MAP 97-07

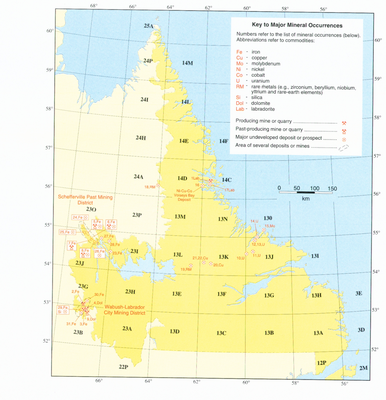
GEOLOGICAL MAP OF LABRADOR

GOVERNMENT OF NEWFOUNDLAND AND LABRADOR
Department of Mines and Energy
Geological Survey

20 0 20 40 60 80 100
kilometres

Transverse Mercator Projection, Central Meridian 61° 30′

MAJOR MINERAL OCCURRENCES AND NATIONAL TOPOGRAPHIC SYSTEM GRID, LABRADOR



COMPILATION SOURCES

Sources of geological information for the main geological map are listed according to the National Topographic System (NTS) 1:250 000 scale map sheet. Sources for NTS 1:50 000 scale maps are listed in the Publications and Information Section, Department of Mines and Energy, Government of Newfoundland and Labrador, P.O. Box 8700, St. John's, Newfoundland, Canada, A1B 4J6. GSC=Geological Survey of Canada. Documents are available from Geological Survey of Canada, Publication Distribution Office, 601 Booth St., Ottawa, Ontario, Canada, K1A 0E8.

National Topographic System reference	Source Map
2M	Gower, C.F., *et al.*, 1994. NLGS Report 94-01, p. 347-369, page size map
2 (prime)	Gower, C.F., 1990. NLGS Map 90-15, scale 1:50 000.
3D	Gower, C.F., *et al.*, 1988. NLGS, Maps 88-087 and 088, scale 1:100 000.
3E	Gower, C.F., *et al.*, 1990. NLGS, Map 89-075, scale 1:100 000.
12P	Gower, C.F., *et al.*, 1994. NLGS Report 94-01, p. 347-369, page-size map.
13 (prime)	Ermatinger, R.F., 1980. GSC Bulletin 293 with 1:250 000 scale map as Figure 5. Gower, C.F., 1990. NLGS Map 90-15, scale 1:500 000. Kerr, A., 1994. NLGS Map 94-216, scale 1:250 000. Wardle, R.J., 1993. NLGS Map 93-016, scale 1:500 000. Wardle, R.J., 1994. NLGS Map 94-117, scale 1:500 000.
13A	Fuste, K.E., 1967. GSC Map 23-1967, scale 1:506 980. Gower, C.F., *et al.*, 1994. NLGS Maps 88-087 and 88-088, scale 1:100 000.
13B	Gower, C.F., *et al.*, 1993. NLGS Report 93-01, p. 17-34, page-size map. van Nostrand, T., *et al.*, 1990. NLGS, Map 90-09, scale 1:100 000.
13C	Stevenson, I.M., 1967. GSC Map 6-1967, scale 1:253 440. Wardle, R.J., *et al.*, 1992. NLGS Report 92-01, p. 267-276, page-size map.
13D	Stevenson, I.M., 1968. GSC Map 28-1967, scale 1:253 440. Thomas, A., 1994. GSC Bulletin 448, including 1:100 000-scale map as Figure 2.
13E	Nunn, G.A.G., 1982. NLGS Map 82-010, scale 1:100 000. Stevenson, I.M., 1968. GSC Map 27-1967, scale 1:253 440. Wardle, R.J., 1993. NLGS Maps 93-020 and 93-021, scale 1:100 000. Thomas, A., 1991. GSC Paper 89-18 including map 1763A, scale 1:100 000. Thomas, A. and Bromley, P., 1990. NLGS Report 90-01, p. 49-58, page-size map. Wardle, R.J., 1989. NLGS Map 89-10, scale 1:100 000.
13F	Ryan, B., 1982. NLGS Maps 82-064, 065, and 066, scale 1:100 000. Thomas, A., *et al.*, 1993. NLGS Map 93-033, scale 1:100 000. Wardle, R.J., 1993. NLGS Map 94-020, scale 1:100 000. Wardle, R.J. and Crisby, L., 1995. NLGS Map 95-060, scale 1:100 000. Wardle, R.J., *et al.*, 1998. NLGS Report 98-01, p. 49-58, page-size map.
13G	Erdmer, P., 1984. GSC Paper 84-1A including 1:100 000-scale map as figure. Gower, C.F., and van Nostrand, T., 1996. NLGS Report 96-01, p. 59-71, page-size map. Noel, N., *et al.*, 1983. NLGS Map 83-044, scale 1:100 000. Nunn, G.A.G. and van Nostrand, T., 1996. NLGS Report 96-01, p. 73-83, page-size map.
13H	Gower, C.F., *et al.*, 1981. NLGS Map 81-045, scale 1:100 000. Gower, C.F., *et al.*, 1986. NLGS Maps 86-073 and 074, scale 1:100 000. Owen, V., *et al.*, 1983. NLGS Map 83-046, scale 1:100 000
13I	Gower, C.F., *et al.*, 1981. NLGS Map 81-209, scale 1:100 000. Gower, C.F., *et al.*, 1983. NLGS Map 83-043, scale 1:100 000.
13J	Gower, C.F., *et al.*, 1981. NLGS Map 86-098, scale 1:100 000. Gower, C.F. 1982. NLGS Map 82-007, scale 1:100 000. Gower, C.F., *et al.*, 1983. NLGS Map 83-042, scale 1:100 000. Gower, C.F., 1986. GSC Map 10-1986, in Paper 86-15.
13K	Ryan, B., *et al.*, 1983. NLGS Maps 83-038 and 039, scale 1:50 000.
13L	Emmerson, L. 1993. GSC Memoir 431 including accompanying 1:100 000-scale map 1606A. Fahrig, W.F., 1959. GSC Map 10794A, scale 1:253 440. Gower, C.F., 1990. GSC Map 10-1986 in Paper 86-15, scale 1:100 000.
13M	Ryan, A.B., 1982. NLGS Maps 82-003 and 004, scale 1:100 000. Thomas, A. and Hibbs, D., 1983. NLGS Map 83-031, scale 1:100 000.
13N	Emslie, R.F., 1964. GSC Map 3-1964, scale 1:253 440. Emslie, R.F., 1969. GSC Map 19-1969, scale 1:63 360. Nunn, G.A.G., 1983. NLGS Map 83-010, scale 1:100 000. Ryan, B., 1990. NLGS Map 90-117, scale 1:100 000. Rivers, S.W. and Emslie, R.F., 1973. GSC Map 1042A, scale 1:250 000. Thomas, A. and Hibbs, D., 1983. NLGS Map 83-031, scale 1:100 000.
13NW	Emslie, R.F., *et al.*, 1980. GSC Paper 80-1A, p. 95-100, page-size map. Ryan, B., 1990. NLGS Map 91-117, scale 1:100 000. Taylor, F.C., 1977. GSC Map 1442A, scale 1:250 000. Thomas, A. and Morrison, R.S., 1991. NLGS Map 91-160, scale 1:100 000.
13N	Emmerson, L. 1993. GSC Memoir 431, includes maps 1807A and 1808A, at 1:100 000 scale. Hill, J.D., 1992. NLGS Map 91-136, scale 1:100 000. Thomas, A. and Morrison, R.S., 1991. NLGS Map 91-160, scale 1:100 000.
13O	Gower, C.F., 1990. NLGS Map 90-007, scale 1:100 000. Ryan, B., *et al.*, 1983. NLGS Maps 83-040 and 041, scale 1:50 000.
14 (prime)	Ryan, B., 1990. NLGS Map 90-044, scale 1:500 000.
14C	Ryan, B. and Lee, D., 1985. NLGS Map 85-066, scale 1:100 000. Ryan, B. and Lee, D., 1988. NLGS Map 88-017, scale 1:50 000. Ryan, B., 1990. NLGS Maps 90-007, 032, and 053, scale 1:100 000. Wheaton, E.P., S.J. 1980 NLGS Maps 80-013 and 80-014, scale 1:200 000. Taylor, F.C., 1977. GSC Maps 1437A and 1438A, scale 1:250 000.
14D	Ryan, B., 1985. NLGS Unpublished information for 14D/SW, scale 1:100 000. Ryan, B. and Hutchinson, L., 1989. NLGS Map 89-037, scale 1:50 000. Ryan, B. and Lee, D., 1985. NLGS Map 85-066, scale 1:100 000. Ryan, B. and Lee, D., 1988. NLGS Map 88-017, scale 1:50 000. Ryan, B., *et al.*, 1991. NLGS Map 91-062, scale 1:50 000.
14E	Emmerson, I. and Van Kranendonk, M.J., 1995. GSC Open Files 3197 and 3189, maps at 1:100 000 scale. Fahrig, W.F., 1959. GSC Map 10794A, scale 1:250 000. Wheaton, E.P., S. 1980 NLGS Map 80-013, scale 1:200 000.
14F	Emmerson, I. and Van Kranendonk, M.J., 1995. GSC Open Files 3189 and 3189, maps at 1:100 000 scale. Fahrig, W.F., 1959. NLGS Report 76-01, p. 72-79, page size map. Taylor, F.C., 1977. GSC Map 1434A, scale 1:250 000.
14G	Emmerson, I. and Van Kranendonk, M.J., 1995. GSC Open Files 3189 and 3189, maps at 1:100 000 scale. Morgan, W.C., 1970. GSC Maps 1468A and 1469A, scale 1:50 000. Ryan, B., *et al.*, 1975. GSC Map 6-1974, scale 1:125 000. Ryan, B., 1990. NLGS Map 90-016, scale 1:100 000. Taylor, F.C., 1977. GSC Map 1431A, scale 1:250 000.
14H	Morgan, W.C., 1979. GSC Map 1490A, scale 1:50 000. Ryan, B., 1990. NLGS Map 90-016, scale 1:100 000. Van Kranendonk, M.J. and Wardle, R.J., 1995. GSC Open File 2907, sheet 2 of 3, 1:100 000-scale maps. Wardle, R.J., 1989. NLGS Report 89-01, p. 88-90, page-size map.
22P	Connelly, J. and Scowen, P., 1986. NLGS Map 86-071, scale 1:100 000. Nunn, G.A.G., *et al.*, 1990. NLGS Map 90-098, scale 1:100 000.
23A	Connelly, J. and Scowen, P., 1986. NLGS map 86-071, scale 1:100 000. Emslie, R.F., *et al.*, 1990. NLGS Map 89-097, scale 1:100 000. James, D.T., 1994. NLGS Map 93-053, scale 1:100 000.
23B	Connelly, J. and Scowen, P., 1986. NLGS Map 86-071, scale 1:100 000. James, D.T., 1989. NLGS Map 89-018, scale 1:100 000. Rivers, T., 1985. NLGS Maps 85-004 and 035, scale 1:100 000.
23C	James, D.T., 1989. NLGS Maps 83-017 and 018, scale 1:100 000. James, D.T., 1994. NLGS Maps 93-053 and 054, scale 1:100 000. Rivers, T. and Wardle, R.J., 1985 NLGS Map 85-007, scale 1:100 000. Weir, M.I., *et al.*, 1979. NLGS Map 79-38, scale 1:100 000.
23H	James, D.T., 1994. NLGS Map 93-54, scale 1:100 000. James, D.T., 1995. NLGS Map 95-004, scale 1:50 000. Nunn, G.A.G., 1990. NLGS Map 87-008, scale 1:100 000. Rivers, T. and Wardle, R.J., 1985. NLGS Map 85-035, scale 1:100 000. Wardle, R.J., 1985. NLGS Map 84-18, scale 1:100 000.
23I	Emslie, R.F., 1963. GSC Map 31-1963, scale 1:253 440. Emslie, R.F., 1969. GSC Map 19-1969, scale 1:63 360. James, D.T., 1994. NLGS Map 94-235, scale 1:250 000. Wardle, R.J., 1982. NLGS Maps 82-005 and 006, scale 1:100 000. Wynne-Edwards, H.R., 1960. GSC Map 9-1960, scale 1:253 440.
23J	Percival, J.A., 1993. GSC Map 1758A, scale 1:125 000. Wardle, R.J., 1982. NLGS Maps 82-003 and 006, scale 1:100 000.
23O	Wardle, R.J., 1982. NLGS Map 82-005, scale 1:100 000.
24A	Ryan, B., 1980. NLGS Unpublished information for 24A/SE, scale 1:100 000. Taylor, F.C., 1977. GSC Map 1439A, scale 1:250 000.
24H	Taylor, F.C., 1977. GSC Map 1435A, scale 1:250 000.
24I	Taylor, F.C., 1977. GSC Map 1432A, scale 1:250 000. Wardle, R.J., 1984. NLGS Report 84-01, p. 1-11, page-size map.
24P	Van Kranendonk, M.J. and Wardle, R.J., 1995. GSC Open File 2907, sheet 1 of 3 geological maps, scale 1:100 000. Taylor, F.C., 1977. GSC Map 1433A, scale 1:250 000. Wardle, R.J., 1984. NLGS Report 84-01, p. 1-11, page-size map.
25A	Van Kranendonk, M.J. and Wardle, R.J., 1995. GSC Open File 2907, sheet 3 of 3 geological maps, scale 1:100 000.

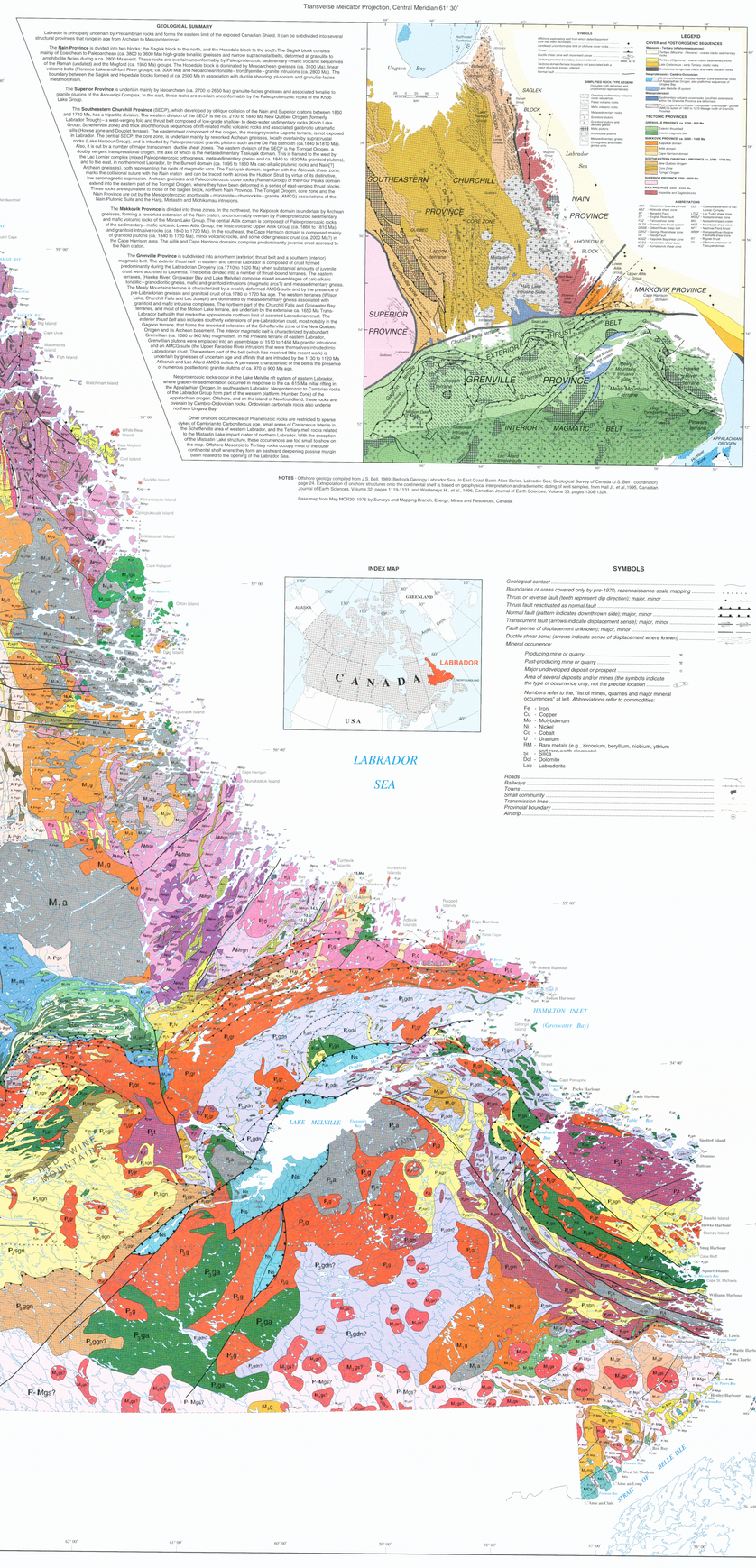
LIST OF MINES, QUARRIES AND MAJOR MINERAL OCCURRENCES

Mines, quarries and major mineral occurrences are keyed by number and commodity to the map above and the main geological map in the right. Where numerous mineral deposits and mineral occurrences occur, as is the case in the Schefferville and Labrador City-Wabush mining districts, they have been grouped together. The MODS (Mineral Occurrence Data System) catalogue numbers and the National Topographic System (NTS) 1:250 000 scale areas in which the mine, quarry or mineral occurrence is located are also listed. Major mineral occurrences (undeveloped prospects and selected prospects under the MODS classification) are those generally having grade and reserve estimates.

Commodity	Occurrence Name (MODS catalogue No. and NTS location)
	PRODUCING MINES AND QUARRIES
1, Lab	Tim Mle Bay Quarry (#16, 14C)
2, Fe	*Carol deposits and others* Carol Lake-Carol Camp-East Mine (#153, 23G) Carol Lake-Carol Camp-West Mine (#154, 23G)
3, Fe	Scully Mine (#376, 23K)
4, Cu	Lella Mountain deposits Lella Wynne North Quarry (#264, 23O) Lella Wynne west Quarry (#265, 23O)
	PAST-PRODUCING MINES AND QUARRIES
2, Fe	*Carol deposits and others* Carol Lake-Carol Camp-Lake (#152, 23G) Lorraine Mine (#155, 23G)
5, Fe	*Timmins deposits and others* Timmins No. 1 Mine (#826, 23J) Timmins No. 2 Mine (#827, 23J) Timmins No. 3 Mine (#828, 23J) Timmins No. 4 Mine (#829, 23J) Fleming No. 9 Mine (#830, 23J)
6, Fe	*Ruth Lake deposits and others* Ruth Lake No. 1 Mine (#802, 23J) Ruth Lake No. 2 Mine (#803, 23J) Ruth Lake No. 3 Mine (#804, 23J) Ruth Lake No. 4 Mine (#805, 23J) Ruth Lake No. 5 Mine (#806, 23J) Ruth Lake No. 6 Mine (#807, 23J) Wishart Mine (#808, 23J) Wishart No. 1 Mine (#853, 23J) Wishart No. 2 Mine (#854, 23J)
7, Fe	*Redmond deposits* Redmond No. 1 Mine (#759, 23J) Redmond No. 2 Mine (#760, 23J)
8, Fe	*Albert Lake deposits* Albert Lake South Quarry (#996, 23B) Albert Lake North Quarry (#997, 23B)
	UNDEVELOPED DEPOSITS AND SELECTED PROSPECTS
9, Fe	*Carol deposits and others* Lorraine No. 4 (#896, 23B) *Timmins deposits and others* Timmins No. 4 (#831, 23J) Timmins No. 5 (#832, 23J) Timmins No. 7 (#833, 23J) Timmins No. 8 (#834, 23J) Howse No. 1 (#836, 23J) Fleming No. 7 (#835, 23J)
10, Fe	*Ruth Lake deposits and others* Ruth Lake No. 2 (#861, 23J) Ruth Lake No. 3 (#862, 23J) Ruth Lake Extension (#863, 23J) Knob Lake No. 1 (#863, 23J) Fleming No. 7 (#864, 23J)
11, Fe	*Howells River deposits* Howells River east A (#809, 23J) Howells River west B (#810, 23J)
12, Fe	*Houston deposits* Houston No. 1 (#786, 23J) Houston No. 2 (#787, 23J) Houston No. 3 (#788, 23J)
13, Fe	*Attikamagen deposit* (#894, 23J)
14, Fe	*Posthonme Lake south deposit* (#743, 23J)
15, Fe, Si	*Wabush-Labrador City area deposits* Wabush No. 1 (#676, 23B) Wabush No. 2 (#677, 23B) Wabush No. 4 (#727, 23G) Wabush No. 7 (#108, 23G) Wabush No. 8 (#109, 23G) Dolly No. 1 (#728, 23B) Dolly No. 2 (#992, 23B) Labrador Ridge (#877, 23B) Carol Lake No. 1 (#1, 23G) Carol No. 1 (#2, 23G) Luce No. 1 (#138, 23G) M.E.O. Ridge (#896, 23G) Red Wine (#632, 23B) Wabush Highway (#633, 23B)
16, Fe	Julienne No. 1 deposit (#214, 23B) Mills No. 1 deposit (#127, 23B)

STRUCTURAL PROVINCES AND MAJOR STRATIGRAPHIC AND TECTONIC FEATURES OF LABRADOR AND SURROUNDING AREAS

Transverse Mercator Projection, Central Meridian 61° 30′



NOTES - Offshore geology compiled from J.S. Bell, 1989, Bedrock Geology Labrador Sea, in East Coast Basin Atlas Series, Labrador Sea; Geological Survey of Canada (J.S. Bell - coordinator) Map 42-1990; and from offshore structures onto the continental shelf is based on geophysical interpretation and radiometric dating of well samples; from Umpleby, D., *et al.*, 1995, Canadian Journal of Earth Sciences, Volume 32, pages 1119-1131; and Wasteneys H., *et al.*, 1996, Canadian Journal of Earth Sciences, Volume 33, pages 1308-1324.

Base map from Map MC1500, 1973 by Surveys and Mapping Branch, Energy, Mines and Resources, Canada.

GEOLOGICAL SUMMARY

Labrador is principally underlain by Precambrian rocks and forms the eastern limit of the exposed Canadian Shield. It can be subdivided into several structural provinces that range in age from Archean to Mesoproterozoic.

The **Nain Province** is divided into two blocks; the Saglek block to the north, and the Hopedale block to the south.The Saglek block consists mainly of Eoarchean to Paleoarchean orthogneiss (3.9 - 3.6 Ga) that has been metamorphosed and deformed at granulite facies to amphibolite facies during a ca. 2800 Ma event. These rocks are overlain unconformably by Paleoproterozoic sedimentary - mafic volcanic sequences of the Ramah (undated) and the Mugford (ca. 1950 Ma) groups. The Hopedale block is dominated by ca. 3320 Ma to 3300 Ma tonalitic to granitic volcanic belts (Florence Lake and Hunt River groups; ca. 3000 Ma) and Neoarchean tonalite - trondhjemite - granite intrusions (ca. 2800 Ma). The boundary between the Saglek and Hopedale blocks formed at ca. 2500 Ma in association with ductile shearing, plutonism and granulite-facies metamorphism.

The **Superior Province** is underlain mainly by Neoarchean (ca. 2700 to 2650 Ma) granulite-facies gneisses and associated tonalite to granite plutons of the Ashuanipi Complex. In the east, these rocks are overlain unconformably by the Paleoproterozoic rocks of the Knob Lake Group.

The **Southeastern Churchill Province** (SECP), which developed by oblique collision of the Nain and Superior cratons between 1860 and 1740 Ma, has a tripartite division. The western division of the SECP is the ca. 2100 to 1840 Ma New Quebec Orogen (Labrador Trough)—a west-verging fold and thrust belt composed of low-grade shallow- to deep-water sedimentary rocks (Knob Lake Group; Schefferville zone) and thick allochthonous successes of rift-related mafic volcanic rocks and associated gabbro to ultramafic intrusions (Doublet, Watts Group and Chioak Lake Formation). The eastern/most component of the orogen, the metaigneous Laporte terrane, is not exposed in Labrador. The central SECP, the core zone, is underlain mainly by reworked Archean gneisses, locally overlain by supracrustal rocks (Lake Herbert Group; ca. 1840 to 1810 Ma) and granitoid plutons (Big Island Suite; ca. 1840 to1810 Ma). Also, it is cut by a number of major transcurrent, ductile shear zones. The eastern division of the SECP is the Tornagat Orogen, a doubly vergent transpressional orogen, the axis of which is the metasedimentary Tasiuyak domain. This is flanked to the west by the Lac Lormier complex (mixed Paleoproterozoic orthogneiss, metasedimentary gneiss and ca. 1840 to 1830 Ma granitoid plutons), and to the east, in northernmost Labrador, by the Burwell domain (ca. 1895 to 1860 Ma calc-alkalic plutonic rocks and Nain[?] plutonic rocks) and the Kaipokok domain (Archean magmatic arcs). The Tasiuyak domain, together with the Abloviak shear zone, marks the collisional suture with the Nain craton and can be traced north across the Hudson Strait by virtue of its distinctive, low aeromagnetic expression. Archean gneisses of the Nain craton, exposed in the Saglek block, Hopedale block and Nain block, extend into the eastern part of the Torngat Orogen, where they have been deformed in a series of east-verging thrust blocks. These rocks are equivalent to those of the Saglek block, northern Nain Province. The Torngat Orogen, core zone and the Nain Province are cut by by the Mesoproterozoic anorthosite - monzonite - charnockite - granite (AMCG) associations of the Nain Plutonic Suite and the Harp, Molaston and Michikamau intrusions.

The **Makkovik Province** is divided into three zones. In the northwest, the Kaipokok domain is underlain by Archean gneisses, forming a reworked extension of the Nain craton, unconformably overlain by Paleoproterozoic sedimentary and mafic volcanic rocks of the Moran Lake Group. The central Aillik domain is composed of Paleoproterozoic rocks of the sedimentary - mafic volcanic Lower Aillik Group, the felsic volcanic Upper Aillik Group (ca. 1860 to 1810 Ma), and the Kitts Island Granite Suite (ca. 1870 to 1840 Ma). In the southeast, the Cape Harrison domain is composed mainly of granitoid plutons (ca. 1840 to 1720 Ma), minor volcanic rocks, and some older gneissic crust (ca. 2000 Ma?) in the Cape Harrison area. The Aillik and Cape Harrison domains comprise predominantly juvenile crust accreted to the Nain craton.

The **Grenville Province** is subdivided into a northern (exterior) thrust belt and a southern (interior) magmatic belt. *The exterior thrust belt* in eastern and central Labrador is composed of crust formed predominantly during the Labradorian Orogeny (ca.1710 to 1620 Ma) when subducted oceanic crust and juvenile crust were accreted to Laurentia. The belt is divided into a number of thrust-bound terranes. The eastern terranes, (Hawke River, Groswater Bay and Lake Melville) comprise mixed assemblages of calc-alkalic metaigneous, granodioritic gneiss, mafic and granitoid intrusions (magmatic arcs?) and metasedimentary gneiss. The Mealy Mountains terrane is characterized by a weakly deformed AMCG suite and by the presence of 1710 to 1690 Ma anorogenic granites (Shirley Harbour, Flowers River, Lake Melville, Churchill Falls and Lac Joseph) are dominated by metasedimentary gneiss and migmatite, granitoid and mafic intrusive complexes. The northern part of the Churchill Falls and Groswater Bay terranes, and most of the Molson Lake terrane, are underlain by the extensive ca. 1650 Ma Trans-Labrador batholith that marks the approximate northern limit of accreted Labradorian crust. The *interior magmatic belt* is composed of the southernmost extensions of pre-Labradorian crust, most notably in the Lagnon terrane, that forms the structural extension of the Schefferville zone of the New Quebec Orogen and its Archean basement. The Lagnon terrane is composed of Archean gneiss and Labradorian Orogen (ca. 1680 to 1600 Ma) magmatism. In the Pinware terrane of eastern Labrador, Grenvillian plutons were emplaced into an assemblage of 1310 to 1480 Ma granitic intrusions, and an AMCG suite (the Upper Paradise River intrusion) that were themselves intruded into Labradorian crust. The western part of the belt (which has received little recent work) is dominated by Labradorian Orogen rocks of similar age and affinity that are intruded by the 1130 to 1120 Ma Allochonk and Lac Allard AMCG suites. A pervasive characteristic of the belt is the presence of numerous postdirectional granite plutons of ca. 970 to 900 Ma age.

Neoproterozoic rocks occur in the Lake Melville rift system of eastern Labrador, where they unconformably overlie Grenville basement rocks. The ca. 615 Ma initial rifting in the Appalachian Orogen. In southwestern Labrador, Neoproterozoic to Cambrian rocks of the Labrador Group form part of the eastern platform. They are part of the Appalachian orogen. Offshore, and on the island of Newfoundland, these rocks are overlain by Cambro-Ordovician rocks. Ordovician carbonate rocks also underlie northern Ungava Bay.

Other onshore occurrences of Phanerozoic rocks are restricted to sparse dykes of Cambrian to Carboniferous age, small areas of Cretaceous laterite in the Schefferville area of western Labrador, and the Tertiary melt rocks related to the Mistastin Lake impact crater of northern Labrador. With the exception of the Mistastin Lake structure, these occurrences are too small to show on the map. Offshore, Cretaceous and younger rocks form most of the outer continental shelf where they form an eastward deepening passive margin basin related to the opening of the Labrador Sea.

INDEX MAP

SYMBOLS

Geological contact .....
Boundaries of areas covered only by pre-1970, reconnaissance-scale mapping .....
Thrust or reverse fault (teeth represent dip direction); major, minor .....
Thrust fault reactivated as normal fault .....
Normal fault (pattern indicates downthrown side); major, minor .....
Transcurrent fault (arrows indicate displacement sense); major, minor .....
Fault (sense of displacement unknown); major, minor .....
Ductile zone; (arrows indicate sense of displacement where known) .....
Mineral occurrence:
Producing mine or quarry .....
Past-producing mine or quarry .....
Major undeveloped deposit or prospect .....
Area of several deposits and/or mines (the symbols indicate the type of occurrence only, not the precise location .....

Numbers refer to the, "list of mines, quarries and major mineral occurrences" at left. *Abbreviations refer to commodities:*

Fe - Iron
Cu - Copper
Mo - Molybdenum
Ni - Nickel
Co - Cobalt
U - Uranium
REM - Rare metals (e.g., zirconium, beryllium, niobium, yttrium
Si - Silica
Dol - Dolomite
Lab - Labradorite

Roads .....
Railways .....
Small community .....
Transmission lines .....
Provincial boundary .....
Airstrip .....

LEGEND

STRATIFIED ROCKS (including metamorphosed extensions of units)

Age (numerous limits in Ma)

EON	ERA	SUB-ERA	
PHANEROZOIC		Tertiary (?)	**Tm** Impact breccia and melt sheets *[Mistastin Lake crater; 39 Ma Ar-Ar age, northern SECP]*
		Neo-proterozoic to Mesozoic	**NCs** Sandstone and conglomerate; local basalt at base of sequence *[Labrador Gp; Strait of Belle Isle area, southeastern GP]*
PROTEROZOIC [P]	MESOPROTEROZOIC [M]	Late Mesoproterozoic [M$_3$]	**Ns** Arkose and conglomerate *[Double Mer Fm., Lake Melville rift system, northeastern GP]* (50% indicate inferred extent under Quaternary cover)
		Middle Mesoproterozoic [M$_2$]	**M$_2$sh** Siltstone, shale and quartzite, minor dolomite *e.g., Seal Lake Gp., southern SECP and northern GP*
			M$_2$ms Subarenal basalt flows
			M$_2$ar Arkose, grading south into quartzite
			M$_2$gr Granite plutons *(e.g., Upper Nonn River pluton, ca.1296 Ma, northern Nain)*
			M$_2$pg Peralkaline granite and syenite intrusions, locally with ring structure *[Strange Lake intrusion, ca. 1300 Ma, SECP; Flowers River igneous suite, ca. 1290 Ma, NP; Red Wine intrusion, southeastern Cambrian boundary is defined at 545 Ma rather than 570 Ma following the U-Pb dating of Ediacaran fossils in Newfoundland.*
			M$_2$ag Alkaline syenite and metamorphic equivalent rocks *[Red Wine Intrusive Suite, north-central GP]*
			M$_2$g Granitoid rocks, including rapakivi varieties *[1351 to 1292 Ma]*
			M$_2$a Anorthositic rocks *[1331 to 1305 Ma]*
			M$_2$m Intermediate rocks, chiefly hornblende *[1333 to 1301 Ma]*
			M$_2$l Layered intrusions of ironstone, gabbro, norite and anorthosite *[1322 to1305 Ma]*
		Early Mesoproterozoic [M$_1$]	**M$_1$ar** Arkose, quartzite and minor conglomerate *[Sims Fm., northeastern GP, southern SECP]*
	PALEOPROTEROZOIC [P]	Late Paleoproterozoic [P$_3$]	**P$_3$v** Rhyolitic to andesitic volcanic rocks including ash-flow tuff and agglomerate *[e.g., Bruce River and Blueberry Lake gps.]*
			P$_3$vs Volcaniclastic sandstone, arkose and conglomerate *[e.g., Bruce River and Blueberry Lake gps.]*
		Late Paleoproterozoic [P$_2$]	**P$_2$gr** Granite, quartz monzonite, granodiorite, syenite and minor quartz diorite *(e.g., ca. 1850 Ma; Trans-Labrador batholith and coeval rocks or GP and MP)*
			P$_2$g Granitoid rocks *(1640 to 1626 Ma; including some ca. 1780 to 1750 Ma rocks)*
			P$_2$a Anorthosite and other, locally layered, mafic components *(1640 to 1625 Ma)*
			P$_2$mi Mafic intrusive suites (gabbronorite, lesser diorite), some metamorphosed at amphibolite to granulite facies *(e.g., Michikamau intrusion, 1650 Ma; Mealy Mountain suite, ca. 1650 to1620 Ma, GP)*
			P$_2$ml Layered gabbro, troctolite and anorthosite, generally recrystallized *(Bridges Intrusion, 1807 Ma (Ar-Ar age, central NP)*
			P$_2$q Quartz diorite to granodiorite plutons
			P$_2$gn K-feldspar megacrystic granite and other granitoid plutonic rocks
			P$_2$ag High-level, locally fluorite-bearing granites *[1776 to 1719 Ma, northeastern NP and MP]*
		Early Paleoproterozoic [P$_1$]	**P$_1$mv** Basalt, andesite, dacite and conglomerate *[Ingrid Gp., ca. 1900 Ma, eastern SECP]*
			P$_1$fv Rhyolite, ash-flow tuff, breccia and hypabyssal rhyolite intrusions; volcaniclastic siltstone and sandstone; minor basalt *[e.g., Upper Aillik Gp., ca. 1860 to 1807 Ma, MP]*
			P$_1$mv$_2$ Basaltic flows, breccias and pyroclastic rocks of predominantly subaerial origin *[Mugford Gp., ca. 1950 Ma, northern NP]*
			P$_1$pv Pillow basalt, basaltic pyroclastic rocks; minor siltstone and greywacke *[Doublet Gp., western SECP; Petscapiskau Gp., central SECP]*
			P$_1$mc$_3$ Schistose amphibolite derived from mafic volcanic rocks *[Moran Lake and Lower Aillik gps., MP]*
			P$_1$ss Arkosic siltstone and sandstone, locally dolomitic *[Knob Lake Gp., western SECP]*
			P$_1$s$_1$/s$_2$ s1 - Siltstone - shale - greywacke sequences of deep water, turbiditic origin *[upper Knob Lake Gp. western SECP]*; s1b - Schistose equivalent rocks *[upper Knob Lake Gp., GP]*
			P$_1$mv Alkalic basalt flows, pyroclastic rocks and local peralkaline felsic volcanic rocks; minor ultramafic rocks *[Knob Lake Gp., 1877 Ma, western SECP]*
			P$_1$cd cl - Dolomite and chert breccia *[Knob Lake Gp., western SECP]*
			dm - Equivalent dolomitic marble *[Knob Lake Gp., western SECP]*
			P$_1$mv Massive to pillowed basalt flows *[Knob Lake Gp., ca. 2142 Ma, western SECP]*
			P$_1$s$_3$ sh - Shale and sandstone of shallow- to deep-water origin *[lower Knob Lake Gp., western SECP; Ramah, Mugford and Snyder gps., northern SECP and NP; Moran Lake Gp., MP]*
			ss - Equivalent pelitic schist *[lower Knob Lake Gp., GP; Petscapiskau Gp., central SECP; Lake Harbour Gp., northern SECP; lower Aillik Gp., MP]*
			P$_1$ac Arkose and conglomerate *[Knob Lake Gp., western SECP]*
	ARCHEAN OR PALEOPROTEROZOIC [A/P]		**P$_1$g** Granite plutons *[ca. 2134 Ma, locally 2032 Ma, northern NP; 1973 to 1891 Ma, MP]*
		Early Paleoproterozoic [P$_1$]	**P$_1$gn** Gabbronorite and derived gneiss *[part of the granitic to gabbroic Paliabin intrusive suite; ca. 2300 Ma; central SECP]*
			P$_1$ag Anorthosite, leucogabbro, leuconorite and derived gneiss *[e.g., Hutton anorthositic suite, northern SECP]*
			A-P$_1$g Granite *[central SECP]*
	ARCHEAN [A]	MESOARCHEAN [A$_2$]	**Amv** Mafic metavolcanic, metasedimentary and metagabbroic rocks *[central SECP]*
			A$_2$a Anorthosite and leucogabbroic rocks *[central SECP and MP]*
		NEOARCHEAN [A$_3$]	**A$_3$sgn** Late- to postkinetic charnockite plutons *[Kammaralit granite, northern NP]*
			A$_3$g Granitoid plutons and derived gneiss *[Ashuanipi Complex, SP]*
			A$_3$ga Gabbroic plutons *[Ashuanipi Complex, SP]*
			A$_3$sg Tonalite, quartz diorite and minor diorite *[Ashuanipi Complex, SP]*
		MESO-ARCHEAN [A$_2$]	**A$_2$mu** Granodiorite, tonalite and minor granite *[Kanairktok Intrusive Suite, ca. 2850 to 2830 Ma]*
		NEO-to PALEO-ARCHEAN [A$_3$]	**A$_3$pa** Anorthosite, leucogabbroic and minor ultramafic rocks, usually in deformed, layered suites

IGNEOUS ROCKS (including metamorphosed extensions of units)

PROTEROZOIC [P]	Late Paleoproterozoic [P$_3$]	**P$_3$gn** Granite, granodiorite, syenite and minor quartz diorite *(e.g., ca. 1650 Ma; Trans-Labrador batholith and coeval rocks or GP and MP)*
		P$_3$g Granitoid rocks *(1640 to 1626 Ma; including some ca.