MAIN LAKE

Areas of the map symbolized as 'Unconsolidated sand and gravel deposits' display underlying rock type(s) to portray the interpreted continuity of units, based on structural, aeromagnetic and topographic signatures. Rock types other than those shown may be present in these areas.

All data stations collected by the authors are plotted using GPS-based coordinates. This map also incorporates pre-GPS field data collected by Emslie (1980). The distribution of rocks of the Harp Lake Complex is based primarily on the mapping of Emslie (1980). Only the unconformity of these rocks and sedimentary rocks of the Majoqua-Besse Lake Formation were mapped during this study. The accuracy of field data stations that were re-plotted from maps or field notes of these sources is dependent on the original plotting accuracy.

The map is augmented by follow-up examination of stained rock slabs, petrographic thin sections and whole rock geochemical analyses. In many areas, geological boundaries are poorly constrained, approximated and extrapolated on the basis of outcrop distribution, topographic lineaments and aeromagnetic signatures. Geological units are defined on the basis of lithology, texture and age. The rock type that is depicted is based on what was interpreted to be the dominant rock type present. All rock types recorded from an individual outcrop may be determined by consulting the 'Unit designator' string for that locality given in the digital database. Discrepancies in rock names applied to field outcrops versus those interpreted from stained slabs or thin sections have not been reconciled in the digital database. Differences may be due to more refined identifications or the sample and/or thin section may not be representative of the source material.

Field work in 2012 by T. van Nostrand

Recommended citation
van Nostrand, T.
2023: Geology of Main Lake map area (NTS 13L/14), central Labrador. Scale 1:50 000. Geological Survey, Department of Industry, Energy and Technology, Government of Newfoundland and Labrador. Map 2023-31, Open File 13L/14/0161.

Geology compiled by T. van Nostrand
Geological cartography by S. McNamara, K. Morgan and T. Sears

The digital topographic database map NTS 13L/14 used here is available from the Surveyor General Branch, Natural Resources, Canada.
Magnetic declination at centre of the map is 20°37' West (March 31, 2022).
Universal Transverse Mercator (UTM) Grid Zone 20, North American Datum (NAD) 27.
Elevations are in metres above sea level. Contour interval is 20 m.

Open File 13L/14/0161

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Preliminary versions of parts of this map published in Current Research articles have evolved so there are some differences between the current and preliminary versions of the map, unit designators and the legends (see van Nostrand and Corcoran, 2013).

Map 2023-31 is eighteen of twenty (20) maps on the geology of the Seal Lake Group, including adjacent rocks of older tectonic provinces in central Labrador.

Department website: https://www.gov.nl.ca/iet
Geological Survey website: https://www.gov.nl.ca/ieti/mines/geoscience
Email: pub@gov.nl.ca

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1980: Geology and petrology of the Harp Lake Complex, central Labrador: An example of Elsonian magmatism, Geological Survey of Canada, Bulletin 293, 136 pages.

Kilfoil, G.
2008: Compilation of colour-shaded relief images generated from airborne magnetic data flown by the Geological Survey of Canada from 1969 through 1972. Government of Newfoundland and Labrador, Department of Natural Resources, Geological Survey, unpublished map, scale 1:250 000.

van Nostrand, T. and Corcoran, C.
2013: Geology of the western Mesoproterozoic Seal Lake Group, central Labrador (including all of NTS map areas 13L/2 and 7 and parts of 13L/1, 3, 6, 8, 9, 10, 11, 14, 15 and 16 and 13E/14 and 15). In Current Research. Government of Newfoundland and Labrador, Department of Natural Resources, Geological Survey, Report 13-1, pages 301-336.

Note
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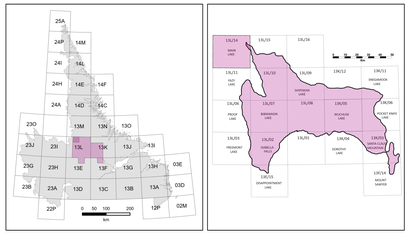
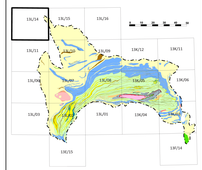
INDEX MAPS

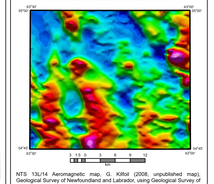


REGIONAL GEOLOGY MAP



This map displays regional geological patterns.

NTS 13L/14 AEROMAGNETIC MAP



NTS 13L/14 Aeromagnetic map, G. Kilfoil (2008, unpublished map), Geological Survey of Newfoundland and Labrador, using Geological Survey of Canada data.

Red end of spectrum indicate magnetic highs. Blue end of spectrum indicate magnetic lows.

LEGEND

MIDDLE MESOPROTEROZOIC

Seal Lake Group (1270-1225 Ma)

Upper Red Quartzite Formation

M,sq; M,tf

M,sq — Red- to pink-weathering, fine- to medium-grained, well-sorted quartz arenite, arenite, and feldspathic arenite. Contains local, cm- to m-scale lenses, and layers of fine-grained slate and siltstone, particularly in the lower levels of the formation

M,tf — Fine-grained, maroon-weathering slate and siltstone. Occur as cm- to 10s of m-thick layers and lenses interbedded with quartz and arenite near the base of the formation

Adeline Island Formation

Upper Member

M,ut; M,gn; M,ps; M,st; M,ss; M,sc; M,gs; M,sh

M,sh; M,gn; M,ps — Maroon- to red-weathering, fine-grained shale, locally grades to slate

M,gn — Grey- to green-weathering, fine-grained slate

M,gs — Grey- to green-weathering, fine-grained slate, locally gradational to phyllite

M,st — Red- to purple-weathering slate

M,ss — Grey-weathering, fine-grained sandy shale to slate

M,sc — Maroon- to purple-weathering, fine-grained slate

M,gs — Grey-, silver- to green-weathering, fine-grained slate, gradational to phyllite. This unit exhibits a distinctive 'silver-grey sheen' and hosts most of the copper sulphide mineralization within the Seal Lake Group

M,sh — Maroon- to purple-weathering, fine-grained slate

Middle Member

M,aq

M,aq — Pink-, red- to locally white-weathering variably recrystallized quartz arenite to arenite. This unit also contains local, thin layers and lenses of slate

Lower Member

M,sl

M,sl — Maroon- to red-weathering, fine-grained slate. Basal unit of the Adeline Island Formation is locally intercalated with layers and lenses of fine-grained quartz arenite

M,b

M,b — Green- to brown-weathering, fine-grained, massive amygdaloidal basalt flows. Flows are 1- to 5-m thick, and intercalated with sedimentary units

Salmon Lake Formation

M,ms; M,gn; M,v; M,cg; M,s; M,g

M,ms — Maroon- to red-weathering, fine-grained slate. Locally contains thin, fine-grained interbedded siltstone and quartz arenite

M,gn — Grey- to green-grey-weathering, fine-grained phyllite to slate

M,ls — Grey- to brown-weathering, fine-grained limestone with rare stromatolitic layers. Also occurs as thin lenses and layers interbedded with other sedimentary rock units

M,q — Pink-, white- to grey-weathering, fine- to medium-grained variably recrystallized quartz arenite to arenite

M,b — Green-, red- to brown-weathering, fine- to medium-grained, moderate to strongly foliated, massive and amygdaloidal basalt flows

M,g — Green-, brown- to grey-weathering, fine- to medium-grained ophitic to equigranular gabbro. Occurs as tabular-shaped sills and small, irregular intrusions

Whiskey Lake Formation

M,st; M,sl

M,st — Brown-, maroon- to red-weathering, thin-bedded to laminated slate, arenite, siltstone and subordinate calcareous rocks and chert

M,sl — Maroon-weathering, thin-bedded to laminated slate. Occurs predominantly as thin lenses and layers

Wuchusk Lake Formation

M,aq; M,sf; M,ms; M,ls; M,b; M,vf; M,g

M,aq — Predominantly pink-, white-, grey- to red-weathering variably recrystallized quartz arenite and arenite occurring as layers of variable thickness interleaved with gabbro sills and basalt flows. Contains cm- and m-scale interbeds of siltstone, mudstone and calcareous rocks

M,st — Brown- to tan-weathering, fine-grained, thin-bedded to laminated siltstone. Also contains thin quartz arenite, arenite, chert, and calcareous layers

M,ms — Fine-grained, red-, maroon- to brown-weathering mudstone, grading to shale and slate and having a weak to strongly developed S₁ axial-planar cleavage

M,bs — Black- to grey-weathering, fine-grained shale interbedded with siltstone and quartz arenite units. Exhibits localized and intermittent elevated radioactive signatures (recorded by scintillometer) on outcrop surface

M,ls — Brown- to grey-weathering, fine- to medium-grained, well-bedded to massive limestone. Occurs as m to 10s of m-scale layers and beds interbedded with other sedimentary rock units

M,b — Green-grey, brown- to red-weathering, fine- to medium-grained plagioclase+clinopyroxene+magnetite basalt. Textures range from homogeneous, massive, amygdaloidal, vesicular and porphyritic. May contain intercalated layers of volcanic tuffaceous rocks, sedimentary rocks and gabbro

M,vf — Brown- to grey-weathering volcaniclastic tuff containing 5-15% feldspar clasts. Occurs as less than 25 m-thick layers intercalated with fine-grained black shale. Locally records elevated radioactivity signatures

M,g — Green-, grey-brown- to rusty-weathering, fine- to very coarse-grained, massive to strongly foliated ophitic gabbro. Rocks are disposed as tabular shaped sills. Contains local leucotroctolite and leuconorite zones. Some sills may consist of composite intrusions

Majoqua and Bessie Lake Formations (stratigraphically equivalent formations)

M,st; M,sl; M,aq; M,qc; M,cg; M,b; M,gr; M,bx/; M,bx; M,ps; M,sg; M,g

M,st — Brown- to maroon-weathering, fine-grained slate. Locally interbedded with quartz arenite, arenite and siltstone layers

M,sl — Brown- to tan-weathering, fine-grained, thin-bedded mudstone to siltstone. Unit contains m- and 10s of m-scale layers of quartz arenite, arenite and minor lime-bearing argillaceous rocks

M,aq — White-, pink-, red-green- to grey-weathering, fine- to coarse-grained variably recrystallized quartz arenite and arenite. Predominant rock within the basal stratigraphic formation containing abundant cm-, to 10s of m-scale interbedded layers of siltstone, mudstone, shale and minor calcareous rocks

M,qc — White-, pink-, red- to grey-weathering, medium- to coarse-grained granule-, pebble- and cobble-bearing arenaceous conglomerate

M,cg — White-, to grey-weathering, fine- to medium-grained, strongly foliated and recrystallized quartz sericite schist, derived from quartz arenite and arenaceous conglomerate. Contains quartz+alkali feldspar+sericite±muscovite±magnetite

M,b — Green-grey, brown- to red-weathering, fine- to medium-grained plagioclase+clinopyroxene+magnetite basalt. May contain intercalated layers of volcanic tuffaceous rocks, sedimentary rocks and gabbro (as thin sills)

M,bv — Green-grey- to brown-weathering, fine- to medium-grained, rubbly-textured volcaniclastic rocks. Locally exhibits a diffuse layering that may include volcaniclastic breccia and intrusive breccia. May also include fine-grained, homogeneous basalt flows and sedimentary rocks

M,bx; M,bx,i — Green-grey- to brown-weathering, medium-grained, volcanic and intrusive breccia. Occurs as localized layers within thick sequences of basalt flows. Contains clasts and fragments of basalt, volcaniclastic rocks, gabbro and sedimentary rocks in basaltic and gabbroic matrices

M,bpi — Green- brown- to grey-weathering, fine- to medium-grained basalt flow containing local pillow structures

M,bg — Green-weathering, fine-grained, very strongly deformed basalt, metamorphosed to mylonitic chlorite schist. Occurs as thin zones adjacent to north and northeast-striking thrust fault

M,g — Green- to grey-green-weathering, fine- to medium-grained, massive, ophitic-textured gabbro. Occurs as rare, less than 100 m thick sills intruding quartz arenite and arenite and basalt flows

Harp Dykes (1271 ± 1 Ma)

M,d

M,d — Northeast-striking, olivine diabase dykes intrude anorthosite and related rocks of the Harp Lake Intrusive Suite

Letitia Lake Group (ca. 1327 Ma)

M,mt; M,cg; M,rp

M,mt — Fine- to medium-grained, black- to grey-weathering, strongly foliated and lineated hornblende-bearing mafic-rich schist or gneiss. Unit forms the basal part of a uppermost layer of Letitia Lake Group in unconformable contact with quartz-sericite schist at the base of the Seal Lake Group

M,cg — Well-banded and complexly folded felsic volcanic rocks: volcanic derived sedimentary rocks of the Letitia Lake Group may include quartz-feldspar-rich sedimentary rocks of the overlying Seal Lake Group

M,rp — White-, buff- to grey-weathering, weakly foliated to gneissic, medium-grained, recrystallized rhyolite porphyry to trachyte and ignimbritic tuffs. Locally intercalated with undifferentiated felsic volcanic rocks

Red Wine Complex (ca. 1337 Ma)

Quartz saturated series

M,qgr

M,qgr — Medium-grained, moderate to strongly foliated mafic to intermediate peralkaline granitoid intrusions. Includes granite, quartz syenite, alkali-feldspar granite and alkali-feldspar quartz syenite

Quartz undersaturated series

M,sy

M,sy — Alkali syenite and metamorphic equivalents

EARLY MESOPROTEROZOIC

Harp Lake Intrusive Suite (ca. 1450 Ma)

M,ul; M,ug

M,ul — Grey- to grey-white-weathering, medium- to coarse-grained, massive to layered, clinopyroxene+magnetite±ilmenite±olivine anorthosite, leucogabbro and leucotroctolite. The predominant rock type mapped proximal to the unconformity with Seal Lake Group rocks is massive anorthosite, with zones of leucotroctolite

M,ug — Light brown- to rust-weathering, medium- to coarse-grained, massive biotite±hornblende granite, locally gradational to quartz monzonite

LATE PALEOPROTEROZOIC

LATE LABRADORIAN ROCKS (1660 - 1650 Ma, reworked during Grenvillian Orogeny)

North Pole Brook Intrusive Suite (Trans-Labrador batholith, ca. 1650 Ma)

P,pgm; P,pgt

P,pgm — White- to pink-weathering, fine- to medium-grained, recrystallized, weakly foliated to mylonitic, K-feldspar porphyritic, biotite±hornblende quartz monzonite to granite, locally gradational to granodiorite

P,pgd — Grey- to green-grey-weathering, massive to foliated hornblende+biotite quartz diorite to diorite

Unassigned intrusions

P,pgt

P,pgb — Unassigned gabbro to gabbronorite

Bruce River Group (ca. 1650 Ma)

Silvia Lake Formation

P,yd

P,yd — Rhyolite, andesite, trachyandesite and basalt. Occurs as massive to brecciated flows, agglomerate and locally bedded tuffaceous rocks

Brown Lake Formation

P,ju

P,ju — Volcaniclastic sandstone, tuff, minor conglomerate and arkose

MIDDLE PALEOPROTEROZOIC

Moran Lake Group (ca. 1800 Ma)

Warren Creek Formation

P,mL

P,mL — Grey- to black-weathering mudstone, slate, siltstone and minor limestone, dolostone and chert

ARCHEAN-PALEOPROTEROZOIC

Southeastern Churchill Province (reworked during Grenvillian Orogeny)

A,gd; A,gr; A,pd; A,mz; A,ala

A,gd — Undifferentiated foliated granite and orthogneiss. May be correlative with rocks of the Sail Lake Intrusive Suite

A,gr — Fine- to medium-grained, weak to moderately foliated, biotite±hornblende granite to quartz monzonite

A,pd — Medium-grained, weakly foliated, hornblende+biotite quartz diorite to diorite. May be correlative with rocks of the Sail Lake Intrusive Suite

A,mz — Medium-grained, weakly to strongly foliated hornblende+biotite monzonite. May be correlative with rocks of the Sail Lake Intrusive Suite

A,sl — Sail Lake Intrusive Suite, includes foliated to gneissic granite, quartz monzonite, granodiorite, quartz diorite and diorite

Southern Nain and Makkovik provinces

A,gd

A,gd — Granodiorite, tonalite orthogneiss and abundant mafic intrusions

Note: Legend is common to all maps (Map 2023-14 to Map 2023-33), but all units do not appear on every map.

SYMBOLS

Data Station

Bedding (tops unknown, known, overturned, horizontal)

Bedding (parallel to foliation)

Crossbedding (overturned)

Sedimentary ripple marks (flow direction)

Igneous layering (tops unknown)

Foliation, 1st generation (inclined, vertical, horizontal)

Foliation, 2nd generation (inclined, vertical, horizontal)

Gneissosity (inclined, vertical, horizontal)

Fold axis (1st, 2nd generation)

Mineral lineation (1st, 2nd generation)

Slicken striae (unknown generation)

Glacial striae (relative age not indicated)

Synform (plunge direction known, unknown, overturned)

Antiform (plunge direction known, unknown, overturned)

Strike slip, primarily brittle fault (offset sense unknown, indicated)

Thrust fault [1](defined, approximate)

Contact (defined, approximate, assumed)

Unconformity (defined, approximate)

Aerial photograph lineament

Mineral occurrence (prospect, showing, indication)

Elevation point (metres above sea level)

Gravel road

Esker

Unconsolidated gravel and sand deposits

[1] Thrust faults based on the presence of ductile features such as mylonitic fabric, rotated phenocrysts and assymetric pressure shadows and, in part, on aeromagnetic signatures. Direction of thrust teeth indicate the dip of thrust fault.

Mineral Occurrence

Cu Copper
Ag Silver
U Uranium (radioactive)
Ti Titanium
Pyr Pyrite
Nb Niobium
Zn Zinc

Status and location of mineral occurrences are referenced after Mineral Occurrence Database System (2022).

Map 2023-31

GEOLOGY OF THE MAIN LAKE MAP AREA (NTS 13L/14)

OPEN FILE 13L/14/0161

Scale 1:50 000

0 0.5 1 2 3 4
km