

Parts of Grand Lake and Nipishish Lake

The southern third of the present area was originally published as part of an uncoloured map, with accompanying report, by Eidner (1984). The northern two-thirds were originally published as part of an uncoloured map, with accompanying report, by Gower (1986). Both previous maps and reports mainly covered areas further east and superseded earlier documents by Eidner (1984) and Gower (1986).

The present map is augmented by follow-up examination of stained slabs, petrographic thin sections, and whole-rock geochemical analyses, including those archived by Eidner. U-Pb geochronological results (Schärer et al., 1986; Gower and Kamu, 1997), Nd-Sm and Rb-Sr isotopic data (Schärer, 1991; Emslie et al., 1997), and a petrographic list of Fahrig and Laroche (1972) are shown. No mineral occurrences are known in the map areas.

The present map differs little from those published by Eidner (1984) and Gower (1986). Unit modification is partly related to a compilation approach applied to the whole of eastern Labrador, but border regions of the map have been revised as a result of data integration with adjacent map areas. Geological boundaries are poorly controlled from outcrop data, and have been extrapolated using structural observations, regional aeromagnetic data and topographic trends. Data station sites have been digitized from where originally located on aerial photographs or (rarely) on topographic maps, so reliability of location is likely mostly dependent on initial plotting accuracy.

As is characteristic of metamorphic and plutonic terranes, individual outcrops are typically very complex, and commonly embody several different rock types. Generally, the unit polygon depicted is based on what was judged to be the dominant rock type present, but this approach was not universally followed, due to the exigencies of specific situations, such as the need to emphasize minor rock types deemed to have high significance. All rock types recorded from any individual outcrop may be determined by consulting the 'unit designator' string for that locality given in the digital database. The user is alerted to the fact that, in the digital database, no attempt has been made to reconcile rock names applied to field outcrops, versus those applied to stained slabs, or petrographic thin sections. Differences may be due to subsequent, more refined identifications but other reasons may apply, such the sample (or thin section) not being representative of its source. Unit designator and polygon labels applied are based on an awareness of such factors.

Recommended citation:
Gower, C.F., 2010. Geology of parts of the Grand Lake and Nipishish Lake areas (NTS sheets 13F/16, 13K/01 and 13K/06), central Labrador. Geological Survey, Mines Branch, Department of Natural Resources, Government of Newfoundland and Labrador, Map 2010-05, Open File LAB/1570.

Geological cartography by T. Pattanavaj, Cartographic Unit, Geological Survey, Department of Natural Resources.

Digital NTS base maps (NTS 13F/16, 13K/01 and 06) used for this map are available from Surveys and Mapping Branch, Natural Resources Canada. Magnetic declination at 53° 45' N, 60° 30' W at the start of 2010 was 22° 50'. Elevations are in feet above sea level. Contour interval is 50 feet. UTM (Universal Transverse Mercator) Grid Zone 20 (but projected in Zone 21), NAD (North American Datum) 27.

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Copies of this map may be obtained from the Geoscience Publications and Information Section, Geological Survey, Mines Branch, Department of Natural Resources, Government of Newfoundland and Labrador, P.O. Box 8700, St. John's, NL A1B 4J8, Canada. Email: geoinfo@nl.ca

NOTE: Map 2010-05 is one of twenty-five maps on the geology of the Grenville Province in eastern Labrador and adjacent eastern Makovik Province produced by the Geological Survey, Mines Branch, Department of Natural Resources, Government of Newfoundland and Labrador.

Mines Branch website: <http://www.nrs.gov.nl.ca/nrmines/index.html>

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Gower, C.F. and Kamu, S., 1997. The age of the Nakami Hill ("Old Mokam") quartz monzonite, Grenville Province, eastern Labrador. In Current Research, Newfoundland Department of Mines and Energy, Geological Survey Branch, Report 97-1, 7 pages.

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Schärer, U., 1991. Rapid continental crust formation at 1.7 Ga from a reservoir with chondritic isotope signatures, eastern Labrador. Earth and Planetary Science Letters, Volume 102, pages 110-133.

Schärer, U., Krogh, T.E. and Gower, C.F., 1986. Age and evolution of the Grenville Province in eastern Labrador from U-Pb systematics in accessory minerals. Contributions to Mineralogy and Petrology, Volume 94, pages 438-451.

MINERAL OCCURRENCE ABBREVIATIONS	SYMBOLS
Amz Amazonite	Geological contact
Alz Almandine	Normal fault
Bt Biotite	Strike-slip fault
Chy Chrysoberyl	Thrust fault
Cu Copper	Normal fault reactivating thrust
Flu Fluorite	Fold axial plane (1st, 2nd, 3rd generation)*
Fe Feldspar	S-fold axis (1st generation)
Flu Fluorite	Z-fold axis (1st generation)
Gar Garnet	Dyke (activity unspecified)
Ilm Ilmenite	Fault (sense of movement unknown, dextral, sinistral, normal)
Lst Limestone	Joint
Mgt Magnetite	Linear fabric (1st, 2nd, 3rd generation)*
Mo Molybdenite	Fold axis (1st, 2nd, 3rd generation)*
Muz Muscovite	Geological data station
Nep Nepheline	Geological data station (no fabric measured)
Ni Nickel	Bedding (dips known, unknown)
Pb Pyrite	Enclave
Pt Platinum	Psolation (1st, 2nd, 3rd generation)*
Sph Sphalerite	Gneissosity (1st, 2nd generation)*
St Silica	Igneous layering (dips known, unknown)
Stn Dimension stone	Vein
Th Thorium	Shear zone (sense of movement unknown, dextral, sinistral, reverse)
Tourm Tourmaline	Mineral occurrence
Tz Topaz	Geochronology location
U Uranium	
V Vanadium	
Zn Zinc	
Zr Zirconium	
(?) Occurrence reported but validity suspect	

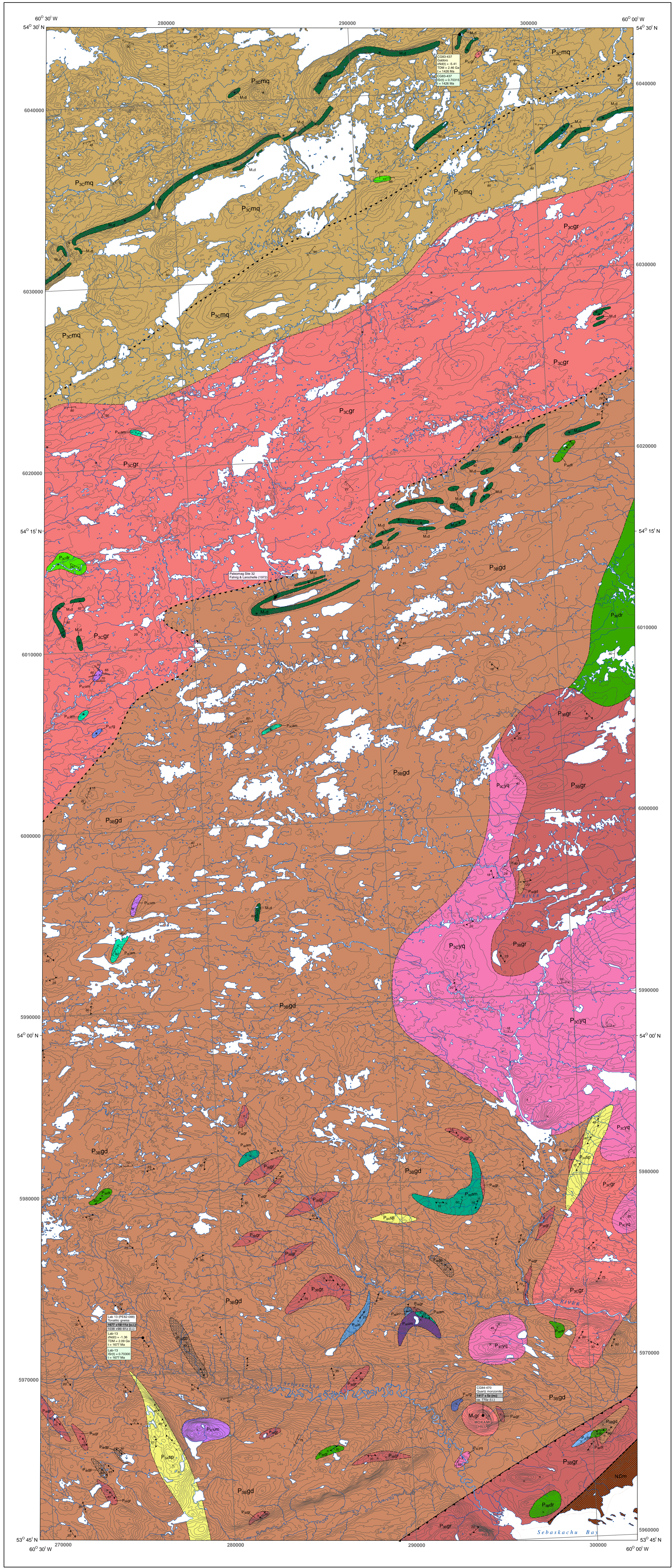
NOTE: All mineral occurrences and structural symbols do not appear on each map. Vertical structures use 90° dip value. * Generation of structure only applicable at observation site.

ISOTOPIC DATA SOURCES	Samples
Method Reference(s)	
U-Pb Gower and Kamu (1997)	CG84-470
U-Pb Schärer et al. (1986)	Lab-13 (PE82-088)
Nd-Sm Emslie et al. (1997)	CG83-57
Nd-Sm Schärer (1991)	Lab-13
Rb-Sr Emslie et al. (1997)	CG83-437
Rb-Sr Schärer (1991)	Lab-13
K/Ar no data	

UPb Geochronology	Nd/Sm Geochronology	Rb/Sr Geochronology	K/Ar Geochronology
Sample number	Sample number	Sample number	Sample number
Rock type	Rock type	Rock type	Rock type
Inferred/identical age	Initial Sr ratio calculated from time t	Initial Sr ratio calculated from time t	Initial Sr ratio calculated from time t
Emplacement age	Age	Age	Age
Meaningful/crosscutting/cooling/undefined/Plb loss age	Displaced mantle age	Age of rock	Age of rock
	(7 age inferred)	(7 age inferred)	(7 age inferred)
			(1 average of two or more analyses)
			(1 one of two or more analyses)
			ns - hornblende
			bl - biotite
			WR - whole rock
			pl - platiou gas
			tot gas - total gas age

ISOTOPIC DATA SOURCES	Samples
Method Reference(s)	
U-Pb Gower and Kamu (1997)	CG84-470
U-Pb Schärer et al. (1986)	Lab-13 (PE82-088)
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K/Ar no data	



Newfoundland Labrador
NATURAL RESOURCES
MAP 2010-05
OPEN FILE LAB/1570
GEOLOGY OF PARTS OF THE GRAND LAKE AND NIPISHISH LAKE AREAS
(NTS SHEETS 13F/16, 13K/01 & 13K/06), EASTERN LABRADOR

LEGEND

DEVONIAN (?)
Dc Sandwiche Bay and Battle Harbour dykes

EARLY CAMBRIAN
Forteau Formation
Brook Formation (subdivided into L'Anse-au-Clair, Crow Head and Blanc-Sabon members)

NEOPROTEROZOIC - EARLY CAMBRIAN
Lighthouse Cove Formation
Bateau Formation

NEOPROTEROZOIC
Ndm Double Mer Formation
NGI Gilbert anorthosite
NSB Sandwiche Bay conglomerate

Nc Clastic dykes
Nl Long Range dykes
Nq Quartz veins

LATE MESOPROTEROZOIC (M₁, 1200 - 900 Ma)
LATE POST-GRENVILLEAN INTRUSIONS (M₂, ca. 975 - 955 Ma)
e.g. Chateau Pond granite

M_{1gr} Massive to weakly foliated megacrystic/porphyritic granite to quartz monzonite
M_{1gr} Massive to weakly foliated granite to alkali-feldspar granite
M_{1gr} Massive to weakly foliated leucogabbro to leucoronite
M_{1gr} Massive to weakly foliated monzogabbro and monzonite
M_{1gr} Massive to weakly foliated quartz monzonite; marbled felsitic textures
M_{1gr} Massive to weakly foliated monzonite to monzodiorite
M_{1gr} Massive to weakly foliated syenite, quartz syenite and alkali-feldspar quartz syenite

M_{1d} Unnamed mafic dykes

EARLY POST-GRENVILLEAN INTRUSIONS (M₂, ca. 985 - 975 Ma)
e.g. Beaver Brook and Pictou Pond intrusions

M_{2gr} Weakly to moderately foliated granite to alkali-feldspar granite
M_{2gr} Weakly to moderately foliated leucogabbro to leucoronite
M_{2gr} Weakly to moderately foliated monzogabbro to monzonite
M_{2gr} Weakly to moderately foliated quartz monzonite
M_{2gr} Weakly to moderately foliated gabbro, norite and troctolite
M_{2gr} Weakly to moderately foliated syenite, quartz syenite and alkali-feldspar syenite

M_{2d} Unnamed mafic dykes

SYN-GRENVILLEAN INTRUSIONS (M₃, ca. 1085 - 985 Ma)
M_{3gr} Moderately to strongly foliated megacrystic/porphyritic granodiorite to quartz diorite
M_{3gr} Moderately to strongly foliated granodiorite to quartz diorite
M_{3gr} Moderately to strongly foliated granite to alkali-feldspar granite
M_{3gr} Moderately to strongly foliated aegirine- or nepheline-bearing syenite

M_{3d} Unnamed mafic dykes (Makovik Province and adjacent Grenville Province)

PRE-GRENVILLEAN INTRUSIONS (M₄, ca. 1200 - 1085 Ma)
e.g. Gilbert Bay pluton

M_{4gr} Weakly to strongly foliated granite
M_{4um} Weakly to strongly foliated monzonite to monzodiorite

MIDDLE MESOPROTEROZOIC (M₄, 1350 - 1200 Ma)
e.g. Upper North River intrusions

M_{4gr} Weakly to strongly foliated granite and alkali-feldspar granite
M_{4g} Weakly to strongly foliated gabbro/norite (in database only - Lourdes-de-Blanc-Sabon intrusion, Quebec)
M_{4gr} Weakly to strongly foliated syenite, quartz syenite and alkali-feldspar syenite

M_{4d} Mesdy dykes

EARLY MESOPROTEROZOIC (M, 1600 - 1350 Ma)
e.g. Upper Paradise River, Kyfanan Lake and 13B/12 intrusions, and Michael Gabbro

M_{1an} Massive or weakly foliated anorthosite to leucogabbro/norite, indistinctly layered in places
M_{1an} Weakly to markedly foliated amphibolite, plus leucocratic and melanocratic variants; granitic facies equivalents
M_{1d} Massive, weakly or strongly foliated diorite to amphibolite, may be metamorphic derivative of monzodiorite or leucogabbro/norite
M_{1gr} Moderately to strongly foliated megacrystic/porphyritic granitoid rocks
M_{1gr} Massive, weakly or strongly foliated granite to quartz monzonite
M_{1an} Massive, weakly or strongly foliated leucogabbro/norite and anorthositic gabbro, locally grading into gabbro/norite, locally coronic
M_{1m} Moderately to strongly foliated monzonite
M_{1m} Moderately to strongly foliated monzonite to quartz monzonite
M_{1m} Moderately to strongly foliated monzonite to monzodiorite
M_{1g} Massive to strongly foliated gabbro, norite and troctolite, commonly layered, subophitic and locally coronic; includes recrystallized derivatives retaining igneous textures
M_{1um} Massive, weakly or strongly foliated ultramafic rocks, commonly layered and locally showing cumulate textures
M_{1gr} Moderately to strongly foliated syenite and quartz syenite

M_{1d} Mafic dykes; includes Michael Gabbro

LATE PALEOPROTEROZOIC AND EARLY MESOPROTEROZOIC (PM 1800 - 1350 Ma)
(Ages generally unknown, but ca. 1650 Ma and 1500 - 1470 Ma rocks identified)

RECRYSTALLIZED IGNEOUS ROCKS
PM_{1a} Medium-grained, equigranular, recrystallized weakly to strongly foliated diorite, quartz diorite and to leucogabbro/norite
PM_{1g} Weakly to strongly foliated granite to granodiorite
PM_{1g} Megacrystic/porphyritic recrystallized granite to quartz monzonite
PM_{1g} Medium- to coarse-grained, recrystallized weakly to strongly foliated granite and alkali-feldspar granite
PM_{1m} Medium- to coarse-grained, recrystallized leucoronite, leucogabbro
PM_{1m} Medium- to coarse-grained, recrystallized, weakly to strongly foliated, monzodiorite to monzonite
PM_{1m} Medium- to coarse-grained, recrystallized, weakly to strongly foliated quartz monzonite
PM_{1g} Medium- to coarse-grained, gabbro, norite and troctolite
PM_{1m} Medium- to coarse-grained, recrystallized, weakly to strongly foliated tonalite to granodiorite
PM_{1g} Medium- to coarse-grained, recrystallized, weakly to strongly foliated syenite, alkali-feldspar syenite and quartz syenite

PM_{1am} Amphibolite; generally thought to be derived from mafic dykes

SUPRACRUSTAL ROCKS PROVISIONALLY ASSIGNED AS PITTS HARBOUR GROUP
PS_{1a} Calc-silicate rocks, compositionally layered, medium grained
PS_{1a} Pelitic schist and gneiss
PS_{1q} Quartzite, meta-arkose, thin to thick bedded
PS_{1s} Quartz-feldspar psammitic schist and gneiss; medium grained
PS_{1ax} Coarse-grained to pegmatitic-granitic material (diatexite), characteristically associated with psammitic gneiss and quartzite
PS_{1m} Fine- to medium-grained, banded quartzofeldspathic rocks; locally have lensoid shapes, possibly indicating felsic volcanoclastic protolith
PS_{1m} Fine- to medium-grained, banded amphibolite containing quartz-feldspar layers and calc-silicate pods; interpreted as mafic volcanic rocks

LATE PALEOPROTEROZOIC (P₁, 1800 - 1600 Ma)
LATE LABRADORIAN GRANITOID INTRUSIONS (P₂, 1660 - 1600 Ma)
e.g. Paradise Arm intrusion and Howe Bay intrusive suite

P_{1d} Diorite, quartz diorite and tonalite; locally grading into leucogabbro/norite
P_{1gr} Alkali-feldspar granite, granite and quartz syenite forming discrete plutons
P_{1gd} Granite to granodiorite forming discrete unmylonitized plutons
P_{1gr} Megacrystic/porphyritic granite to granodiorite
P_{1gr} Granite and minor alkali-feldspar granite
P_{1um} Monzonite and monzogabbro
P_{1um} Quartz monzonite, including rare quartz syenite
P_{1mz} Monzonite, including minor syenite
P_{1gr} Syenite to quartz syenite forming discrete plutons

P_{1d} Unnamed mafic dykes

LATE LABRADORIAN ANORTHOSITIC AND MAFIC INTRUSIONS (P₃, 1660 - 1600 Ma)
e.g. White Bear Arm complex and Sand Hill Big Pond intrusion

P_{3gr} Weakly to markedly foliated mafic granulite, plus leucocratic and melanocratic variants
P_{3am} Weakly to markedly foliated amphibolite, plus leucocratic and melanocratic variants
P_{3am} Massive to strongly foliated anorthosite and leucogabbro/norite
P_{3gr} Massive to strongly foliated gabbro and norite, commonly layered, subophitic and locally coronic

P_{3h} Primary textured to recrystallized leucogabbro/norite and leucogabbro; coronic locally
P_{3d} Primary textured to recrystallized leucogabbro/norite

P_{3um} Massive, weakly or strongly foliated ultramafic rocks, commonly layered and locally showing cumulate textures
P_{3am} Massive, weakly or strongly foliated ultramafic rocks, commonly layered and locally showing cumulate textures

EARLY LABRADORIAN MAFIC AND ASSOCIATED ROCKS (P₄, 1710 - 1600 Ma)
e.g. Alexis River anorthosite (assigned here although age is uncertain)

P_{4um} Weakly foliated to gneissic amphibolite and mafic granulite, plus leucocratic and melanocratic variants
P_{4um} Weakly foliated to gneissic anorthosite and leucogabbro
P_{4h} Weakly foliated to gneissic leucogabbro/norite and leucogabbro; coronic locally
P_{4um} Weakly foliated to gneissic monzonite and monzogabbro
P_{4gr} Weakly foliated to gneissic gabbro and norite
P_{4um} Massive, weakly or strongly foliated ultramafic rocks, commonly layered and locally showing cumulate textures

EARLY LABRADORIAN GRANITOID AND ASSOCIATED ROCKS (ca. 1678 and 1671 Ma)
e.g. Newnik Island and Red Island events

P_{4d} Foliated to gneissic diorite to quartz diorite, and compositionally equivalent well-banded gneiss, in part derived from mafic dykes
P_{4gd} Foliated to gneissic granodiorite and compositionally equivalent well-banded gneiss
P_{4gr} Foliated to gneissic megacrystic/porphyritic granitoid rocks, augen gneiss
P_{4gr} Foliated to gneissic granite and alkali-feldspar granite, and compositionally equivalent well-banded gneiss
P_{4mz} Foliated to gneissic quartz monzonite, grading into diorite or syenite, and compositionally equivalent well-banded gneiss
P_{4mz} Foliated to gneissic monzonite and monzodiorite, and compositionally equivalent well-banded gneiss
P_{4gr} Foliated to gneissic syenite, alkali-feldspar syenite and alkali-feldspar granite, and compositionally equivalent well-banded gneiss
P_{4um} Amphibolite skoliths, lenses and layers (mainly remnants of former dykes)

PRE-LABRADORIAN GRANITOID ROCKS (P₅, 1800 - 1710 Ma)
e.g. Newnik Island and Red Island events

P_{5gr} Mafic granulite skoliths, lenses and layers
P_{5d} Foliated to gneissic diorite to quartz diorite, and compositionally equivalent well-banded gneiss
P_{5gr} Foliated to gneissic granodiorite and compositionally equivalent well-banded gneiss
P_{5gd} Foliated to gneissic megacrystic/porphyritic granitoid rocks, augen gneiss
P_{5gr} Foliated to gneissic granite and alkali-feldspar granite, and compositionally equivalent well-banded gneiss
P_{5h} Foliated to gneissic leucogabbro/norite, and compositionally equivalent well-banded gneiss
P_{5am} Amphibolite skoliths, lenses and layers (mainly remnants of former dykes)

PRE-LABRADORIAN SUPRACRUSTAL ROCKS (P₆, 1800 - 1710 Ma)
(Age uncertain; certainly pre-1670 Ma, probably 1800 - 1770 Ma)

PS_{6a} Calc-silicate rocks, compositionally layered, medium grained
PS_{6p} Fine- to medium-grained pelitic schist and gneiss
PS_{6q} Quartzite, meta-arkose, thin to thick bedded
PS_{6s} Quartz-feldspar psammitic schist and gneiss; medium grained and commonly rusty-weathering
PS_{6ax} Metasedimentary diatexite, coarse grained to pegmatitic and characteristically weakly-weathering

Volcanic protolith
PS_{6v} Fine- to medium-grained, banded quartzofeldspathic rocks; locally have lensoid shapes, possibly indicating felsic volcanoclastic protolith
PS_{6vm} Fine- to medium-grained, banded amphibolite containing quartz-feldspar layers and calc-silicate pods; interpreted as mafic volcanic rocks

MID PALEOPROTEROZOIC (P₇, 2100 - 1800 Ma)
LATE MID PALEOPROTEROZOIC (P₈, 1800 - 1600 Ma)
Granitoid and related intrusive rocks

P_{7g} Foliated to gneissic diorite to quartz diorite, and compositionally equivalent well-banded gneiss
P_{7gr} Alkali-feldspar granite, granite and quartz syenite
P_{7gd} Foliated to gneissic granodiorite and compositionally equivalent well-banded gneiss
P_{7gd} Foliated to gneissic megacrystic/porphyritic granitoid rocks, augen gneiss
P_{7gr} Foliated to gneissic granite and alkali-feldspar granite, and compositionally equivalent well-banded gneiss
P_{7mz} Foliated to gneissic quartz monzonite, grading into diorite or syenite, and compositionally equivalent well-banded gneiss
P_{7mz} Foliated to gneissic monzonite to monzodiorite, and compositionally equivalent well-banded gneiss
P_{7gr} Foliated to gneissic syenite to alkali-feldspar syenite, and compositionally equivalent well-banded gneiss
P_{7gr} Syenite to quartz syenite

Mafic and associated intrusive rocks
P_{7am} Amphibolite skoliths, lenses and layers (mainly remnants of former dykes)
P_{7gr} Massive to strongly foliated gabbro and norite, commonly layered, subophitic and locally coronic

P_{7d} Unnamed mafic dykes

Sedimentary protolith
PS_{7a} Calc-silicate rocks, compositionally layered, medium grained
PS_{7a} Pelitic schist and gneiss
PS_{7q} Quartzite, meta-arkose, thin to thick bedded
PS_{7s} Quartz-feldspar psammitic schist and gneiss; medium grained and commonly rusty-weathering
PS_{7ax} Coarse-grained to pegmatitic-granitic material (diatexite), characteristically associated with psammitic gneiss and quartzite
PS_{7m} Fine- to medium-grained, banded amphibolite containing quartz-feldspar layers and calc-silicate pods; interpreted as mafic volcanic rocks
PS_{7vm} Fine- to medium-grained, banded amphibolite containing quartz-feldspar layers and calc-silicate pods; interpreted as mafic volcanic rocks

NOTES

- Legend is common to all maps (Map 2010-01 to Map 2010-25), but all units do not appear on every map.
- Uncoloured units do not appear as polygons on maps, but are in un-legended strings in databases.
- Some mafic dykes also shown as polygons (especially where orientation is known).

Scale 1: 100 000

0 2 4 6 8 10
Kilometers

MINERAL OCCURRENCE DATA SOURCES

Inventory No.	Map label	Status	Entry	Listing	No. mineral occurrences	Reference

GEOLOGICAL DATA SOURCES

Personnel	Status	(rept) data collected	Project	Mining references
C.F. Gower (project geologist)	116	1983, 84	Double Mer & other sites	Gower (1984, 1986)
P. Eidner (project geologist)	70	1982	Lake Melville	Eidner (1983, 1984)
M.F. Wilson (assistant geologist)	54	1982	Lake Melville	Eidner (1983, 1984)
C. Burns (assistant geologist)	9	1982	Lake Melville	Eidner (1983, 1984)