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

LEGEND

Order of listing of units under each heading does not necessarily correspond to relative stratigraphic age. Consult accompanying descriptive notes for details and relationships

MINOR INTRUSIONS
(may include rocks that pre-date and postdate the Nain Plutonic Suite)

- dgb; dp: Olivine gabbro and diabase; feldsparphyric dykes
- dg: Granitic dykes; includes aplitic and pegmatitic varieties of several ages
- dgp: Olivine-bearing pegmatitic gabbroic or dioritic dykes
- dfd: Dioritic dykes, including oxide- and pyroxene-rich dykes
- dc: Undeformed to strongly deformed composite mafic - silicic dykes
- dgl: Black and dark-grey granular gabbronoritic (ferrodioritic?) dykes, locally biotite- and hornblende-bearing
- MKm: Kaiktusuak dykes - Massive, slightly porphyritic, - augite monzonite
- Mgbn: Leucogabbronoritic sheet
- dlm: Meta-lamprophyre (?)

IGNEOUS ROCKS OF MESOPROTEROZOIC AGE: THE NAIN PLUTONIC SUITE
(may include some older rocks)

GRANITIC INTRUSIONS

- MSgr: Coarse fayalite+augite-bearing monzonite and quartz monzonite
- MBIfmz: Massive to foliated, fayalite-bearing monzonite and quartz monzonite within the Barth Island composite intrusion
- MLfmz: Massive to strongly foliated, locally layered, fayalite-bearing, porphyritic monzonite, quartz monzonite and syenite peripheral to the Mount Lister intrusion

DIORITIC INTRUSIONS

- Mfd: Coarse, buff- to brown-weathering, oxide-rich gabbronoritic rock
- Mlfd: Layered to massive, buff- to brown-weathering, oxide-rich, gabbronoritic rock
- Moxf: Rusty, locally oxide(magnetite)-rich ferrodiorite
- MSKfd: Satorsoakulluk ferrodiorite dykes - Granular brownish ferrodiorite
- MAfd: Akpaume? ferrodiorite - Granular brownish ferrodiorite
- Mxfd: Granular brownish ferrodiorite
- MSfd: Sachem Bay intrusion - Massive to diffusely layered ferrodiorite and related hybrid rocks
- MBIfd: Massive to layered ferrodiorite and related hybrid rocks within the Barth Island composite intrusion

TROCTOLITIC INTRUSIONS

- Mclt: Coarse leucotroctolite
- MTlt: Tessiuyarsuk intrusion - Leucotroctolite, troctolite, and olivine-bearing leuconoritic rocks
- Mlt: Leucotroctolite, troctolite, and orthopyroxene-bearing troctolitic rocks; Mltb = redddish-brown troctolite of the western part of the body
- MPMlt: Port Manvers Run intrusion - Dark-grey to black leucotroctolite
- MTtr: Tikkiraluk Hill intrusion - Brown-weathering troctolite and olivine gabbro
- MBlt: Pale gray-green to reddish-brown troctolite and olivine gabbro of the Barth Island composite intrusion

ANORTHOSITIC INTRUSIONS

- Mla2: Massive ,white to pale-grey-weathering anorthosite, leuconorite, and leucogabbro
- Mla1: Massive white to pale-grey-weathering anorthosite and leuconorite
- MHPln: Halfway Point intrusion - Mottled to clotty textured leuconorite
- Msln: Seriate-textured leuconorite
- MTla: The Turnpikes intrusion(s) - Massive, grey-weathering, locally olivine-bearing, leuconorite and anorthosite
- MFRa: First Rattle intrusion - Massive grey-weathering anorthosite and leuconorite
- MHln: Hosenbein Lake intrusion - Brownish- weathering leuconorite, massive olivine gabbro (subunit MHg), and grey-weathering clotty- to seriate-textured leuconorite and leucogabbro;
- MHlno = oxide-rich rocks of the northern part of the intrusion
- MSCl: South Channel Cairn intrusion - Massive to layered leucogabbro, leuconorite and anorthosite
- MAln: Akpiksai Bay intrusion - Massive to weakly foliated leuconorite to anorthosite, having a fairly uniform distribution to the orthopyroxene
- M?mlna: Massive to weakly layered, locally foliated, white (recrystallized) and mauve-grey (nonrecrystallized) anorthosite and leuconorite
- MMLa: Mount Lister intrusion - Pegmatoidal anorthosite and leuconorite;
- MMLfm = Foliated leuconoritic and anorthositic eastern margin of the Mount Lister intrusion
- MUlna: Unity Bay intrusion - Medium to coarse-grained leuconorite, leucogabbro and anorthosite; MUfz = Foliated leuconoritic and anorthositic northern zone of the Unity Bay intrusion
- M?mflta: Foliated to massive leuconorite, olivine-bearing leuconorite, leucotroctolite and anorthosite

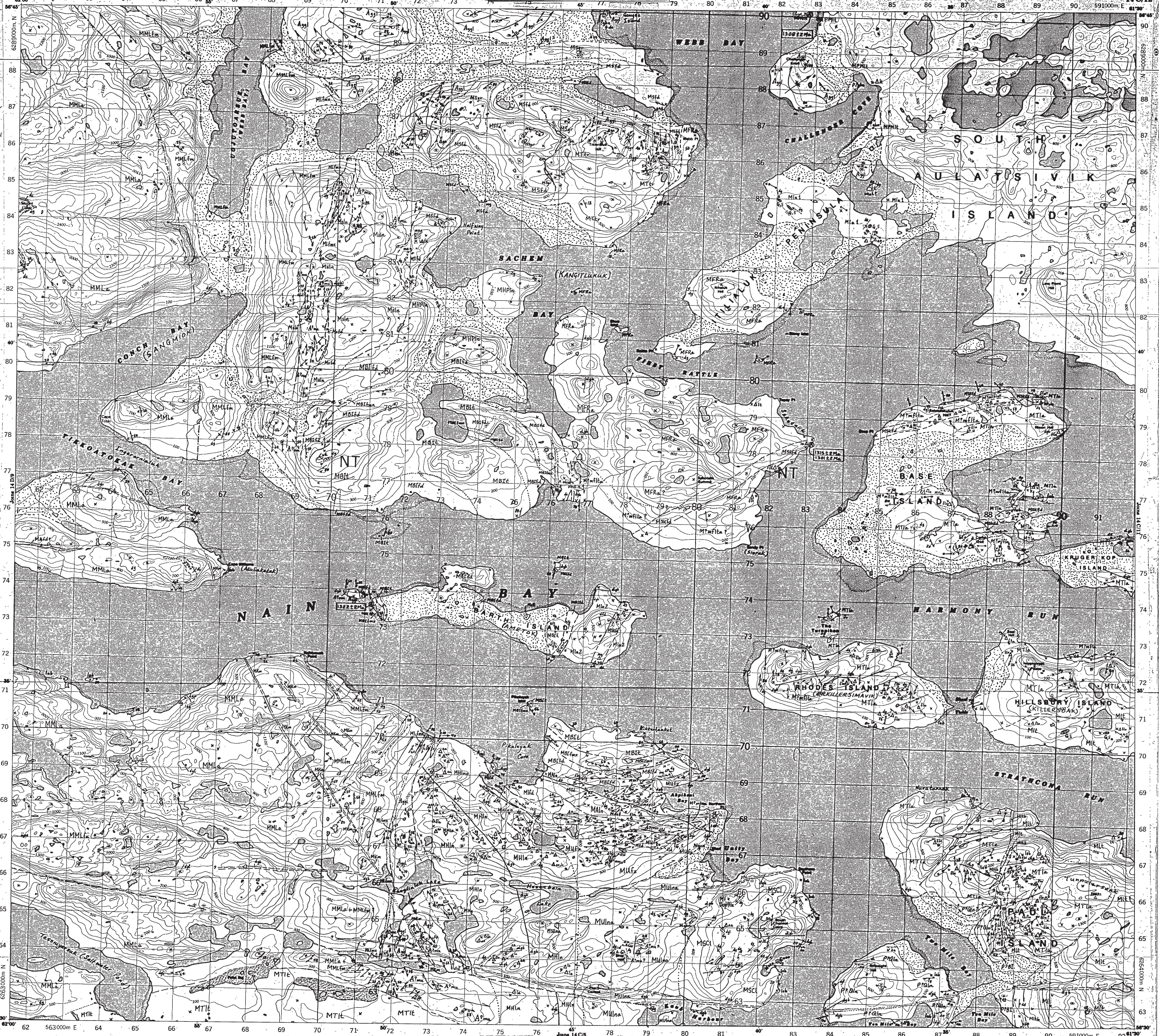
IGNEOUS ROCKS OF PROBABLE PALEOPROTEROZOIC AGE

- P?Qln: Quarry intrusion - Foliated, grey to brownish-grey leuconorite and anorthosite
- P?Bl: The Bridges Intrusion - Well layered mesocratic to ultramafic rocks
- P?gbn: Metagabbronorite

MAFIC, ULTRAMAFIC, AND FELSIC ROCKS OF ASSUMED ARCHEAN AGE

- Aggl: Migmatitic granulite-facies quartzofeldspathic gneisses; dispersed mafic, ultramafic and metasedimentary rafts
- A?om: Layered olivine-bearing mafic rocks and olivine-free, mesocratic, leuconoritic and anorthositic rocks
- A?mu: Layered ultramafic, mafic, mesocratic and pale-weathering leucogabbronoritic to anorthositic rocks

PROVISIONAL MAP 14 C/12 1:50,000 EDITION 1 CARTE PROVISOIRE 14 C/12



Produced, 1969, by the SURVEYS AND MAPPING BRANCH, DEPARTMENT OF ENERGY, MINES AND RESOURCES, from aerial photographs taken in 1962 and 1964. Field surveys 1957. Printed 1972.

Copies may be obtained from the Map Distribution Office, Department of Energy, Mines and Resources, Ottawa.

This Provisional Map is equivalent to a standard map in accuracy of content.

Some names on this map are not yet official. Corrections or additions are invited by the Surveys and Mapping Branch.

CONTOUR INTERVAL 100 FEET
Elevations in Feet above Mean Sea Level
North American Datum 1927
Transverse Mercator Projection

MAP 2001-10

Preliminary Geological Map of the Nain Map Sheet
(NTS 14C/12)

Scale 1 : 50 000 (km)

Cette carte provisoire équivaut une carte régulière au point de vue précision de l'information.

Certains noms inscrits sur cette carte ne sont pas encore officiels. La Direction des levés et de la cartographie saurait gré au public de lui signaler corrections et additions.

ÉQUIDISTANCE DES COURBES 100 PIEDS
Élévations en pieds au-dessus du niveau moyen de la mer
Système de référence géodésique nord-américain, 1927
Projection transverse de Mercator

Établie en 1969, par la DIRECTION DES LEVÉS ET DE LA CARTOGRAPHIE, MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES, d'après des photographies aériennes prises en 1962 et 1964. Levés sur le terrain en 1957. Imprimée en 1972.

Ces cartes sont en vente au Bureau de distribution des cartes, ministère de l'Énergie, des Mines et des Ressources, Ottawa.

SYMBOLS

- Observation and/or note station
- Data station compiled from other sources
- Geological contact (defined, approximate, transitional, assumed, questionable)
- Gneissic layering (inclined, vertical, dip unknown)
- Igneous layering (inclined, vertical, dip unknown)
- Foliation, both metamorphic and igneous (inclined, vertical, dip unknown)
- Layering and foliation parallel in plutonic rocks (inclined, dip unknown)
- Elongation of mafic enclaves in granitic rocks
- Elongation orientation of pyroxene concentrations
- Preferred orientation of plagioclase megacrysts (inclined, dip unknown)
- Lineation trend and plunge
- Plunge of small-fold; S, M, Z indicates down-plunge symmetry
- General form-lines of foliation trend
- Lineaments
- Antiform, synform, overturned antiform
- Fault (approximate, assumed)
- Gossan zone (see NOTES below)
- Sulphide(s) and/or magnetite(mag) showings and prospects (see NOTES below) .... s, mag
- Labradorite occurrence (see NOTES below) .... lab
- Age determination site
- Minor units in gneisses (see NOTES below)
- Inclusions in plutonic rocks (see NOTES below)
- Areas having Quaternary cover and few or no outcrops

NOTES

The gneissic layering in the Archean(?) ultramafic-mafic-mesocratic-anorthositic sequence (Unit A?mu) refers to compositional variations that are primary in origin, as well as those generated by deformational transposition.

Foliation symbols displayed on the map encompass fabrics of penetrative origin caused by solid-state structural modification of metamorphic rocks (e.g., axial plane fabrics to folds in the gneisses), those solid-state fabrics within the igneous rocks that are produced by post-magmatic modification of igneous textures (e.g., the recrystallization and elongation of feldspar and orthopyroxene in the margin of the Mount Lister intrusion), those that are presumably produced by pre-full-solidification compaction (e.g., flattening of mafic pillows in the granitic rocks), and those that are produced by magmatic processes (e.g., orientation of feldspar trains in ferrodiorite).

The contact between the Unity Bay intrusion and the Hosenbein Lake intrusion southwest of Nain is a broad zone of megabreccia within which individual outcrops on each side of the border as portrayed on the map may include one unit in excess of the other (e.g., numerous blocks of Unity Bay intrusion within a host of Hosenbein Lake leuconorite or numerous dykes of Hosenbein Lake leuconorite transecting Unity Bay rock).

Areas underlain by the Mount Lister intrusion in the upland region north of Conch Bay and south of Nain Bay have not been systematically traversed, the data points being based largely on helicopter reconnaissance. Similarly, the inland region between First Rattle and Sandy Point has been mapped only through limited observation by helicopter reconnaissance.

The northern part of the Barth Island intrusion has been mainly compiled from a thesis by Kathleen Mulhern, completed as part of the requirements for a M.Sc. degree at Syracuse University, New York, in 1974 and on file with the Geological Survey (GSNL File # 14C/12/13).

The extent of the troctolitic dyke and some abutting rocks on Paul Island northeast of Two Mile Bay is based partly on a map by R. Miller completed in 1996 and contained in a report from NDT Ventures Limited on file with the Geological Survey (GSNL File# 14C/12/129).

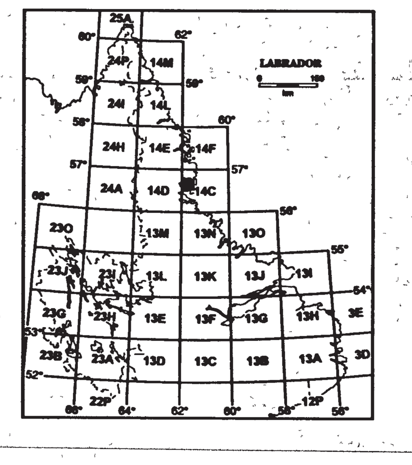
The following key applies to the inclusions in plutonic rocks:
a = undivided anorthositic rocks; ln = leuconorite (locally containing olivine); lt = leucotroctolite (locally containing orthopyroxene); fln = foliated leuconorite; flt = foliated leucotroctolite; lan = layered anorthosite and leuconorite (including rafts derived from the gneisses); gn = gneissic rocks of various types; mg = mafic granulite; dt = diatremic breccia; od = oxide-rich dioritic rocks; B = The Bridges-type layered rocks

The following key applies to selected minor units in gneisses:
Q = quartzite; cs = calc-silicate rocks; pg = pelitic to semipelitic rocks; an = anorthositic rocks

Sulphide and oxide mineralization in the area has several modes of occurrence and several hosts. The salient features of each are:
1. The "Valley Zone", west of Akpiksai Bay - named and investigated by NDT Ventures Limited, comprises sulphide and magnetite within brown oxide-rich ferrodiorite. The gossanous rocks are associated with a stockwork of such diorite. When part of a horizontal sheet, the area covered by the rusty rock gives a misleading impression of the volumetric extent of the mineralization.
2. The "Unity Zone", on the ridge to the west of Nain - named and investigated by NDT Ventures Limited, comprises sulphide minerals in a couple of differing settings. The east prospect, exemplified by a gossan zone in the cliff directly behind Nain, comprises pyrrhotite veins that cross-cut a mafic to ultramafic "granulite", part of the layered rock sequence of Nain ridge. Rusty oxide(magnetite)-rich, sulphide-bearing meladioritic (gabbronoritic) dykes occur on the ridge above the gossan, and the pyrrhotite veins in the granulitic rock may be related to these. The west prospect comprises brown pyroxenite dykes that intrude, and contain numerous blocks of, the Unity Bay anorthosite and leuconorite. These dykes are not as noticeably enriched in magnetite as those of the east zone, and may represent a different dyke emplacement episode.
3. Gossan zones located on the central Itilialuk Peninsula are hosted by pale grey to white leuconorite and anorthosite. The rusty zones are developed over networks of sulphide veinlets that penetrate along silicate grain boundaries and cross-cut silicate crystals. Mineralized parts of outcrops locally have abrupt contacts with unmineralized host, but whether the sulphide-bearing parts are rafts or indigenous products of trapped sulphide magma has not been determined. Assays of grab samples returned less than 0.5% Ni and Cu.
4. Gossan zones located along the southern part of Hillsbury Island are hosted by grey, locally olivine-bearing, leuconorite. Only the easternmost one shown on the map has been examined, the freshest samples comprising minor amounts of intergrain sulphides. The locations of other gossans demarcated on the island were plotted from distant observation, and not examined on the ground. Assays from the examined zone returned very low values of base metals (<100 ppm).
5. Magnetite is widespread in the ferrodioritic rocks of the Nain area, and the differing aeromagnetic signature of some rock units can be used to define their extent. This is very well illustrated, for example, by the Barth Island ferrodiorite and the Satorsoakulluk dyke. The magnetite has a variety of modes in the largest intrusions, from scattered granules between silicate minerals to irregular streaks and poorly-defined layers. It is the main component in some of the narrow dykes on the ridge west of Nain (see 1 and 2 above). The magnetite-rich zones shown on the map in ferrodiorite south of Sachem Bay were outlined and investigated by Kernow Resources in 1995, (see map by S. Walters and D. Cole on file with Geological Survey; GSNL File #14C/12(134)); these showings have not been examined by the compiler.

Labradorite schiller to plagioclase is a widespread attribute of the anorthositic intrusions. Particularly noteworthy occurrences include: (i) deep-blue shades within pegmatoidal anorthosite of the Mount Lister intrusion along the cliffs of inner Nain Bay, (ii) yellowish-green shades in medium-grained leuconorite of The Turnpikes intrusion along Shoal Tickle and on the largest island east of Base Island, and (iii) pale blue to blue-green shades in medium grained leuconorite assigned to the South Channel Cairn intrusion between Southern Point and Kauk Harbour.

Geology based on field work by B. Ryan, 1999 and 2000, augmented with data derived from other published and unpublished sources.

Ages determined by M. A. Hamilton, Geological Survey of Canada, using U-Pb data derived from zircon and badelleyite; from published and unpublished work.

Recommended citation for map:
Ryan, B., 2001, Preliminary geological map of the Nain map sheet (NTS 14C/12), Scale 1;50 000, Map 2001-10, Geological Survey, Department of Mines and Energy, St. John's, Open File 014C/12/0136