoliths; commonly intruded by unit Lg, Lt or GG leucosomes; indistinct and gradual contacts with QDi

Diorite-Granodiorite, with sedimentary rock: unit GDi with diffuse cm- to mm-scale interstitial portions of fine to very fine grained psammopelitic rock; commonly adjacent to sedimentary units, interpreted to have formed from the partial ingestion of psammopelitic rocks by the intrusion.

Supracrustal and associated plutonic rocks:

Pelite: red-brown to dark grey; fine grained; well foliated to gneissic; locally migmatitic, typically stromatic migmatite, leucosomes make up to 20% of rock; locally porphyroblastic; biotite (2060), plagioclase (10-40), quartz (20-40), ± garnet (up to 15) and typically trace graphite; ASM'ii: 20-70; low MS (<1); forms very thin slivers on the map; commonly interlayered with other sedimentary rocks and/or volcanic rocks.

Psammopelite: light grey to grey; fine grained; typically equigranular, locally porphyroblastic; foliated, weakly layered (cm-scale); locally migmatite, typically stromatic migmatite, leucosomes make up to 15% of rock; quartz (40-50), plagioclase (40-50), biotite (10-25), ± garnet and ± graphite; ASM: 15-25; low MS

Ps Psammite: light grey; fine grained; homogeneous to weakly layered; quartz (40-50), plagioclase (40-45), biotite (5-15), ± muscovite (0-5); ASM: 5-15; low MS (=0.4) apart from one station with average MS of 17; commonly interlayered with other sedimentary rocks.

Mixed sedimentary rocks: interlayered sedimentary rocks including two or more of either PI, Psp or Ps at

cm-to decimetre-scale.

Layered volcanic and sedimentary rocks: interlayered volcanic rocks and sedimentary rocks at cm to

(<1); commonly interlayered with other sedimentary rocks and/or volcanic rocks.

decimeter scale including two or more of the following units: FV, IV, AmMV, AmC, AmGa

Layered volcanic rocks: cm-to decimetre- scale layered volcanic rocks and locally associated gabbroic rocks including two or more of the following units: FV, IV, AmMV, AmC, AmGa.

Felsic volcanic rocks: light grey to white; fine grained; homogeneous to weakly layered (cm-scale);

plagioclase (60-70), quartz (20-40), hornblende (0-15), locally garnet (0-40), locally sulphide-bearing; CI: 0-55; variable MS (0-36); locally exhibits quartzofeldspathic ribboned texture interpreted as siliceous alteration, potentially disguising protolith.

Intermediate volcanic rocks: grey; fine to medium grained; homogeneous weakly layered; massive to foliated; commonly stromatic migmatite; commonly porphyroblastic (garnet); plagioclase (60-75),

AmMV

Amphibolilte, Mafic volcanic rocks: black to brown-black; fine-grained; homogeoneous to layered on a cm-scale; locally stromatic migmatite, leucosomes up to 5% of the rock; hornblende (40-90), plagioclase (10-60), locally garnet porphyroblasts (0 to 15); CI: 40-90; typically low MS (<2) but locally up to 50; locally interlayered with FV and IV; locally contains cm-scale layers of AmC.

Amc Amphibolite, Calcic volcanic rocks: pale green to dark green; fine grained; forms homogeneous to moderately foliated cm-to decimetre interlayers within mafic volcanic rocks; diopside (20-40), hornblende (20-40), plagioclase (30-40), ± quartz (0-5), ± titanite ± carbonate and typically sulphides (2-5) (pyrrhotite, pyrite and locally chalcopyrite); CI: 40-80; low MS (<1); potentially derived from addition of calcium to mafic volcanic rocks during pre-metamorphic hydrothermal

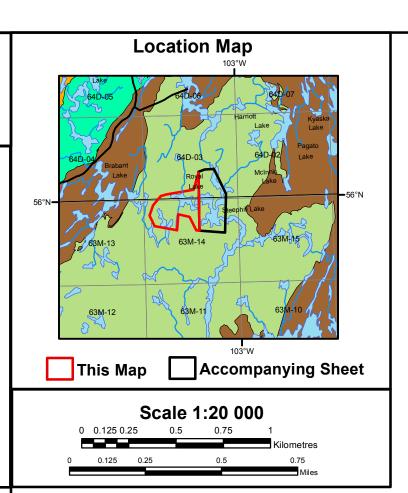
hornblende (15-35), quartz (0 -5) and local garnet (0 to 7), along with traces of magnetite and sulphide

Amphibolite, Gabbro: dark grey to black; medium grained; massive to well-foliated; homogeneous; hornblende (45-80), plagioclase (35-55), locally garnet (0-10); CI: 45-65; variable MS (0.1-62).

Amm Amphibolite, Migmatitic gabbro: AmGa with up to 20% quartzofeldspathic leucosomes, typically net-structured migmatite.

i – numbers in parentheses are % of mineral typically present in rock
 ii – MS = Magnetic Susceptibility (10⁻³ SI units); common values for unit noted in parentheses
 iii – handheld spectrometer readings are typically between 60 and 200 total counts per second; only noted in text when readings are notably out of this range
 iv – TCPS – total counts per second

are notably out of this range
iv – TCPS – total counts per second
v – mineral identification of allanite is based on field observations only
vi – CI = colour index, based on the percentage of mafic minerals in a metamorphosed rock, was used in the field to distinguish
between mafic (>35), intermediate (35-15) and felsic (<15) variants of volcanic and plutonic rocks.
vii – ASM = % of aluminum silicate-bearing minerals



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Symbols

Geological contact: defined to approximate

———— Airphoto lineament
....— Trace of F₄ axial plane

Trace of F_3 axial plane, antiform

Trace of F₃ axial plane, synform

 \cdots Trace of F_3 axial plane \cdots Trace of F_2 axial plane

~ ~ ~ ~ Shear

Saskatchewan Mineral Deposit Index showings (with number)

♦ Bedrock geochemical anomaly: uranium

Outcrop examined

★ ★ Stations of interest (with station number) – uranium, base metals

Iceflow indicators (striae, microstriae, roche moutonnee, groove, rat tail)

Main foliation (commonly composite S1/S2 fabric): inclined, vertical, dip unknown

Foliation, dip unknown: second generation

Foliation, inclined: second generation

Fold axial plane (inclined): unknown generation, first generation, second generation, third

Fold axial plane (vertical): unknown generation

Small ductile shear (inclined): sense unknown

Small ductile shear (vertical): sense unknown

Bedding (inclined): tops unknown

Fold axis (u-fold): unknown generation, first, second generation, third generation

Fold axis (w-fold): unknown generation, first generation

Fold axis (s-fold): first generation, second generation

Fold axis (z-fold): unknown generation, first generation

Lineation, unknown type: second generation

Lineation, mineral: unknown generation, first generation

Lineation, stretching: unknown age

// // Dyke: inclined, vertical

Contour interval (10 metre)

