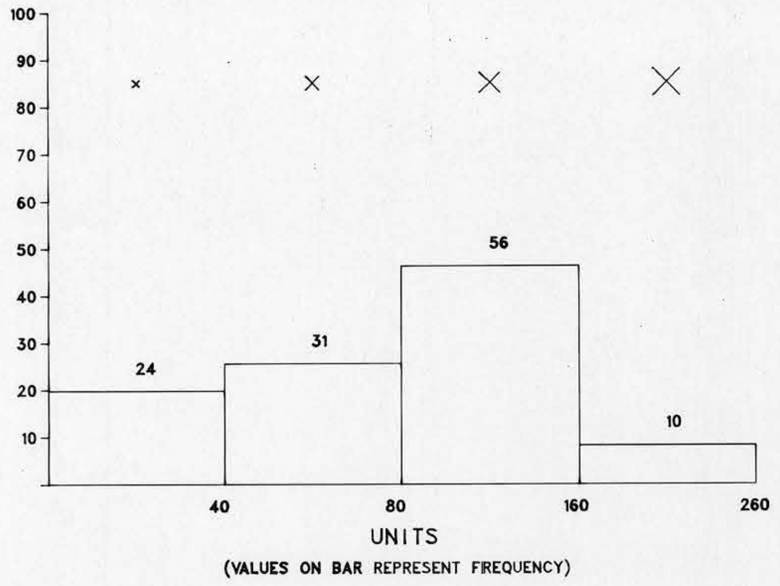
N POINTS 121 MEAN 87
MEDIAN 84 STD DEV 52
MINIMUM 5 MAXIMUM 260



CERIUM (PPM)

TILL GEOCHEMISTRY
CENTRAL MINERAL BELT, LABRADOR

SNEGAMOOK LAKE NTS 13K

F.J. THOMPSON, R.A. KLASSEN, R.K. BURNS

Normal range of values for Ce is 30-100 ppm. Low background values, 5-20 ppm, occur in tills derived from the Harp Lake Anorthosite. Scattered high background values, 100-200 ppm, in the Seal Lake area may reflect either the composition of the underlying bedrock or transport from the Ce bearing rocks of the Red Wine Complex and Letitia Lake volcanics 40 km to the west. One sample over Moran Lake Group returned 215 ppm Ce.

Introduction

Geochemical analysis of till in the Snegamook Lake area of central Labrador are presented on the accompaning maps at a scale of 1:250,000. The till samples were collected during the 1984 and 1985 field seasons by the Terrain Sciences Division, Geological Survey of Canada, to establish drift composition and patterns of glacial dispersal in the area and to develop techniques of drift prospecting. The work has been funded by the Canada – Newfoundland Mineral Development agreement.

Sample densities varied from 1-3 per 100 km^2 in areas with limited mineral potential, and from 8-15 per 100 km^2 within the Central Mineral Belt. Pits were dug, by shovel, to depths of 30-70 cm depending on depth to bedrock and on difficulties in penetrating stony till. Samples were collected from the least oxidized and most organic-free section of the modern soil profile near the base of the pit. In areas of tundra vegetation, pits were dug in mudboils where soil zonation was absent or poorly developed due to periglacial churning.

The clay-sized (<0.002 mm) fraction of the till samples was analyzed for Cu, Pb, Zn, Ni, Cr, Mo, Mn, and Fe by atomic absorption methods and for U by delayed neutron activation. The silt plus clay-sized (<0.063 mm) fraction of selected samples was analyzed for Be, Ce, Nb, Sn, Y and Zr by X-ray fluorescence and Au by fire assay/atomic absorption. All geochemical analyses were done by Bondar-Clegg and Co. Ltd., Ottawa. About 440 clay-sized samples and 111 silt plus clay-sized samples were analyzed.

Physiography and bedrock geology

The study area is rugged, with hills commonly rising 200 m above valley floors. Sample sites were preferentially located on hilltops because valley bottoms are heavily forested, providing few landing sites, and because major valleys are commonly infilled with glaciofluvial and glaciomarine deposits. The bedrock comprises Archean gneiss and Paleohelikian anorthosite to the north, and Grenville gneiss and Paleohelikian granite to the south. The central part of the study area is underlain by supracrustal volcanics and sediments which include Aphebian Aillik and Moran Lake Groups, Paleohelikian Bruce River Group, and Neohelikian Seal Lake Group. The volcanics and sediments are part of the Central Mineral Belt, which is considered to have potential for economic mineralization in base metals, gold and uranium.

Glacial Geology

Regional Ice flow trends are indicated by the orientation of striae and glacial landforms. Sense of movement has been determined by the shape of streamlined landforms and by small scale features on outcrop surfaces. The prominent ice flow trends are east northeast in the central part of the map area, east-south east in the south and northeast in the north. Striations recording an older northeast phase of ice flow are preserved in the central part of the map area. The northeast trending striations are consistent in orientation and relative age with striation recorded in the Churchill falls area, Letitia Lake area and Labrador Trough and are considered to have formed during a major phase of ice flow prior to the last regional phase.

The dispersal patterns of glacial erratics (not shown), Red Wine Alkaline Intrusive Suite, Seal Lake Group Basalt, Bruce River Volcanics and Snegamook Granite demonstrate broad fan-shaped eastward dispersal of 30 to more than 150 km from their respective bedrock sources. Transport of erratics and development of fan shapes is consistent with the last regional ice flow trends. Erratics of Red Wine Alkaline complex occur in till north of the Kanairiktok River, 200 km northeast of the bedrock source demonstrating transport in the earlier northeast phase of ice flow (Thompson and Klassen, 1986). The foregoing suggests that glacial debris has been subjected to a complex history of transport. Furthermore, as yet unrecognized, topographically controlled local variations in ice movement, particularly in low areas or on hillsides, may have played an important role in the transport of glacial debris during the late stages of glaciation.

Geochemistry

The geochemistry of the till generally reflects the geochemistry of underlying and immediately up ice bedrock. Isolated anomalous values may reflect economically interesting mineralization in the bedrock up ice.

Contribution to the
CANADA-NEWFOUNDLAND MINERAL DEVELOPMENT AGREEMENT 1984-1989

DEPARTMENT OF MINES AND ENERGY
GOVERNMENT OF NEWFOUNDLAND AND LABRADOR

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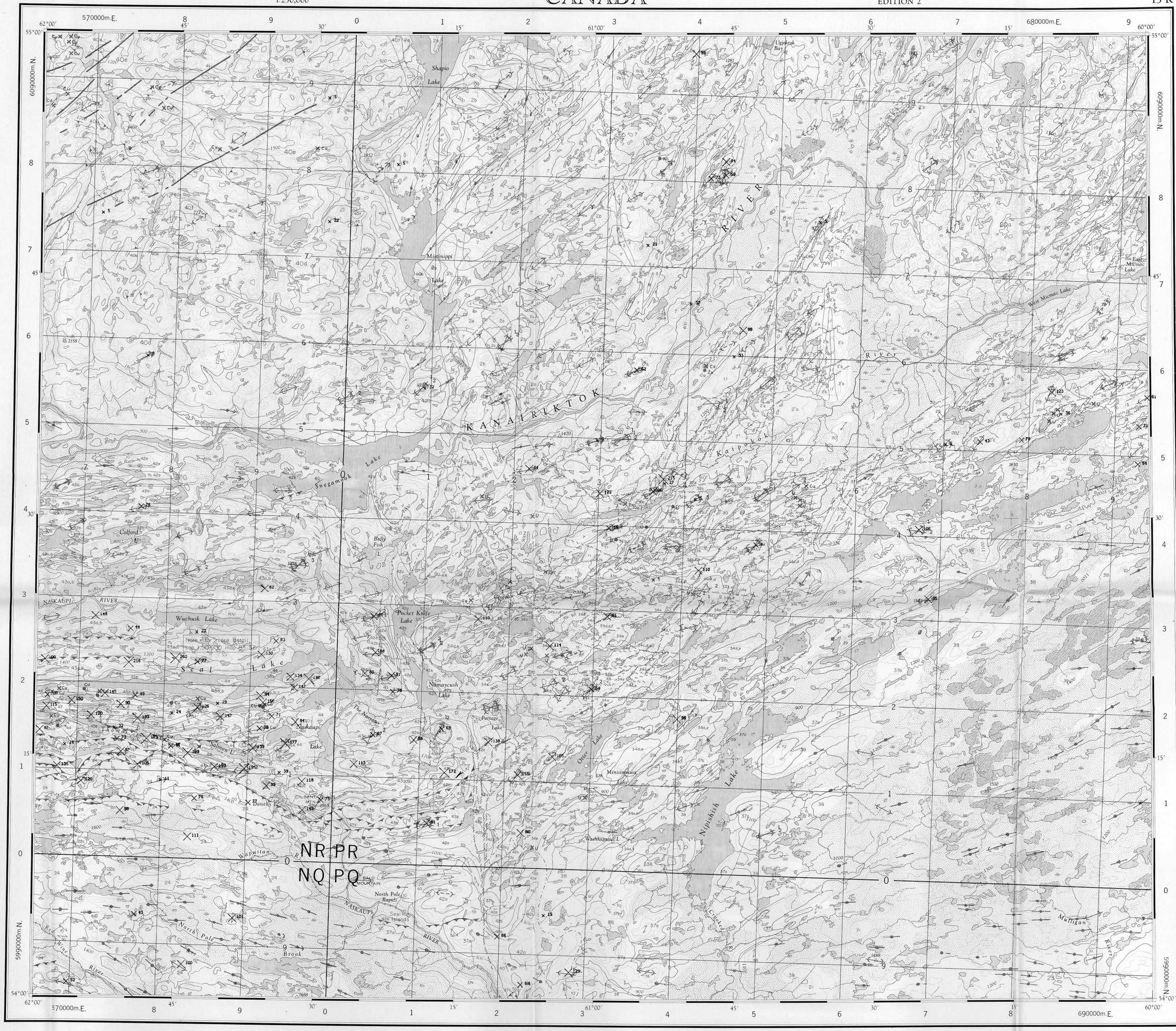
13 K 1:250,000 CANADA EDITION 2 13 K



References

Thompson, F.J. and Klassen, R.A.
1986: Ice flow directions and drift composition, central Labrador; in Current Research, Part A, Geological Survey of Canada, Paper 86-1A, p. 713-717.

The reader is also referred to
1983: Regional Lake Sediment and Water Geochemical Reconnaissance Data, Labrador, Geological Survey of Canada, Open File 997, NGR-62-1983, NTS 13K.

1983: Mineral Occurrence Map, Wuchusk Lake, Map 83-37; compiled by C.F. O'Driscoll and N. Noel, Department of Mines and Energy, Newfoundland.

1983: Mineral Occurrence Map, Snegamook Lake, 13 K, Map 83-36; compiled by C.F. O'Driscoll and N. Noel, Department of Mines and Energy, Newfoundland.

SNEGAMOOK LAKE

NEWFOUNDLAND

Scale 1:250 000

Kilometres 5 0 5 10 15 20 Kilometres

Universal Transverse Mercator Projection

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SYMBOLS

Drift covered area
Bedding, tops known (inclined, overturned)
Bedding, tops unknown (inclined)
Schistosity, gneissosity, cleavage (inclined, vertical, dip unknown)
Fault (defined, approximate, assumed)
Thrust fault (defined, approximate, assumed)
Anticlinal axis
Synclinal axis
Geological boundary
Unconformity
Igneous layering (inclined, dip unknown, estimation from airborne observation)

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LEGEND

QUATERNARY

Poorly sorted glacial till, boulder fields, and sandy outwash. Extensive exposures of swamp along Kaipokok River.

GRENVILLE PROVINCE FORELAND ZONE

NEOHELIKIAN

GABBRO, DIORITE, DIABASE

48 Medium to fine grained, mafic and intermediate intrusive rocks of unknown absolute age.

SEAL LAKE GROUP

47 Upper Red Quartzite Formation: Well bedded, crossbedded, red quartzite.

46 Adeline Island Formation: Shale, slate and quartzite.

45 Salmon Lake Formation: 45a, Red shale and silty quartzite, some interbedded basalt; 45b, amygdaloidal basalt, some interbedded sediments; 45c, diabase dikes and sills.

44 Whisky Lake Formation: Red and gray shale, slate, and argillite; minor red quartzite.

43 Wuchusk Lake Formation: 43a, Quartzite, shale, chert, and limestone; 43b, diabase and gabbro sills.

42 Bessie Lake Formation: 42a, White, gray and pink, quartzite, arkose, and conglomerate; 42b, amygdaloidal and vesicular basalt.

HARP LAKE COMPLEX

41 Olivine diabase dikes

40 40a, Pink to red, leucocratic, massive, medium to coarse grained granite; 40b, massive, mainly coarse grained adamellite; 40c, ferrodiorite, locally monzodiorite or diorite, mainly massive, fine to medium grained; 40d, anorthosite, leuconorite, less common leucogabbro, very rarely contains olivine; 40e, anorthosite, leucotroctolite, leuconorite, minor leucogabbro, commonly contains olivine; 40f, gabbroic rocks, mainly fine to medium grained, in part massive, in part weakly layered, includes small bodies of layered olivine gabbro and troctolite.

PALEOHELIKIAN

MICHAEL GABBRO

39 Medium to fine grained olivine gabbro; actinolite-plagioclase-biotite schist (metagabbro).

NIPISHISH LAKE INTRUSIVE SUITE

38 Crooked River Granite: Pink to gray, muscovite and biotite bearing aplite and fine to medium grained, pink biotite granite.

37 Otter Lake - Walker Lake Granite: 37a, Pink to gray, equigranular and porphyritic, biotite ± hornblende granite, granodiorite and monzonite, undivided; 37b, green to gray, medium grained diorite.

BRUCE RIVER GROUP

36 Synvolcanic, red to pink, quartz-feldspar porphyry.

35 Synvolcanic, gray to black, plagioclase porphyry. May be extrusive in part.

34 Sylvia Lake Formation: 34a, Brown to green, flow brecciated rhyolite; 34b, dark green to gray, massive to slightly porphyritic andesite and basalt; 34c, mauve to green, plagioclase porphyritic andesite and trachyandesite; 34d, massive to porphyritic, gray and green basalt, andesite, and trachyandesite flows, agglomerate, breccia and bedded tuff; 34e, massive to porphyritic, red, purple, gray, and black trachyte and rhyolite ignimbrite, flows, breccia, agglomerate, and bedded tuff; 34f, volcaniclastic mudstone, sandstone and conglomerate.

33 Brown Lake Formation: 33a, Red, polymictic conglomerate and minor, white, oligomictic conglomerate; 33b, pink, red, buff, and green volcaniclastic sandstone, cherty dust tuff, minor conglomerate, and subarkose, undivided.

32 Heggart Lake Formation: 32a, Massive to well bedded, buff to maroon, arkosic sandstone, minor polymictic conglomerate, and mudstone; 32b, red and gray, pebble to cobble, polymictic conglomerate; 32c, massive and porphyritic mafic flows and/or sills and/or dikes.

SOUTHERN KAIPOKOK VALLEY INTRUSIVE SUITE

31 Differentiated diorite.

30 Junior Lake Granite: Undeformed to weakly foliated, medium grained, hornblende granodiorite.

29 Megacrystic, medium to coarse grained, undeformed to weakly foliated biotite granodiorite.

28 Pink, undeformed to weakly foliated, medium grained, potassic granite.

27 Gray, medium to fine grained, foliated quartz monzonite.

PALEOHELIKIAN–APHEBIAN

26 Gabbronorite: Hypersthene and augite bearing gabbro to norite.

25 Hypersthene Granite: Hypersthene granite containing minor amounts of augite.

24 North Pole Brook Intrusive Suite: Biotite-hornblende granodiorite, quartz monzonite, quartz diorite and diorite.

23 Granite to granodiorite, massive to poorly foliated, may be porphyritic in part.

APHEBIAN OR EARLIER

22 Wapustan River Metamorphic Suite: 22a, Banded muscovite-biotite quartzofeldspathic gneiss; 22b, pelitic schist, metagraywacke, metaquartzite; 22c, mafic metavolcanic rocks; 22d, amphibolite (metadiabase).

21 Quartz-feldspar-hornblende-biotite gneiss and migmatite of uncertain affinity.

MAKKOVIK SUBPROVINCE MOBILE ZONE

SYNKINEMATIC AND LATE KINEMATIC GRANITES

20 Island Harbour Granite: Pink and gray, medium grained, equigranular to porphyritic, granodiorite. Border zone (20a), contains numerous gneiss xenoliths and is mylonitic.

19 Well foliated medium grained granite, granodiorite and quartz monzonite.

UNDIVIDED SUPRACRUSTAL ROCKS

18 Metavolcanic rocks of diverse origin varying from bedded mafic and felsic tuffs to banded amphibolite.

17 Metasedimentary rocks varying from slate, phyllite, and psammite to garnetiferous muscovite-biotite schist.

AILLIK GROUP

UPPER SEQUENCE

16 Gray to pink, porphyritic and nonporphyritic rhyolite, in part intrusive; ignimbrite, ash-fall tuff, and volcanic breccia.

15 Pink, gray and green, laminated, volcaniclastic siltstone and sandstone.

LOWER SEQUENCE

14 14a, Green, schistose, intermediate to mafic volcanic rocks of diverse origin including flows, sills, bedded tuffs, and breccias; 14b, laminated garnetiferous mafic tuffs.

13 Gray to black, siltstone, mudstone, and slate, locally containing andalusite porphyroblasts; garnetiferous biotite-muscovite schist.

12 Banded white quartzite; minor actinolite and biotite schist.

MORAN LAKE GROUP EQUIVALENTS

11 Schistose mafic metavolcanic rocks of diverse origin; bedded tuffs present east of Island Pond. Metagabbro locally present east of Boiteau Lake and north of Island Pond.

10 Black, graphitic, and chlorite-sericite phyllite and slate; minor chert, dolostone, and sandstone.

NAIN PROVINCE AND MAKKOVIK SUBPROVINCE FORELAND ZONE

APHEBIAN

MORAN LAKE GROUP

11 Joe Pond Formation: Massive and pillowed basalt, pillow breccia and bedded tuff; minor dolostone and chert.

10 Warren Creek Formation: 10a, Gray to black mudstone, slate, siltstone, sandstone, and mudstone with minor limestone, dolostone and chert, undivided; 10b, gray sandstone; 10c, brown dolostone.

ARCHEAN

KANAIRIKTOK VALLEY COMPLEX

GABBRO AND DIABASE

8 Coarse to fine grained mafic dikes, generally undeformed but locally schistose. May include post-Archean dikes.

KANAIRIKTOK INTRUSIVE SUITE

7 Massive to weakly foliated to gneissic, medium grained, gray to pink, granite, granodiorite, and tonalite.

ULTRAMAFIC ROCKS

6 Serpentinized peridotite and talc-carbonate rocks.

FLORENCE LAKE GROUP

5 Lise Lake Formation: Felsic lapilli tuff, lapillistone, minor chert and marble.

4 Adlatok Formation: Intermediate to felsic tuff, volcanic breccia, porphyritic sills, minor marble.

3 Schist Lakes Formation: Mafic flows and sills, intermediate and felsic tuffs and sills, minor marble. Mafic flows locally pillowed.

MAGGO GNEISS AND WEEKES AMPHIBOLITE

2 2a, Layered, amphibolite facies, quartzofeldspathic gneiss with numerous amphibolite inclusions, cut by pegmatite and aplite dikes, and locally highly migmatized; 2b, migmatites of various ages.

1 Layered amphibolite, locally garnetiferous.

KAIPOKOK VALLEY COMPLEX

BALLET POND SCHISTS

9 9a, Quartzofeldspathic and mafic schist tectonically derived from 1', 2', 4', 8', undivided; 9b, retrogressed and partially refoliated banded gneiss; 9c, schistose leucogranite.

GABBRO AND DIABASE

8' Coarse to fine grained mafic dikes, locally as swarms. Undeformed to slightly schistose, and discordant to layering in 1', 2'a, but commonly rotated parallel to superimposed foliation in 2'b.

KANAIRIKTOK INTRUSIVE SUITE EQUIVALENTS

7' Massive to weakly foliated, medium grained, gray tonalite and granodiorite.

FLORENCE LAKE GROUP EQUIVALENTS

4' Deformed, pale green, felsic lapilli tuff, volcanic breccia, and siliceous volcanogenic sediments; minor chert and marble.

3' Deformed pillow lava.

MAGGO GNEISS AND WEEKES AMPHIBOLITE EQUIVALENTS

2' 2'a, Layered, amphibolite facies, quartzofeldspathic gneiss and interlayered amphibolite; 2'b, partially retrogressed and refoliated layered gneiss and amphibolite, commonly mylonitic; 2'c, gray refoliated migmatite.

1' Layered amphibolite, locally garnetiferous.

Geology from:

O'Driscoll, C.F. and Noel, N. (compilers)
1983: Mineral occurrences Snegamook Lake; Mineral Development Division, Department of Mines and Energy, Government of Newfoundland and Labrador, Map 83-36.

STRIAE, WELL DEFINED (FLOW DIRECTION KNOWN,UNKNOWN) NUMBERS INDICATE RELATIVE AGE)

STRIAE, POORLY DEFINED (FLOW DIRECTION KNOWN,UNKNOWN)

STREAMLINED LANDFORMS (FLOW DIRECTION KNOWN,UNKNOWN)

From:
Fulton, R.J. Hodgson, D.A., Minning, G.V., and Thomas, R.D.
1980: Surficial materials, Snegamook Lake, Labrador; Geological Survey of Canada Map 27-1979.

Mineral showing....................................×
Mineral prospect....................................●

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