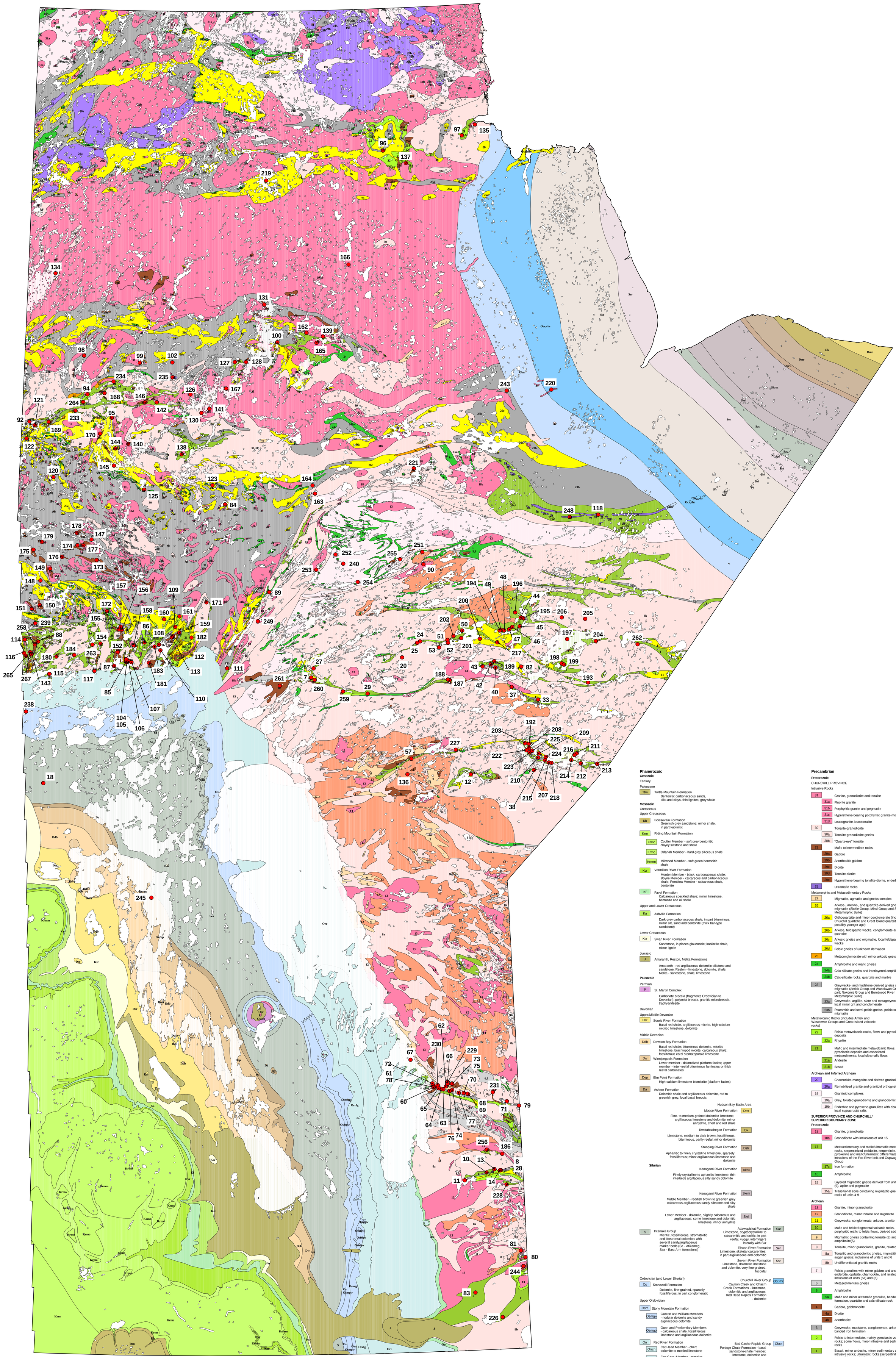


Phanerozoic

Cenozoic

Tertiary

Paleocene

- Ttm — Turtle Mountain Formation: Bentonitic carbonaceous sands, silts and clays, thin lignites; grey shale

Mesozoic

Cretaceous

Upper Cretaceous

- Kb — Boissevain Formation: Greenish grey sandstone; minor shale, in part kaolinitic
- Krm — Riding Mountain Formation
  - Krmc — Coulter Member - soft grey bentonitic clayey siltstone and shale
  - Krmo — Odanah Member - hard grey siliceous shale
  - Krmm — Millwood Member - soft green bentonitic shale
- Kvr — Vermilion River Formation: Morden Member - black, carbonaceous shale; Boyne Member - calcareous and carbonaceous shale; Pembina Member - calcareous shale, bentonite
- Kf — Favel Formation: Calcareous speckled shale; minor limestone, bentonite and oil shale

Upper and Lower Cretaceous

- Ka — Ashville Formation: Dark grey carbonaceous shale, in part bituminous; minor silt, sand and bentonite (thick bar-type sandstone)

Lower Cretaceous

- Ksr — Swan River Formation: Sandstone, in places glauconitic; kaolinitic shale, minor lignite

Jurrasic

- J — Amaranth, Reston, Melita Formations: Amaranth - red argillaceous dolomitic siltstone and sandstone; Reston - limestone, dolomite, shale; Melita - sandstone, shale, limestone

Paleozoic

Permian

- P — St. Martin Complex: Carbonate breccia (fragments Ordovician to Devonian), polymict breccia, granitic microbreccia, trachyandesite

Devonian

Upper/Middle Devonian

- Dsr — Souris River Formation: Basal red shale, argillaceous micrite, high-calcium micritic limestone, dolomite

Middle Devonian

- Ddb — Dawson Bay Formation: Basal red shale; bituminous dolomite, micritic limestone, brachiopod micrite; calcareous shale; fossiliferous coral stomatoporoid limestone
- Dw — Winnipegosis Formation: Lower member - dolomitized platform facies; upper member - inter-reefal bituminous laminates or thick reefal carbonates
- Dep — Elm Point Formation: High-calcium limestone biomicrite (platform facies)
- Da — Ashern Formation: Dolomitic shale and argillaceous dolomite, red to greenish grey; local basal breccia

Hudson Bay Basin Area

- Moose River Formation (Dmr): Fine- to medium-grained dolomitic limestone, argillaceous limestone and dolomite; minor anhydrite, chert and red shale
- Kwataboahegan Formation (Dk): Limestone, medium to dark brown, fossiliferous, bituminous, partly reefal; minor dolomite
- Stooping River Formation (Dstr): Aphanitic to finely crystalline limestone, sparsely fossiliferous; minor argillaceous limestone and dolomite

Silurian

- Kenogami River Formation (Dkru): Finely crystalline to aphanitic limestone; thin interbeds argillaceous silty sandy dolomite
- Kenogami River Formation (Skrm): Middle Member - reddish brown to greenish grey calcareous argillaceous sandy siltstone and silty shale
- Kenogami River Formation (Skrl): Lower Member - dolomite, slightly calcareous and argillaceous; some limestone and dolomitic limestone; minor anhydrite
- S — Interlake Group: Micritic, fossiliferous, stromatolitic and biostromal dolomites with several sandy/argillaceous marker beds (Sa - Atikameg, Sea - East Arm formations)
- Attawapiskat Formation (Sat): Limestone, cryptocrystalline to calcarenitic and oolitic; in part reefal, vuggy, interfingers laterally with Skr
- Ekwan River Formation (Ser): Limestone, skeletal calcarenites; in part argillaceous and dolomitic
- Severn River Formation (Ssr): Limestone, dolomitic limestone and dolomite, very fine-grained, fucoidal

Ordovician (and Lower Silurian)

- Os — Stonewall Formation: Dolomite, fine-grained, sparcely fossiliferous; in part conglomeratic

Upper Ordovician

- Osm — Stony Mountain Formation
  - Osmgw — Gunton and William Members - nodular dolomite and sandy argillaceous dolomite
  - Osmgp — Gunn and Penitentiary Members - calcareous shale, fossiliferous limestone and argillaceous dolomite
- Orr — Red River Formation
  - Orrch — Cat Head Member - chert dolomite to mottled limestone
  - Orrfg — Fort Garry Member - massive to laminated dolomite; minor argillaceous dolomite
- Churchill River Group (Ocr,rhr): Caution Creek and Chasm Creek Formations - limestone, dolomitic and argillaceous; Red Head Rapids Formation - dolomite
- Bad Cache Rapids Group (Obcr): Portage Chute Formation - basal sandstone-shale member; limestone, dolomitic and argillaceous; Surprise Creek Formation - microcrystalline dolomite
- Ow — Winnipeg Formation: Basal sandstone overlain by complex sequence of quartzose sandstone and shale

Precambrian

Proterozoic

CHURCHILL PROVINCE

Intrusive Rocks

- 31 — Granite, granodiorite and tonalite
  - 31a — Fluorite granite
  - 31b — Porphyritic granite and pegmatite
  - 31c — Hypersthene-bearing porphyritic granite-monzonite
  - 31d — Leucogranite-leucotonalite
- 30 — Tonalite-granodiorite
  - 30a — Tonalite-granodiorite gneiss
  - 30b — "Quartz-eye" tonalite
- 29 — Mafic to intermediate rocks
  - 29a — Gabbro
  - 29b — Anorthositic gabbro
  - 29c — Diorite
  - 29d — Tonalite-diorite
  - 29e — Hypersthene-bearing tonalite-diorite, enderbite
- 28 — Ultramafic rocks

Metamorphic and Metasedimentary Rocks

- 27 — Migmatite, agmatite and gneiss complex
- 26 — Arkose-, arenite-, and quartzite-derived gneiss and migmatite (Sickle Group, Missi Group and Sickle Metamorphic Suite)
  - 26a — Orthoquartzite and minor conglomerate (includes Churchill quartzite and Great Island quartzite of possibly younger age)
  - 26b — Arkose, feldspathic wacke, conglomerate and quartzite
  - 26c — Arkosic gneiss and migmatite, local feldspathic wacke
  - 26d — Felsic gneiss of unknown derivation
- 25 — Metaconglomerate with minor arkosic gneiss
- 24 — Amphibolite and mafic gneiss
  - 24a — Calc-silicate gneiss and interlayered amphibolite
  - 24b — Calc-silicate rocks, quartzite and marble
- 23 — Greywacke- and mudstone-derived gneiss and migmatite (Amisk Group and Wasekwan Group in part; Nokomis Group and Burntwood River Metamorphic Suite)
  - 23a — Greywacke, argillite, slate and metagreywacke; local minor grit and conglomerate
  - 23b — Psammitic and semi-pelitic gneiss, pelitic schist and migmatite

Metavolcanic Rocks (includes Amisk and Wasekwan Groups and Great Island volcanic rocks)

- 22 — Felsic metavolcanic rocks, flows and pyroclastic deposits
  - 22a — Rhyolite
- 21 — Mafic and intermediate metavolcanic flows, pyroclastic deposits and associated metasediments; local ultramafic flows
  - 21a — Andesite
  - 21b — Basalt

Archean and Inferred Archean

- 20 — Charnockite-mangerite and derived granitoid gneiss
  - 20a — Remobilized granite and granitoid orthogneiss
- 19 — Granitoid complexes
  - 19a — Grey, foliated granodiorite and granodioritic gneiss
  - 19b — Enderbite and pyroxene-granulites with abundant local supracrustal rafts

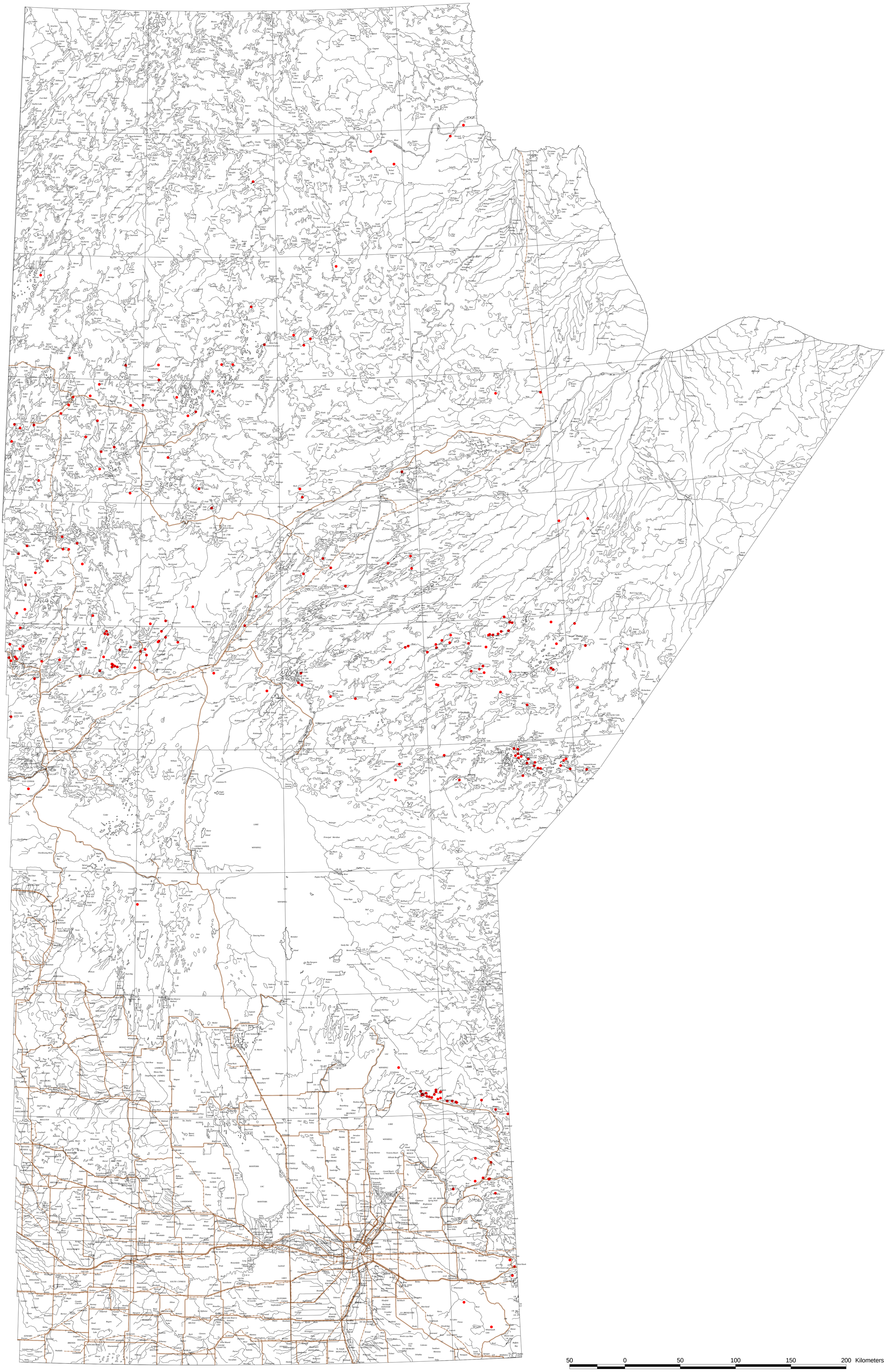
SUPERIOR PROVINCE AND CHURCHILL/ SUPERIOR BOUNDARY ZONE

Proterozoic

- 18 — Granite, granodiorite
  - 18a — Granodiorite with inclusions of unit 15
- 17 — Metasedimentary and mafic/ultramafic metavolcanic rocks, serpentinized peridotite, serpentinite, pyroxenite and mafic/ultramafic differentiated intrusions of the Fox River belt and Ospwagan Group
  - 17c — Iron formation
- 16 — Amphibolite
- 15 — Layered migmatitic gneiss derived from units (4) to (9), aplite and pegmatite
  - 15a — Transitional zone containing migmatitic gneiss and rocks of units 4-9

Archean

- 13 — Granite, minor granodiorite
- 12 — Granodiorite, minor tonalite and migmatite
- 11 — Greywacke, conglomerate, arkose, arenite
- 10 — Mafic and felsic fragmental volcanic rocks, porphyritic mafic to felsic flows, derived sediments
- 9 — Migmatitic gneiss containing tonalite (8) and amphibolite(5)
- 8 — Tonalite, minor granodiorite, granite, related gneiss
  - 8a — Tonalitic and granodioritic gneiss, migmatitic gneiss, augen gneiss; inclusions of units 5 and 6
  - 8b — Undifferentiated granitic rocks
- 7 — Felsic granulites with minor gabbro and anorthosite; enderbite, opdalite, charnockite, and related gneiss; inclusions of units (5a) and (6)
- 6 — Metasedimentary gneiss
- 5 — Amphibolite
  - 5a — Mafic and minor ultramafic granulite, banded iron formation, quartzite and calc-silicate rock
- 4 — Gabbro, gabbronorite
  - 4a — Diorite
  - 4b — Anorthosite
- 3 — Greywacke, mudstone, conglomerate, arkose, banded iron formation
- 2 — Felsic to intermediate, mainly pyroclastic volcanic rocks; some flows, minor intrusive and sedimentary rocks
- 1 — Basalt, minor andesite, minor sedimentary and mafic intrusive rocks; ultramafic rocks (serpentinite, serpentinized peridotite, pyroxenite) and differentiated ultramafic/mafic intrusions


50 0 50 100 150 200 Kilometers

Name of Intrusion Pipestone Lake Anorthosite Complex Ref ID. 7

UTM

Easting	579500
Northing	6044500
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Cross Lake Greenstone Belt

SIZE

Area (km2)	12
Maximum Dimensions	0.9 x 17 km

AGE DATA

Age	Archean
Geochronological Data	2758+/-3 Ma (Corkery et al., 1992)

CLASSIFICATION

Intrusion Type	Lopolith
Geochemical Classification	Tholeiitic - Low Ti
General Classification	Mafic
Other Classification	Rifted Archean basement

GEOLOGY

Principal Rock Types	Anorthosite, leucogabbro, gabbro, pyroxenite, massive magnetite-ilmenite
Host Rocks	Pipestone Lake Group (basalt); Whiskey Jack Gneiss Complex
Layering Features	Megacyclic Units
Igneous Textures	Plagioclase megacrystic layers; Gabbro pegmatite
Other Igneous Features	Magmatic breccia with layered anorthosite-gabbro autoliths in plagioclase megacrystic gabbroic matrix; massive and disseminated magnetite+ilmenite layers in the middle and upper parts of the intrusion
Metamorphic Grade	Amphibolite facies
Deformation	Local east-striking shear zones; otherwise undeformed

Synoptic Geology

Detailed reviews of the geology, mineral occurrences and petrogenesis of the Pipestone Lake anorthosite complex (PLAC) are given in Cameron (1992), Jobin-Bevans (1997) and Jobin-Bevans et al. (1997). The regional geology is described by Corkery et al. (1992). The late Archean Pipestone Lake Anorthosite Complex (PLAC) is a 0.9 x 17 km sill-like layered intrusion. It is part of a suite of coeval megacrystic anorthosite bodies in the Cross Lake region, northwestern Superior Province. Detailed mapping, drill core, geochemical and mineralogical studies (e.g., Jobin-Bevans et al., 1997) have established a laterally continuous igneous stratigraphy comprising three megacyclic units, each of which consists of a melagabbro/ferrogabbro lower part and a leucogabbro to anorthosite upper part. Massive oxide mineralization occurs at the base of the second (middle) cyclic unit, and abundant disseminated oxide mineralization occurs in the melgabbro units of each cyclic unit. The proportion of ilmenite to magnetite increases up section. The base of the intrusion is principally made up of a thick megacrystic anorthositic unit, but local megacryst-bearing pyroxenitic units locally develop just above the basal contact in the thickest part of the intrusion. These pyroxenitic rocks may have crystallized from dense, residual mafic liquids that collected in topographical lows along the basal contact (keel or conduit/feeder zone). Field evidence, including disrupted blocks of layered units, scour contacts, and size-graded and modally-graded layering, indicates that convection and/or vigorous magma flow was involved during the development of the three megacyclic units. Each megacyclic unit is interpreted to represent a separate pulse of magma into the chamber. A cryptic compositional trend is now recognized in the PLAC and involves an increase in incompatible trace element contents and a decreases in plagioclase anorthite (An) content up-section (e.g., An75 near the base of the PLAC to An30 near the top). This cryptic trend likely reflects the ascent of chemically-evolved late-stage melts throughout the crystallization history of the intrusion. See also Peck et al. (1998).

PREVIOUS EXPLORATION

Geophysical Surveys	Airborne magnetic and ground magnetic
Assessment Files	92610, 91274, 91289, 92613, 92611, 92612, 91271, 91270, 91273

Mineral Occurrences

One massive (Main Central Subzone) and 3 disseminated (South Subzone, Disseminated Subzone and North Contact Subzone) Fe-Ti-V rich units are developed in the PLAC. These are hosted by or occur immedialtely below decametre-thick ferrogabbro layers that form thelower parts of the three megacyclic units in the PLAC (Jobin-Bevans et al., 1997). Gossan Resources Ltd. (news releases, Vancouver Stock Exchange, 1998) estimate a resource of >300 million tonnes and

comprising approximately 6% TiO_2, 0.4% V_2O_5 and 20% Fe_2O_3 to a depth of 300 m within a 6 km long segment of the PLAC. Although scarce, pyrrhotite and subordinate chalcopyrite were identified in anorthositic rocks in the lower parts of the intrusion and in drill core samples of massive oxide layers belonging to the Main Central Zone.

Exploration History

In 1959-1960, Noranda Mine Ltd. (AF 92610, 91270)
1. Completed the ground EM and magnetic surveys on the Lisi (1-85) claim group along the southern shore of Pipestone Lake.
2. Drilled 9 holes on Lisi 14, 15, 38 and 40 claims along the southern shore of Pipestone Lake.

In 1963-1964, Noranda Exploration Co. Ltd. (AF 92611, 92612, 91271, 91274)
1. Completed geological mapping on part of the Lisi claim group.
2. Drilled 7 holes on Lisi 2, 3, 4, 17 and 31 claims, and encountered anorthosite and gabbro in 6 holes.
3. Conducted a ground EM survey in Pipe 7 claim area (the Pipe claim group is located about 2 km northwest of the Pipestone Lake).
4. Drilled two holes (P-1 and P-2) on Pipe 12 claim. The hole P-2 encountered 73 feet long serpentinite (11-84 ft. interval) associated with mafic volcanic rocks.

In 1968-1969, Noranda Exploration Co. Ltd. (AF 91269, 92613)
1. Completed the ground EM survey on the Mil (86-90, 96-120) and Lisi (17, 33-39) claim groups.
2. Dilled the Mil-18 on the conductor and encountered metasediments and metavolcanic rocks in the hole.

Between 1993 and 1995, Gossan Resources Limited and Cross Lake Mineral Exploration completed a >100 diamond drill program that delineated four major oxide-rich subzones. Subsequently, Gossan Resources Limited has completed metallurgical studies on bulk samples from some of these units. For the most part, the oxide-rich layers have near-vertical orientations and relatively uniform thicknesses along strike. Where intersected by an east-trending shear zone that is developed along the south shore of Pipestone Lake, flattening and boudinage of the massive oxide layers is locally observed.

MAPPING

Most Detailed Mapping	1:2 500 scale (Peck et al.,1994a; Jobin-Bevans et al., 1995)
Sketch Map Figure#	Yes
Regional Mapping	1:20 000 scale (Corkery and Cameron, 1985)
Type Section Figure#	Yes

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.1027 to 1.1106 and 1.1399 to 1.1406
Whole-rock Analyses Numbers	2.554 to 2.597 and 2.793 to 2.801

Geochemical Features and PGE Abundances

Limited surface grab samples with visible, disseminated pyrrhotite contain <100 ppb combined Pd+Pt but up to 880 ppb Au (Table 1). The new PGE data for the PLAC, contained in Table 1, reflect anomalously low PGE contents that could indicate prior extraction of PGE by sulphide liquids at depth or along the base of the intrusion. See also Peck et al., (1994b).

Recommendations

The anomalously low PGE contents of most of the analysed samples presented in Table 1 appear to reflect significant PGE depletion in the PLAC magmas. These low values likely reflect prior removal of PGE from the parental magmas to the exposed/sampled parts of the intrusion, although they could also indicate derivation of the entire PLAC from PGE-impoverished mantle-derived magmas. Exploration along the base of the PLAC for contact-type PGE mineralization (e.g., Peck et al., 1993) is recommended.

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Name of Intrusion Bird River Sill (Chrome Property) Ref ID. 8

UTM

Easting	752290
Northing	5595980
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Bird River Sill

SIZE

Area (km2)	30
Maximum Dimensions	20 x 1.5 km

AGE DATA

Age Archean

Geochronological Data 2745+/-5 Ma (Timmins et al., 1985)

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Tholeiitic - Low Ti

General Classification Mafic-Ultramafic

Other Classification Rifted Archean basement

GEOLOGY

Principal Rock Types Dunite, peridotite, troctolite, pyroxenite, gabbro, leucogabbro, anorthosite, trondhjemite

Host Rocks Metavolcanic rocks of Peterson Creek Formation; overlain by felsic volcanic rocks; underlain by basalt

Layering Features Megacyclic Units

Igneous Textures Ultramafic rocks have supersaturation textures (hopper and amoeboidal olivine); local megacrystic anorthosite; local dendritic olivine

Other Igneous Features Chromitite layers at several levels in ultramafic series; local disrupted layering; some breccia layers

Metamorphic Grade Greenschist facies

Deformation North-trending block-faults cause local offsetting of the stratigraphy on a metre-scale at the Chrome property

Synoptic Geology

The Chrome Property is one of several major fault-bounded blocks of the Bird River sill - a once-continuous, layered mafic-ultramafic intrusion more than 20 km in length. The Chrome Property and the Maskwa-Dumbarton mines area are the best documented parts of the Bird River sill. Several detailed studies have been completed on the Bird River sill (e.g., Trueman, 1971; Theyer, 1989; Scoates et al., 1989; Talkington et al., 1983; Karop-Moeller and Brummer, 1971). The Bird River sill consists of a less than 100 m to 400 m thick basal ultramafic series overlain by a thicker (300 to 500 m) mafic series. The contact between the two series is rarely exposed and may have been faulted. Rhythmic modal layering occurs in the ultramafic series and reflects variable proportions of olivine, pyroxene and chromite. Layering is only sporadically developed in the mafic series, in which megacrystic anorthosite is locally developed. At the Chrome Property, the upper part of the exposed section of the mafic series contains a trondhjemite layer that is underlain by anorthositic rocks that contain an intersitial trondhjemitic component. The trondhjemite is interpreted to represent a coeval melt likely derived from older intermediate to felsic orthogneiss by contact-related partial melting during the emplacement of the Bird River sill. Ongoing petrogenetic studies by the Manitoba Geological Survey have demonstrated that the mafic series was likely derived from the underlying ultramafic series by fractional crystrallization of olivine, chromite and pyroxene. The mafic series comprises abundant leucogabbro but evolves to trondhjemite and quartz diorite. Chromitite layers are planar or convoluted and are typically several centimetres thick, although some layers are up to 1 m in thickness. Sulphides occur within several metre-thick intervals of stratabound disseminations within the ultramafic series.

PREVIOUS EXPLORATION

Geophysical Surveys IP, ground magnetic and airborne magnetic

Assessment Files Not yet reviewed

Mineral Occurrences

The Bird River sill contains chromitite and Ni-Cu sulphide deposits, including 2 past-producing Ni-Cu mines (Maskwa and Dumbarton mines; Karup-Moller and Brummer, 1971). Surface sampling results obtained by Theyer (1985) and Scoates et al. (1987, 1989) indicate the presence of multiple PGE-enriched sulphide-bearing intervals within the ultramafic series. Maximum reported whole-rock PGE abundance is x.x g/t Pd and x.x g/t Pt.

Exploration History

Chromitite layers in the sill have seen intermittent exploration dating back to before the start of World War II. In the 1980s, Falconbridge Limited undertook the first significant exploration of the Bird River Sill for PGE. Despite extensive exploration of the central part of the Bird River sill for Ni-Cu mineralization (e.g., Maskwa Mining, Falconbridge Limited, Canmine Resources Limited) and the presence of local sulphide-related PGE mineralization > 2g/t, the Bird River sill remains underexplored for PGE. There is no drilling in most parts of the sill, particularly to the west of the Maskwa-Dumbarton property.

MAPPING

Most Detailed Mapping	Williamson (1990)
Sketch Map Figure#	Yes
Regional Mapping	Trueman (1971)
Type Section Figure#	Yes

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.0004 to 1.0115
Whole-rock Analyses Numbers	2.033 to 2.144

Geochemical Features and PGE Abundances

Rocks in the mafic and ultramafic series sampled from the Chrome Property display similar whole-rock geochemical trace element ratios and mantle-normalized abundances (Table 2). Accordingly, and based on detailed mapping (e.g., Williamson, 1990) of the sill at the Chrome Property, the mafic series is believed to represent the product of evolved, plagioclase-rich residual liquids that were generated during the crystallization of the ultramafic series. PGE mineralization at the Chrome Property consists of three or more apparently stratiform sulfide-bearing peridotite layers up to several metres in thickness. The PGE tenor of these occurrences is described in detail by Theyer (1985), Theyer (1989), Scoates et al. (1987), Scoates et al. (1989), Williamson (1990) and Peck and Theyer (1998). In addition, PGE-bearing minerals occurring in the chromitiferous zone of the ultramafic series at the Chrome Property are documented by Talkington et al. (1983). The average PGE tenor of the PGE-rich intervals in the ultramafic series at the Chrome Property appears to be directly proportional to the Cu content and locally coincides with increases in the modal proportions of disseminated chromite in the host rocks. The genesis of the mineralization warrants additional research.

Recommendations

The Bird River Sill is one of the best known PGE prospects in Manitoba. Most of the sill's strike length remains underexplored for PGE. The extent of PGE-rich layers in the ultramafic series and the range of their PGE contents along strike and at depth remains unknown. The mineralization is best documented at the Chrome Property but is likley to occur elsewhere in the Bird River Sill, based on the strong lithostratigraphic similarities between the main blocks of the sill. Future exploration should also investigate the potential for classic reef-type PGE mineralization near the contact between the ultramafic series and the mafic series. Detailed chemostratigraphic studies of the best exposed segments of the sill should be undertaken to establish regional across-strike trends in chalcophile metal contents that could pinpoint mineralization. The potential for PGE-rich chromitite layers, although not indicated at the Chrome property, should be investigated as part of a regional PGE exploration program of the Bird River Sill.

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Name of Intrusion Bird River Sill (Page claim group) Ref ID. 10

UTM

Easting	739235
Northing	5593773
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Bird River Sill

SIZE

Area (km2)	1
Maximum Dimensions	3 x 0.25 km

AGE DATA

Age	Archean
Geochronological Data	2745+/- Ma (Timmins et al., 1985)

CLASSIFICATION

Intrusion Type	Sill
Geochemical Classification	Tholeiitic - Low Ti
General Classification	Mafic-Ultramafic

GEOLOGY

Principal Rock Types	Peridotite, gabbro
Host Rocks	Lamprey Falls basalt (footwall), Bernic Lake conglomerate (hanging wall)
Layering Features	Megacyclic Units
Igneous Textures	Massive peridotite overlain by chromitiferous zone and by a mafic series; a transitional zone occurs locally
Metamorphic Grade	Greenschist facies
Deformation	Soft sediment deformation in chromitites; late brittle deformation produces block faulting disrupting the stratigraphic continuity

Synoptic Geology

Tripartite subdivision of the sill into a lower ultramafic series containing discrete chromite layers within its stratigraphically upper section, in places overlain by a peridotitic to gabbroic transition series, and capped by a gabbroic to dioritic mafic series.

PREVIOUS EXPLORATION

Geophysical Surveys	Ground magnetic and EM
Assessment Files	Not yet reviewed

Mineral Occurrences

Chromite, concentrated in layers mainly within the stratigraphically upper part of the ultramafic series. Field observations in 1994 suggest that the stratigraphic distribution of chromite layers in the Page claim group is equivalent to the stratigraphy of the chromite on the Chrome property. This observation is in contrast to that of Young (1992), who reported discrepancies in the .

Exploration History

Initial rock sampling and assaying for chromite in 1942 by J.D. Bateman.
Bulk sampling, drilling and HLEM survey between 1942 and 1967 by Hudson Bay Exploration and Development and Manitoba Chromium Limited.
Geological mapping, magnetometer survey and drilling by INCO Ltd. In 1981 and 1982.
Davies, 1962.

MAPPING

Most Detailed Mapping	1:2 000 scale map - Young (1992)
Sketch Map Figure#	Yes
Regional Mapping	Trueman, D.L. (1971)

GEOCHEMISTRY

Geochemistry	none
PGE Analyses Numbers	N.A.
Whole-rock Analyses Numbers	N.A.

Geochemical Features and PGE Abundances

No modern data currently available.
Traces of platinum were reported in "dense chromite ore" by Hudson Bay Mining and Smelting Co. Ltd. (Bateman, 1943).

Recommendations

Layered intrusions are characterized by a stratigraphy that is consistent over large distances along strike. Parallels in the chromite stratigraphy on the Page and Chrome groups of claims support this notion. It follows that recommendations made for the exploration of the Chrome group are also valid for the Page group, namely: Compare the stratigraphy of the chromitite layers to determine unequivocally whether there is stratigraphic continuity between the Page and Chrome groups of claims. After establishing stratigraphic continuity, it is suggested that detailed mapping and geochemical sampling for PGE should be undertaken at the stratigraphic levels that contain PGEs in the Chrome group of claims.

Selected Bibliography

Bannnatyne, B.B. and Trueman D.L. 1982: Chromite reserves and geology of the Bird River sill, Manitoba; Manitoba Energy and Mines, Open File Report OF82-1.
Bateman, J.D. 1943: Bird River chromite deposits, Manitoba; Transactions of the Canadian Institute of Mining and Metallurgy, v. 46, p. 154-183.
Davies, 1962.
Timmins, E.A., Turek, A., Symons, D.T.A., Smith, P.E., 1985: U-Pb zircon geochronology and paleomagnetism of the Bird River greenstone belt, Manitoba; Geological Association of Canada, Mineralogical Association of Canada, 1985 Joint Annual Meeting, Program with Abstracts, v. 10, p. A62.
Young, J. 1992: Geology of the chromitite layers in the Page Property, Bird River Sill, southeastern Manitoba; in Report of Activities 1992 Manitoba Energy and Mines, Minerals Division.

Name of Intrusion Bird River Sill (Wards, Trimpas Claims) Ref ID. 11

UTM

Easting	719463
Northing	5586678
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Bird River Sill

SIZE

Area (km2)	1
Maximum Dimensions	3.2 km x 400 m

AGE DATA

Age Archean

Geochronological Data 2745+/- Ma (Timmins et al., 1985)

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Tholeiitic - Low Ti

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro

Layering Features Modally graded/weakly differentiated

Igneous Textures Three gabbro varieties recognized: fine grained, medium grained and porphyritic (anorthositic)

Metamorphic Grade Greenschist facies

Deformation Brittle faulting into blocks

Synoptic Geology

Mafic volcanic rocks host a steeply dipping southwest-trending chromite- and sulphide-bearing gabbro sill that may or may not be a part of the adjacent Bird River sill (Bannatyne and Trueman, 1982).

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic

Assessment Files 91382

Mineral Occurrences

Chromite layers, seams and pockets; pyrrhotite, pyrite and chalcopyrite, all hosted by gabbro

Exploration History

Trenches and pits were sunk initially in 1943 to evaluate chromite potential; further pitting and drilling were performed until 1950. No assay records or drill logs are available.

MAPPING

Regional Mapping 1:100 000 scale (Cerny et al., 1981)

GEOCHEMISTRY

PGE Analyses Numbers 1.1389 to 1.1392

Whole-rock Analyses Numbers 2.030 to 2.032

Geochemical Features and PGE Abundances

Up to 1.37 g/t, Pt and 1.71 g/t Po in drill core (AF 91382)
Up to 540 ppb Pt and 780 ppb Pd were obtained from coarse-grained pyrite-bearing gabbro (Theyer, 1986).

Recommendations

Small tonnage and extent, anomalous PGE concentrations but low-grade, erratically distributed mineralization. This is a prospect of marginal importance. No further work is recommended.

Selected Bibliography

Bannnatyne, B.B. and Trueman D.L. 1982: Chromite reserves and geology of the Bird River sill, Manitoba; Manitoba Energy and Mines, Open File Report OF82-1.
Cerny, P., Trueman, D.L., Ziehlke, D.V., Goad B.E. and Paul, B.J., 1981; The Cat Lake-Winnipeg River and the Wekusko Lake pegmatite fields, Manitoba; Manitoba Department of Energy and Mines, Mineral Resources Division, Economic Report ER80-1.
Theyer, P., 1986: Platinum group elements in southeastern Manitoba; in Report of Field Activities 1986, Manitoba Energy and Mines, Minerals Division, p. 120-124.
Timmins, E.A., Turek, A., Symons, D.T.A., Smith, P.E., 1985: U-Pb zircon geochronology and paleomagnetism of the Bird River greenstone belt, Manitoba; Geological Association of Canada, Mineralogical Association of Canada, 1985 Joint Annual Meeting, Program with Abstracts, v. 10, p. A62.

Name of Intrusion Bigstone Lake

Ref ID. 12

UTM

Easting	329000
Northing	5954250
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Knife Lake Greenstone Belt

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown

Geochemical Classification Unknown

General Classification Mafic-Ultramafic

Other Classification Greenstone belt

GEOLOGY

Host Rocks Mafic volcanic rocks

Synoptic Geology

Both gabbro and ultramafic rocks were recognized by Noranda Exploration. The main gabbro body is less than 100 m wide and approximately 300 m long.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM

Assessment Files 93482

Exploration History

Drilling by Noranda Exploration (1984 and 1985).

MAPPING

Most Detailed Mapping Assessment File 93842

GEOCHEMISTRY

Recommendations

Determine if the ultramafic rocks are intrusive or extrusive.

Name of Intrusion Bird River Sill (National Ledin Claims) Ref ID. 13

UTM

Easting	746446
Northing	5596780
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Bird River Sill

SIZE

Area (km2)	2
Maximum Dimensions	5 x 0.3 km

AGE DATA

Age Archean

Geochronological Data 2745+/- Ma (Timmins et al., 1985)

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Tholeiitic - Low Ti

General Classification Mafic-Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Peridotite, gabbro

Host Rocks Lamprey Falls basalt (footwall), Bernic Lake conglomerate (hanging wall)

Layering Features Megacyclic Units

Igneous Textures Unknown

Metamorphic Grade Greenschist facies

Deformation Brittle deformation resulting in block faulting

Synoptic Geology

The National-Ledin property is underlain by a poorly exposed part of the Bird River sill; a small outcrop of peridotite was reported on this property by Davies (1952). The geology is cursorily known from drillhole descriptions and consists of peridotite containing layered and disseminated chromite.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM

Mineral Occurrences

Chromite

Exploration History

The Howe Bay Mining Company Limited drilled 7 holes (approximately 300 m) in 1951, intersecting peridotite and sporadically occurring chromite layers.

MAPPING

Regional Mapping 1:100 000 scale (Cerny et al., 1981)

GEOCHEMISTRY

Geochemistry none

Geochemical Features and PGE Abundances

No data available.

Recommendations

Poor exposures on this property preclude petrological and/or geochemical exploration. It is suggested that more expensive exploration methods should only be employed if significant PGE concentrations have been detected in other, better exposed portions of the sill.

Selected Bibliography

Bannnatyne, B.B. and Trueman D.L. 1982: Chromite reserves and geology of the Bird River sill, Manitoba; Manitoba Energy and Mines, Open File Report OF82-1.
Cerny, P., Trueman, D.L., Ziehlke, D.V., Goad B.E. and Paul, B.J. 1981: The Cat Lake-Winnipeg River and the Wekusko Lake pegmatite fields, Manitoba; Manitoba Department of Energy and Mines, Mineral Resources Division, Economic Report ER80-1.
Timmins, E.A., Turek, A., Symons, D.T.A., Smith, P.E., 1985: U-Pb zircon geochronology and paleomagnetism of the Bird River greenstone belt, Manitoba; Geological Association of Canada, Mineralogical Association of Canada, 1985 Joint Annual Meeting, Program with Abstracts, v. 10, p. A62.

Name of Intrusion Bird River Sill (Maskwa Open Pit) Ref ID. 14

UTM

Easting	751508
Northing	5595807
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Bird River Sill

SIZE

Area (km2)	2.75
Maximum Dimensions	5.5 x 0.5 km

AGE DATA

Age Archean

Geochronological Data 2745+/- Ma (Timmins et al., 1985)

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Tholeiitic - Low Ti

General Classification Mafic-Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Peridotite, gabbro

Host Rocks Peridotite

Layering Features Modally graded/weakly differentiated

Igneous Textures Unknown

Other Igneous Features Serpentinized peridotite layer approximately 200 m thick, under- and overlain by gabbro: "Upper and Lower" gabbro (Juhas, 1973). This unit is part of the Bird River sill, an approximately 33 km long mafic-ultramafic intrusion in the Rice Lake belt.

Metamorphic Grade Greenschist facies

Synoptic Geology

Disseminated Ni-Cu sulphides accumulated at and near the stratigraphic base of the ultramafic part of the Bird River sill.

PREVIOUS EXPLORATION

Assessment Files Not yet reviewed

Mineral Occurrences

Dominantly pyrrhotite containing Ni-Cu mineralization. Mined were 365 730 tonnes with an average grade of 1.16% Ni and 0.2% Cu (Coats et al., 1979). An additional 816 000 tonnes are indicated reserves with a grade of 1.34% Ni and 0.23% Cu (Northern Miner, July 15, 1976).

Exploration History

The Maskwa West mineralization was identified by drilling in 1974. Previous exploration had been centred on the Dumbarton property (approximately 1.2 km to the northeast). Open pit mining commenced in 1975 and closed in 1976.

MAPPING

Most Detailed Mapping 1:12 000 scale (Davies, 1955)

Regional Mapping 1:100 000 scale (Cerny et al., 1981)

GEOCHEMISTRY

Geochemistry none

PGE Analyses Numbers N.A.

Geochemical Features and PGE Abundances

N.A.

Recommendations

Ore from the Maskwa pit was crushed and mixed with ore from the Dumbarton Mine before concentration in the Consolidated Faraday mill at Werner Lake. Thus, neither the content nor the grade of PGEs in the Maskwa ore is known. A comprehensive petrological and petrochemical investigation of the drillcore from the Maskwa pit is recommended to determine the existence and grade of PGE content.

Selected Bibliography

Coats, C.J.A., Stockford, H.R. and Buchan, R. 1979: Geology of the Maskwa West nickel deposit, Manitoba; Canadian Mineralogist, v 17, p 309-318.

Davies, J.F. 1955: Geology and mineral deposits of the Bird Lake area; Manitoba Mines Branch, Publication 54-1.

Juhas, A.P. 1973: Geology and origin of copper-nickel sulphide deposits of the Bird River area of Manitoba; PhD. thesis, University of Manitoba.

Karup-Moller, S. and Brummer, J.J., 1971. Geology and sulphide deposits of the Bird River claim group, southeastern Manitoba. Geological Association of Canada, Special Paper 9, p. 143-154.

Timmins, E.A., Turek, A., Symons, D.T.A., Smith, P.E., 1985: U-Pb zircon geochronology and paleomagnetism of the Bird River greenstone belt, Manitoba; Geological Association of Canada, Mineralogical Association of Canada, 1985 Joint Annual Meeting, Program with Abstracts, v. 10, p. A62.

Name of Intrusion Picket Lake

Ref ID. 18

UTM

Easting	335500
Northing	5948500
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Knife Lake Greenstone Belt

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Name of Intrusion Carrot River West Ref ID. 20

UTM

Easting	662350
Northing	6063050
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Carrot River - Walker Lake Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Unknown

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Serpentinized peridotite, olivine hornblendite

Host Rocks Pillowed basalt, andesite of Hayes River Group, tonalite porphyry of Bayly Lake Complex.

Layering Features Unknown

Metamorphic Grade Amphibolite facies

Synoptic Geology

Three small occurrences of ultramafic sills were located at longitudes 96°31'W, 96°34'W and 96°39'W, along western Carrot River.

PREVIOUS EXPLORATION

Geophysical Surveys Ground EM

Mineral Occurrences

Po, py, cpy

Exploration History

Occurrence at 96°34' W:
Barry (1960) reported a sulphide mineralized zone, about 600 m long and 1.5-9.1 m wide, near the southwestern end of the Carrot River. The mineralized zone follows the shore of the bay and consists of pyrite and pyrrhotite with minor specks of chalcopyrite.
In 1973, Mineral Resources Division conducted an EM survey in the area that identified a 608 m long conductor, and subsequently drilled a hole to tested the conductor. The hole encountered pillow basalts (0-20.7 m), pyrrhotite mineralized serpentinite (20.7-23.7 m) and tonalite porphyry (23.7-31.7 m). The pyrrhotite appears as veinlets and replacement fillings in the serpentinite and is associated with heavy silicification. The tonalite porphyry contains disseminated pyrrhotite in xenoliths of serpentinite (Haskins & Stephenson, 1974). The serpentinite contains 0.02% Cu and 0.03-0.05% Ni.

MAPPING

Most Detailed Mapping 1:50 000 scale; (Hubregtse, 1985).

Sketch Map Figure# No

Regional Mapping 1:250 000 Scale (Bedrock Geology Compilation Map Series, Cross Lake, NTS 63I, 1996).

Type Section Figure# No

GEOCHEMISTRY

Selected Bibliography

Barry, G.S. 1960: Geology of the western Oxford Lake-Carghill Island area; Manitoba Mines and Natural Resources, Mines Branch, Publication 59-2, p. 35.
Haskins, R.A. and Stephenson, J.F., 1974: Geology and mineralization of western Oxford Lake and Carrot River; in Summary of Geological Field Work 1974, Manitoba Department of Mines, Resources and Environmental Management, Mineral Resources Division, Geological Paper 2/74, p. 38, 44-46.
Hubregtse, J.J.M.W. 1985: Geology of the Oxford Lake-Carrot River area; Manitoba Energy and Mines, Geological Report 83-1A, p. 7.
Southard, G.G. 1977: Exploration history, compilation and review, including exploration data from cancelled assessment files, for the Gods, Knee and Oxford Lake areas, Manitoba; Manitoba Department of Mines, Resources and Environmental Management, Mineral Resources Division, Open File Report 77-5, p. 43.
Theyer, P. 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Manitoba Mineral Resources Division, Economic Report ER79-2, p.17, 56.

Name of Intrusion Carrot River East Ref ID. 24

UTM

Easting	678750
Northing	6077550
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Carrot River - Walker Lake Greenstone Belt

SIZE

Area (km2)	1.25
Maximum Dimensions	Approx. 250 m x 5 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type	Sill
Geochemical Classification	Komatiitic
General Classification	Ultramafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	Serpentinized peridotite, pyroxenite, feldspathic pyroxenite
Host Rocks	Mafic metavolcanic rocks
Layering Features	Local modal layering
Igneous Textures	Areally extensive, well preserved, spinifex-textured komatiitic flows
Other Igneous Features	Sill displays a crude zoning, with a pyroxenite to feldspathic pyroxenite, margin surrounding a highly serpentinized peridotite core.
Metamorphic Grade	Amphibolite facies
Deformation	Locally affected by major east-trending shear zones

PREVIOUS EXPLORATION

Geophysical Surveys	Airborne magnetic/EM and ground magnetic/EM
Assessment Files	91285, 92269, 92303, 92304, 92306, 93237, 93196, 93248

Mineral Occurrences

Py, cpy, po

Exploration History

In 1950, Sherritt Gordon Mines (AF 91285) drilled 4 holes east of Peridotite Island. The holes intersected andesite and tuff, which is crosscut by quartz veins and disseminated pyrite (py), arsenopyrite, and some quartz-carbonate veinlets containing trace chalcopyrite (cpy). No Au and Cu were detected in the samples analyzed.

Scoates (1971) examined the serpentinite and serpentinized peridotite (Barry, 1960) on the north shore of the Carrot River. Fine-grained disseminated sulphides have an erratic distribution, and locally constitute 5% and average less than 2% of the rock. A one-pound grab sample, containing approximately 3% sulphides, assayed 0.27% Ni, 0.01% Cu and 0.01% Co. A few, narrow, cross-fibre asbestos veinlets were observed. However picrolite veinlets, with associated magnetite and carbonate, are more common.

In 1972 and 1973, Canex Placer Ltd. (AF 92269, 92303, 92304, 92306) carried out an exploration program on 2 ultramafic intrusions in the area along Carrot River, following claim staking in 1971. The exploration areas consisted of West Grid and East Grid. The West Grid is located about 2.4 km west of Eagle Island, and covers the northern river channel and shores of Carrot River.The East Grid is located about 200 m east of Eagle Island, and covers the southern river channel and shores of Carrot River (south of Peridotite Island).

Geological survey:
Geological mapping (1":400' scale) on both grids was completed in 1972. The geological map of East Grid was revised by combining all available geological, drill core and geophysical data in 1973.

Geophysical surveys:

The geophysical surveys consisted of ground magnetics, horizontal and vertical loop EM and IP. The magnetics and EM readings were taken on a 400'x100' grid (1":400' scale) and the IP readings were taken at 200' intervals along the lines. The surveys outlined the ultramafic intrusions in some detail, and suggested that both the north and south contacts of the intrusions have mineral potential.

Drilling:
12 holes were drilled in the area:
1) CR-1 and CR-2 were located near west end of northern channel of Carrot River (West Grid), and drilled into the ultramafic intrusion from the north and south contacts. The ultramafic rocks consisted mainly of serpenitite, serpentinized dunite, dunite, serpentinized peridotite and peridotite. The country rocks consisted of dacite, dacite-rhyodacite, and chlorite or serpentine-talc schist. Trace amounts of pyrite, pyrrhotite and chalcopyrite were found in the ultramafic rocks. They only assayed for Ni, which ranged from 0.1 to 0.29% and averaged about 0.23%.

2) CR-8 was collared on top of the ultramafic intrusion near the south shore of the center of Peridotite Island (East Grid), and drilled though the ultramafic body and the south contact with metasediments, ending in the granite. The ultramafic body consisted mainly of pyroxenite and olivine pyroxenite with trace amounts of sulphides. In the drillcore samples, the Ni content ranged from 272 to 1920 ppm, and averaged about 1200 ppm.

3) CR-15 and CR-17 were located about 500 and 1000 feet northeast of Eagle Island, respectively. CR-17 intersected two gabbro dykes (at 30-74 feet and 203-276 feet).

4) CR-4, CR-5, CR-12, CR-13, CR-14 and CR-21 were located in the south river channel, southwest of Peridotite Island (East Grid). CR-4, CR-13 and CR-14 were drilled into the north contact of the ultramafic intrusion, and CR-5, CR-12 and CR-21 were drilled into the south contact.

CR-4 passed through andesite, metasedimentary rock and rhyolitic tuff, then the silicified contact zone from 466 to 469 feet and the ultramafic intrusion from 469 to 566 feet, and finally aplite . The ultramafic rocks are serpentinized peridotite and dunite that contain trace disseminated suphides and were assayed for Ni, Ag and S. The Ni contents ranged from 140-3535 ppm, and averaged about 1547 ppm.
The drillhole intersected 37 feet (from 427 to 464 feet) of massive to semimassive sulphides (20-80%) in the metasediments and rhyolitic tuff. The zone contains pyrite, pyrrhotite, chalcopyrite (5%), sphalerite (1-2%), chlorite, graphite and some siliceous segments (fine-grained rhyolitic tuff?) with 0.16% Cu and 0.82% Zn.

CR-13 passed through metasedimentary rocks, rhyolite and graphitic tuff and ended in the serpentinized peridotite (395-425 feet). The peridotite contains 5% suphides and the Ni contents ranged from 930-5100 ppm, and averaged about 2680 ppm Ni.

CR-14 passed through metasedimentary rocks, andesite and rhyolite, and ended in a gabbro dyke (454-465 feet).

CR-5 was collared atop the ultramafic intrusion, passed into the gabbro dyke at 691 feet and did not penetrate the basal contact of the ultramafic rocks. The ultramafic rocks are serpentinized peridotite and dunite, and contain trace pyrite, usually in fractures. The ultramafic rocks were assayed for Ni and S. The Ni content ranged from 1980-7250 ppm, and averaged about 3100 ppm Ni. The gabbro is fine-grained and porphyritic, with feldspar phenocrysts.

CR-12 was collared in the granite, passed through fine-grained diorite, intersected 408 feet of fine-grained dunite from 588 to 966 feet and ended in the dunite. The dunite contains trace sulphides, and was assayed for Ni, Cu and S. The Ni content ranged from 1600 to 7000 ppm, and averaged about 3400 ppm; Cu content ranged from 6 to 1300 ppm, and averaged about 360 ppm.

CR-21 was collared in the granite and encountered serpentinized peridotite from 173 to 438 feet. The south contact is brecciated and consists mainly of rhyolite, andesite agglomerate and unidentified volcanics. Samples were analyzed for Ni and S, the Ni content ranging from 2100 to 2900 ppm, and averaging about 2600 ppm.

In 1984, Westmin Resoures Ltd. (AF 93237) carried out a gold exploration program, consisting of airborne geophysical, ground geophysical and geochemical surveys, and geological mapping and sampling, in Carrot River area.

Geophysical survey:
1) 8.75 line-km, in total, of VLF survey was done on grids XG-1 (located about 500 m southwest of Eagle Island and on the south shore of Carrot River) and WG-2 (west of XG-1).
2) A helicopter-borne geophysical survey, totalling 1,392 line-km with 150 m line-spacing, was done in the area. The survey consisted of helicopter-borne radar-controlled EM, magnetics, resistivity, and a lesser amount of VLF-EM.

Geochemical survey:
1) Approximately 155 lake sediment and rock samples were analyzed for Au and As to supplement the original Cu and Zn analyses. These samples were collected by Barringer in early 1970s during lake sediment geochemical reconnaissance in the area.
2) 1,113 humus and soil samples were collected on the 4 grids and 9 reconnaissance lines.
3) 174 lake sediment samples were collected on 16 lake profiles.
4) 165 rock samples from gossans, prospects and drill core were collected.
Samples from 2, 3, and 4 were analyzed for Au, Ag, As, Cu, Zn, Pb, Mo and the organic content (LOI).

Geological survey:
1) Detailed geological mapping was done on grids XG-1 and WG-2.
2) Reconnaissance mapping was done in most sampling areas.

Highlights of the results:
1) Two gold anomalies in lake sediments were found in the area. One contains 1450 ppb Au near the western end of Peridotite Island. Another one contains 1200 Au on the north shore of Carrot River and north of the west end of Peridotite Island (near station 204, section D-D', Peck et al., 1997).

2) A rock sample containing 580 ppb Au and 1450 ppm Cu was collected from the shore of the western end of the south channel of Carrot River (in grid WG-2).

3) Two siliceous, brecciated rock samples (felsite dyke or statabound chert?) containing pyrite-chalcopyrite mineralization, from south side of Peridotite Island near the contact of peridotite and quartz-magnetite iron-formation, yielded anomalous Au, Ag and Cu values (sample 4047 contained 1450 ppb Au, 12 ppm Ag, 210 ppm Pb, 24 ppm Zn, 88 ppm Cu, 3.2 ppm As and 75 ppm Mo; sample W18a-11 contained 1360 ppb Au, 9.5 ppm Ag, 10 ppm Pb, 39 ppm Zn, and 4 ppm Mo).

In 1985, Westmin Resources Ltd. (AF 93196) completed a geochemical survey program and collected 87 humus and 35 rock samples to analyze for Au, Ag, As, Cu, Zn, Pb, Mo and LOI, and examined and investigated geochemical and geophysical anomalies in the area for selection of diamond-drill targets.
Thirteen diamond drill targets were proposed based on Au, Mo, As, Cu and conductivity anomalies.

In 1990, Westmin Resoures Ltd. (AF 93248) completed a four drillhole program on the eastern part of the Carrot River. Drill core and sludge samples containing sulphide mineralization were sent for analysis for Au and Cu by fire assay and AA.

1) Hole 90-1 was drilled on the south shore of the center of Peridotite Island to intersect the rock beneath the chalcopyrite-siliceous breccia showing (1450 ppb Au, 1200 ppm Cu in grab sample), and magnetic and VLF anomalies south of the showing. The drillhole encountered peridotite, gabbro, pyroxenite, mudstone, felsite dyke, iron formation and quartzite. Pyrite and pyrrhotite mineralization occurs mainly in quartz and quartz-carbonate veins or veinlets within the mudstone and iron-formation, and in the felsite dyke. A chlorite-graphite-pyrrhotite zone at 20.2-20.6 m contains 530 ppb Au. An additional four samples with anomalous gold values between 105 and 325 ppb were obtained between 21.3 and 32.8 m from pyrite-quartz veins and felsite dykes within iron-formation and mudstone.

2) Hole 90-2 was collared on the south shore of the center of Peridotite Island, 400 m east of Hole 90-1, and encountered fine- to medium-grained peridotite with occasional coarse-grained sections. Serpentization is variable, no sulphides were found, and no samples were taken.

3) Hole 90-3 was collared in pyrite-bearing iron-formation east of Peridotite Island and 60 m from the south shore of Carrot River, and encountered peridotite and then dunite (?) near the bottom of the hole. The hole intersected 3% sulphides (pyrrhotite + chalcopyrite) at the end of the peridotite section (97.3-100.4 m) that returned 25-185 ppb Au and 1840-2540 ppm Cu.

4) Hole 90-4 was collared 1050 m southeast of Peridotite Island and 550 m from the south shore of Carrot River, and encountered serpentinized peridotite and gabbro. The hole intersected a pyrite (5%)-quartz vein at 24.6-25.9 m with 145-250 ppb Au and 82-120 ppm Cu, and a weakly mineralized zone (2-3% pyrrhotite, 1% chalcopyrite) with less than 5% ppb Au and 230-485 ppm Cu in probable chlorite metasediment.

MAPPING

Most Detailed Mapping	1:50 000 scale; (Hubregtse, 1985)
Sketch Map Figure#	Yes
Regional Mapping	1:250 000 scale (Bedrock Geology Compilation Map Series, Cross Lake, NTS 63I, 1996).
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE
PGE Analyses Numbers	1.0137 to 1.0140
Whole-rock Analyses Numbers	2.152 to 2.157

Selected Bibliography

Barry, G.S. 1960: Geology of the Western Oxford Lake-Carghill Island area; Manitoba Mines Branch, Publication 59-2, p. 34.

Bell, C.K. 1962: Cross Lake map area, Manitoba; Geological Survey of Canada, Paper 6122, p. 14.

Davidson D.D. 1974: The Carrot River ultramafic complex; M.Sc. thesis, Acadia University, 154 p.

Hubregtse, J.J.M.W. 1985: Geology of the Oxford Lake-Carrot River area; Manitoba Energy and Mines, Geological Report GR 83-1A, 73p.

Peck, D.C. and Heaman, L.M. 1998: Geochemical characteristics and preliminary U-Pb zircon age of Proterozoic mafic dykes from the eastern part of the Carrot River greenstone belt (part of NTS 63I/16); in Report of Activities 1998, Manitoba Energy and Mines, Geological Services, p. 135-143.

Peck, D.C. and Theyer, P. 1997: Geology and geochemistry of komatiites and mafic-ultramafic intrusions, Carrot River Greenstone Belt; Manitoba Energy and Mines, Manitoba Mining and Minerals Convention '97, Winnipeg, Manitoba, Nov. 20-22, 1997, Program, p. 43.

Peck, D.C., Theyer, P., Liwanag, J., Chandler, C. 1997: Geology and geochemistry of the eastern part of the Carrot River greenstone belt, northwestern Superior Province, Manitoba (part of NTS 63I/16); in Report of Activities 1997, Manitoba Energy and Mines, Minerals Division, p. 18-36.

Scoates, 1971:

Southard, G.G. 1977: Exploration history, compilation and review, including exploration data from cancelled assessment files, for the Gods, Knee and Oxford Lake areas, Manitoba; Manitoba Department of Mines, Resources and Environmental Management, Mineral Resources Division, Open File Report 77-5, p. 40-42.

Theyer, P. 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Manitoba Mineral Resources Division, Economic Report ER79-2, p.17-18, 56.

Name of Intrusion Eagle Island Gabbro (Carrot River East) Ref ID. 25

UTM

Easting	676100
Northing	6076300
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Carrot River - Walker Lake Greenstone Belt

SIZE

Area (km2)	0.2
Maximum Dimensions	0.2 x 1 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Tholeiitic - Low Ti

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro, leucogabbro, diorite

Host Rocks Mafic metavolcanic rocks, Lower Series, Carrot River greenstone belt

Layering Features Local modal layering

Igneous Textures Several decametre-thick modal layers are present; local variably-textured gabbroic pegmatite pods

Metamorphic Grade Amphibolite facies

Deformation Relatively undeformed; primary layering is well preserved

Synoptic Geology

The regional geology is discussed in Hubregtse (1985). Detailed mapping of the Eagle Island gabbro body (Peck et al., 1997) delineated 9 major layers (L1 to L9), including (from base to top, thickness in parentheses): L1 (>10 m) - coarse-grained leucogabbro; L2 (30 m) - coarse-grained to medium-grained leucogabbro with diffuse gabbroic bands; L3 (25 m) - medium-grained leucogabbro with pyrrhotite-bearing granophyric gabbro pods, layers and veins, and displaying minor centimetre-scale modal layering; L4 (1 m) - fine-grained gabbro; L5 (2 m) - modally layered (centimetre-scale) fine-grained gabbro, coarse- to medium-grained leucogabbro and quartz gabbro; L6 (8 m) - medium-grained gabbro with minor, irregular patches of pegmatitic, variably textured gabbro; L7 (6 m) - irregular mixing between fine-grained gabbro, medium-grained leucogabbro and pegmatitic, locally dendritic quartz-bearing gabbro, with abundant stratiform, lenticular zones of disseminated pyrrhotite + chalcopyrite mineralization; L8 (3 m) - thinly banded (2-15 cm) coarse-grained quartz gabbro/diorite, medium-grained leucogabbro and fine-grained gabbro with local, lenticular, pyrrhotite-rich bands containing up to 15% sulphides; L9 (>10 m) - a distinctive coarse-grained gabbro/leucogabbro characterized by randomly orientated acicular amphibole crystals. The layered gabbro body is overlain by massive and pillowed basalt flows containing local amygdaloidal units.

PREVIOUS EXPLORATION

Assessment Files 91285, 92269, 92303, 92304, 92306, 93237, 93196, 93248

Mineral Occurrences

Sulphides are concentrated into the upper parts of the gabbro, where losange-shaped, disseminations of pyrrhotite and minor chalcopyrite, measuring less than 20 cm wide by 1-5 m long, are developed in variably textured granophyre-bearing gabbro, coarse-grained leucogabbro and fine-grained gabbro. The average sulphide content in these zones is less than 5%.

Exploration History

Not explored

MAPPING

Most Detailed Mapping 1:50 000 scale; (Hubregtse, 1985).

Sketch Map Figure# Yes

Regional Mapping 1:250 000 scale (Bedrock Geology Compilation Map Series, Cross Lake, NTS 63I, 1996).

Type Section Figure# Yes

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.0202 to 1.0215
Whole-rock Analyses Numbers	2.219 to 2.232

Geochemical Features and PGE Abundances

Peck et al. (1997) reported low PGE contents for a suite of samples collected from the Eagle Island layered gabbro body. The layered gabbro body appears to be coeval and comagmatic with adjacent peridotite bodies. The potential for stratiform PGE mineralization, typically situated at or above the first occurrence of plagioclase in mafic-ultramafic complexes, warranted investigation. Table GS-4-4 (Peck et al., 1997) reports the assay results for samples from the layered gabbro body (station 216, Fig. GS-4-2) and additional sulphide-bearing gabbro samples. Four samples contained anomalously high Au, with values between 29 to 83 ppb (Table GS-4-4). However, none of the samples contained anomalously high Pt or Pd, with most of the values being below the limit of detection for the method used (<5 ppb for Pd; <10 ppb for Pt). Given a komatiitic parent liquid for the gabbroic rocks (based on REE data described above), the high Au and low Pt and Pd values are problematic. The S/Se ratios for most of the samples exceed those typical of the mantle (1000 to 5000), indicating that a hydrothermal or sedimentary sulphide component may be present in the rocks. The low total PGE abundances could reflect prior extraction of the PGE during fractional crystallization of a sulphide phase.

Recommendations

Preliminary surface sampling by Peck et al. (1997) did not return anomalously high values, even in sulphide-bearing samples. Additional, systematic assays should be completed.

Selected Bibliography

Barry, G.S. 1960: Geology of the Western Oxford Lake-Carghill Island area; Manitoba Mines Branch, Publication 59-2, p. 34.
Bell, C.K. 1962: Cross Lake map area, Manitoba; Geological Survey of Canada, Paper 61-22, p. 14.
Hubregtse, J.J.M.W. 1985: Geology of the Oxford Lake-Carrot River area; Manitoba Energy and Mines, Geological Report 83-1A, p. 7-8.
Peck, D.C., Theyer, P., Liwanag, J., Chandler, C. 1997: Geology and geochemistry of the eastern part of the Carrot River greenstone belt, northwestern Superior Province, Manitoba (part of NTS 63I/16); in Report of Activities 1997, Manitoba Energy and Mines, Minerals Division, p. 18-36.
Southard, G.G. 1977: Exploration history, compilation and review, including exploration data from cancelled assessment files, for the Gods, Knee and Oxford Lake areas, Manitoba; Manitoba Department of Mines, Resources and Environmental Management, Mineral Resources Division, Open File Report 77-5, p. 40-42.
Theyer, P. 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Manitoba Mineral Resources Division, Economic Report ER79-2, p.17-18, 56

Name of Intrusion Cross Lake (Sandy Bay) Ref ID. 27

UTM

Easting	581750
Northing	6053000
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Cross Lake Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

Age Archean

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

Principal Rock Types Peridotite

PREVIOUS EXPLORATION

Assessment Files 91266, 91268

Exploration History

In 1968, Noranda Exploration Co. Ltd. (AF 91262, 91268):
1) completed ground EM on the Mil (1-31) claim group along Sandy Bay; and
2) drilled 4 holes on Mil 6 and Mil 11 claims; hole Mil-4 intersected 62 feet of peridotite to serpentinized (peridotite from 150 to 212 feet) and granodioritic gneiss (from 212 to 291 feet). The peridotite probably contains disseminated pentlandite or pyrite and the Ni content ranges from 0.07 to 0.20%.

MAPPING

Most Detailed Mapping 1:2500 scale (Peck et al., 1994; Jobin-Bevans et al., 1995)

Regional Mapping Corkery et al. (in preparation)

GEOCHEMISTRY

Name of Intrusion Bird River Sill (Dumbarton Mine) Ref ID. 28

UTM

Easting	752311
Northing	5595965
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Bird River Sill

SIZE

Area (km2)	0.02
Maximum Dimensions	2.3 km x 10 m

AGE DATA

Age Archean

Geochronological Data 2745+/- Ma Timmins et al., 1985

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Tholeiitic - Low Ti

General Classification Other

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Basalt, sulphide-facies iron-frormation, peridotite

Host Rocks Sulphide-facies iron-formation

Layering Features Modally graded/weakly differentiated

Igneous Textures None

Metamorphic Grade Greenschist facies

Deformation Small-scale folding

Synoptic Geology

A layer of silicate-facies iron formation with sulphide-facies iron-formation zones, deposited on basalt, contains Ni, Cu and Zn. It is thought that the Cu and Zn were accumulated in the exhalative stage of the iron-formation, whereas Ni, Pt and Pd mobilized during metamorphism of the adjacent ultramafic rocks of the Bird River sill were introduced at a later stage.

PREVIOUS EXPLORATION

Geophysical Surveys Ground magnetic and EM

Assessment Files Mineral Inventory 52L/6 Ni 1

Mineral Occurrences

Pyrrhotite, pentlandite, chalcopyrite, pyrite, pentlandite, cubanite

Exploration History

Staked in 1920, trenching before 1926; drilling (1200 m). Active mining from 1969 to 1973. Currently owned by Canmine Ltd.

MAPPING

Most Detailed Mapping Juhas (1973)

Sketch Map Figure# Yes

Regional Mapping 1:100 000 scale (Cerny et al., 1981)

GEOCHEMISTRY

Geochemical Features and PGE Abundances

Karup-Moller and Brummer (1971) published an analysis of two random flotation concentrate samples: 4.69 and 5.96% Cu; 8.5 and 9.88% Ni; 0.036 and 0.032 oz./ton Pt; 0.11 and 0.12 oz./ton Pd

Theyer (1986) analyzed selected drill core of the Dumbarton mine and Maskwa pit area; results were: Pd up to 320 ppb Pd and up to 220 ppb, Pt.

Jonasson et al., (1987) reported the results of 5 ore samples from the Dumbarton mine: 0 to 260 ppb Pt and 465 to 1760 ppb

Pd.

Recommendations

This deposit consists of an iron-formation containing Fe, Cu and Zn sulphides. All the additional nickel, most of the copper and probably, most of the PGEs originated from the (in places) adjacent Bird River sill. Since PGE concentrations in the most thoroughly investigated Chrome area of the sill are comparable in magnitude to those in the Dumbarton exhalative layer, one has to presume either an extremely efficient (ionic?) scavenging and transfer of the PGEs from the sill to the exhalative layer or (even more interesting) very high PGE concentrations in the adjacent sill.

Selected Bibliography

Cerny, P., Trueman, D.L., Ziehlke, D.V., Goad B.E. and Paul, B.J. 1981: The Cat Lake-Winnipeg River and the Wekusko Lake pegmatite fields, Manitoba; Manitoba Department of Energy and Mines, Mineral Resources Division, Economic Report ER80-1.
Jonasson, I.R., Eckstrand, O.R. and Watkinson, D.H. 1987: Preliminary investigations of the abundance of platinum, palladium and gold in some samples of Canadian copper-nickel ores; in Current Research, Part A, Geological Survey of Canada, Paper 87-1A.
Juhas, A.P. 1973: Geology and origin of copper-nickel sulphide deposits of the Bird River area of Manitoba; unpubl. PhD thesis, University of Manitoba.
Karup-Moller, S. and Brummer, J.J. 1971: Geology and sulphide deposits of the Bird River claim group, southeastern Manitoba; Geological Association of Canada, Special Paper No 9.
Theyer, P. 1986: Platinum group elements in southeastern Manitoba; in Report of Field Activities, 1986, Manitoba Energy and Mines, Minerals Division.
Timmins, E.A., Turek, A., Symons, D.T.A., Smith, P.E., 1985: U-Pb zircon geochronology and paleomagnetism of the Bird River greenstone belt, Manitoba; Geological Association of Canada, Mineralogical Association of Canada, 1985 Joint Annual Meeting, Program with Abstracts, v. 10, p. A62.

Name of Intrusion Echimamish River Ref ID. 29

UTM

Easting	631000
Northing	6030000
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Cross Lake Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	Unknown

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type	Unknown
Geochemical Classification	Unknown
General Classification	Mafic-Ultramafic
Other Classification	Unknown

GEOLOGY

Principal Rock Types	Gabbro and talc-serpentine schist (ultramafic)
Host Rocks	Metavolcanic and metasedimentary rocks of Hayes River Group
Layering Features	Unknown
Metamorphic Grade	Amphibolite facies

PREVIOUS EXPLORATION

Geophysical Surveys	IP, ground magnetic and EM
Assessment Files	91260, 91261, 92039, 92145, 93299, 93843, 93889, 93891, 93893, 93898, 93890

Mineral Occurrences

Visible gold, pyrhhotite, pyrite, chalcopyrite, sphalerite, stibnite, galena

Exploration History

In 1937, T.L. Tanton wrote a geological report on the Echimamish Area. The report documented the gold prospecting and exploration activities prior to 1936, and geological information of each group of mining claims in Echimamish River area. He also noted that F.D. Shepherd reported a dark green hornblende gabbro or diorite with variable texture occuring in the Pine Creek area.

In 1962-1963; Robo and Bergun Syndicates (AF 91260, 91261) carried out an exploration program, consisting of the following geological mapping, ground EM surveys and drilling, in the Echimamish River area.
1) Defined several ground conductors, some of which are associated with magnetic response along the Echimamish River.
2) Completed 2 holes (hole 1A and hole 2) along the Echimamish River. Hole 1A drilled encountered andesite from 87 to 240 feet and 264.8 to 398.1 feet, a quartz porphyry from 240 to 264.8 feet, and 51.9 feet of talc-serpentine schist (from 389.1 to 450 feet at the end of the hole).
The zones of sulphide mineralization occur in the andesite (from 176 to 205 feet) and at the contact area between the quartz porphyry and andesite (from 264 to 266.6 feet). The zones are silicified and contain pyrite, chalcopyrite and arsenopyrite. Hole 2 intersected andesite from 41.6 to 503 feet (end of the hole) with a carbonate-quartz vein containing pyrrhotite mineralization from 103 to 105 feet.
3) Completed 2 holes (hole 2 and hole 1) about 200 and 1000 feet north of Marakesh Lake (Ole Lake), respectively. Both holes encountered andesite, rhyolite and pyrrhotite-pyrite bearing iron-formation at the top and gabbro at the bottom.

In 1962-1968, Selco conducted an airborne EM survey.

In 1968-1971, Noranda-Selco. Noranda completed geophysical ground definition of previously outlined airborne anomalies and drilled holes OX-22, -23 and OX-28 to -32 testing anomalies for base metals.

In 1973, Kerr Addison Mines Ltd. (AF 92039) carried out a base-metal exploration program in the area and completed magnetic and VLF-EM on three small grids. The survey detected one weak EM conductor zone associated with a magnetic

anomaly west of Echimamish River. The zone was tested previously by Noranda's drill hole OX-23.

In 1975-1976, Exploration Operation Branch (AF 92145) carried out an exploration program consisting of ground magnetic, EM and VLF-EM surveys, bedrock and soil sampling, and geological mapping in the area:

1) Geophysical surveys:
The ground magnetic and EM surveys were completed on two grids (Grid 1 and Grid 2), and were followed up by VLF-EM survey on selected anomalous areas. The magnetic readings were taken at 100 foot intervals along the cross lines with 400 feet separation between lines. The EM readings were taken on 100 feet intervals along the lines with 300 foot coil-to-coil separation. Data from both the magnetic and EM surveys were plotted at 1":400' scale.
The VLF-EM survey was carried out on six selected grid areas.
a) As a result of the surveys, 9 EM anomalies were identified in the areas, some of them associated with magnetic highs. Because of lack of geological information at the time, no drilling targets were proposed.
b) The gabbro dyke located on northwest side of Contact Lake is associated with a strong magnetic anomaly and a very weak conductor.
c) The gabbro dykes occurring in the area between Hightowl Lake and Henderson Lake are associated with a series of northwest trending magnetic highs.

2) Geochemical survey:
The bedrock samples were collected, where possible, at systematic grid intervals in selected and preferred areas. The soil samples were collected at systematic grid intervals in selected and target areas. The samples were assayed for Cu, Zn, Pb and Mo by AA and colorimetry, and a limited number of samples were analyzed for Au and Ag by fire assay. The correlation between the magnetic and EM anomalies and the geochemical data was not well established for the limited number samples and the few analyzed elements.

3) Geological mapping:
A detailed mapping project was carried out at 1"=1/4 mile scale. The metavolcanic and metasedimentary rocks occur in areas within the Hayes River Group. The metavolanic are mainly andesite and basalt with minor dacitic and pyroclastic units. The metasedmentary rocks consist mainly of thin greywacke and shaly units, occur sporadically and intermittently, and are intercalated within the metavolcanic rocks. A gabbro plug with off-shooting dykes has intruded into the centre of the sequence between Henderson, Contact, Marakesh and Pine lakes.
Sulphide mineralization is commonly located in thin quartz-rich pods or zones in the metasediments or metavolcanics. The quartz-rich zones are usually less than 10 feet wide and less than 50 feet long, and contain sporadic and intermittent disseminated, semimassive to massive sulphides, consisting of galena, sphalerite, stibnite, chalcopyrite and pyrite.

In 1984-1985, a joint venture between Kennco Exploration Ltd. and Claude Resources Inc. (AF 93299, 93843):
1) completed a compilation of work in the area and re-established three grids on the ground (Grid A = Grid 1 of EOB; Grid B = Grid 2 of EOB; Grid C was located along Echmamish River to correspond to the Robo and Bergun grid);
2) completed ground magnetic and VLF-EM surveys, and geological mapping on Grid A, B and C areas, and geochemical soil sampling in selected grid areas; the soil samples were analyzed for Au, Ag, As, Sb, Cu, Pb and Zn;
3) investigated the old trenches, showings and mineralized zones, and collected samples for Au, Ag, As, Sb, Cu, Pb and Zn; and
4) conducted prospecting, geological mapping, and bedrock and soil sampling in the Halfway Creek area (Grid C); the samples were analyzed for Au.

Highlights of the results:
1) A
2) B

In 1989-1990, Noranda Exploration Company Limited (AF 93889, 93891, 93893, 93898, 93890):
1) completed a compilation of work, claim staking, reconnaissance and geological mapping in the area;
2) established two grids (Con and Robo) on the ground;
3) completed ground magnetometer and Max-Min surveys on the Robo grid and magnetometer and IP surveys on the Con grid;
4) conducted geological mapping/prospecting of the Robo grid and follow-up of the IP anomalies on the Con grid; and
5) completed humus and bedrock geochemical sampling on the Robo grid and the O'Day showing.

Highlights of the results:
1) A
2) B

MAPPING

Most Detailed Mapping	AF 93299
Sketch Map Figure#	Yes
Regional Mapping	1:250 000 scale (Bedrock Geology Compilation Map Series, Cross Lake, NST 63I, 1996).

GEOCHEMISTRY

Geochemistry	none

Selected Bibliography

Bell, C.K. 1962: Cross Lake map area, Manitoba; Geological Survey of Canada, Paper 61-22.
Theyer, P. 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Manitoba Mineral Resources Division, Economic Report ER79-2, p. 18, 56, Map ER 79-23A.

Name of Intrusion Goose Lake

Ref ID. 33

UTM

Easting	395750
Northing	6016750
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Gods Lake Greenstone Belt

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown

Geochemical Classification Unknown

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Isolated ultramafic bodies

Host Rocks Mafic tuff, andesite and greywacke

Layering Features Unknown

Metamorphic Grade Amphibolite facies

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM

Assessment Files 91169, 93923, 91629

Mineral Occurrences

Pyrrhotite, pyrite

MAPPING

Sketch Map Figure# No

Regional Mapping 1:250 000 Scale (Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Selected Bibliography

Bell, C.K. 1962: Cross Lake map area, Manitoba; Geological Survey of Canada, Paper 61-22.

Elbers, F.J. 1972: Beaver Hill Lake - Goose Lake area; in Summary of Geological Fieldwork, 1972; Manitoba Mines Branch, Geological Paper 3/72, p.

Elbers, F.J. and Gilbert, H.P. 1972: Munro Lake area (Greenstones project); in 1972 Manitoba Mines Branch, (Summary of Geological Field Work), Geological Paper 3/72, p. 39-40.

Elbers, F.J. and Marten, B.E. 1973: Kanuchuan Rapids, Manitoba Mines Branch, Prel. Map 1973H-12.

Macek, J.J. and Trueman, D.L. 1972: Beaver Hill Lake Mafic Complex; Manitoba Mines Branch, Prel. Map 1972A-1.

Rousell, D.H. 1965: Geology of the Cross Lake area; Manitoba Mines Branch, Publication 62-4.

Scoates, R.F.J., D.L. Trueman and Macek, J.J.1972: Ultramafic Rocks Project; in Summary of Geological Fieldwork 1972; Manitoba Mines Branch, Geol. Paper 3/72, p. 45-48.

Name of Intrusion Beaver Hill Lake

Ref ID. 37

UTM

Easting	372750
Northing	6030250
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Gods Lake Greenstone Belt

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown

Geochemical Classification Unknown

General Classification Ultramafic

Other Classification Unknown

GEOLOGY

Principal Rock Types Serpentinized peridotite

Host Rocks Mafic tuff, andesite and greywacke

Layering Features Unknown

PREVIOUS EXPLORATION

Assessment Files 92668, 92669, 92670

Mineral Occurrences

Pyrrhotite, pyrite

MAPPING

Sketch Map Figure# No

Regional Mapping 1:250 000 Scale (Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Selected Bibliography

Elbers, F.J. 1972: Beaver Hill Lake-Goose Lake area; in Summary of Geological Fieldwork, 1972; Manitoba Mines Branch, Geological Paper 3/72, p.
Elbers, F.J. and Marten, B.E.1973: Kanuchuan Rapids, Manitoba Mines Branch, Prel. Map 1973H-12.
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Name of Intrusion Wapus Bay (Island Lake) Ref ID. 38

UTM

Easting	386500
Northing	5953250
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Island Lake Domain
Locality 2	Island Lake Greenstone Belt

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Massive ultramafic rocks characterized by asbestos veins and talc schist

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Ames (1975), Federal-provincial aeromagnetic map series #7274G, Island Lake, Manitoba-Ontario (53E)

Name of Intrusion Reekie Lake Ref ID. 40

UTM

Easting	359500
Northing	6049000
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Munro Lake Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	>40 m x 8 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type	Unknown
Geochemical Classification	Unknown
General Classification	Ultramafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	Serpentinized peridotite, serpentinite and carbonate-chlorite-serpentine schist.
Host Rocks	Ultramafic body in contact with andesitic tuff, tuff, carbonate-talc schist and quartzite.
Layering Features	Unknown
Metamorphic Grade	Amphibolite facies

PREVIOUS EXPLORATION

Geophysical Surveys	IP, ground magnetic/EM and airborne magnetic/EM
Assessment Files	91416, 92005, 91179, 93683, 93895, 93901

Mineral Occurrences

Pyrrhotite, pyrite, chalcopyrite
A sheared and carbonatized sample from a small island (2 x 3 m) at the east end of Reekie Lake contains 10% carbonate veins, 2% chalcopyrite, 2% magnetite and greater than 0.5% hematite with 3.8 g/t Au over 0.4 m. Resampling of this outcrop resulted in an assay of 340 ppb Au over 0.3 m. The sample was described as the wall rock to a 3 cm wide brecciated carbonate vein containing 50% magnetite and 5% chalcopyrite. The discrepancy in gold values may be due to the nugget effect.

Exploration History

In 1963, Falconbridge Nickel Mines Ltd. (AF 91416) carried out AFmag-longwire and magnetometer surveys along the Reekie Lake, at 100 foot intervals on picket lines spaced 400 feet apart along a cut base line. The surveys detected a series of east trending magnetic anomalies associated with a continuous and weak afmag conductive zone.

In 1968, Falconbridge Nickel Mines Ltd. (AF 92005, 91179) completed 6 holes along Reekie Lake, all of which encountered ultramafic (ultrabasic) rocks. According to the drill core, the ultramafic bodies ranges in horizontal width from about 40m to greater than 107m and may be over 8 km long.

1) Hole RE-1 intersected 460 feet of ultramafic intrusive rocks (from 336 to 796 feet), consisting of serpentinite, serpentinized peridotite and serpentine schist.
2) Hole RE-2 intersected 183 feet of ultramafic intrusive rocks (from 271 to 454 feet), consisting of talc-carbonate-chlorite schist and black serpentinite.
3) Hole RE-4 intersected 170 feet of ultrabasic intrusive rocks (from 310 to 480 feet), consisting of carbonate-talc schist, serpentinite and carbonate-rich serpentinite.
4) Hole RE-5 intersected 260 feet of green to black serpentinite (from 296 to 556 feet).
5) Hole RE-6 intersected 191 feet of serpentinized peridotite (from 596 to 787 feet).
6) Hole RE-7 intersected 268 feet of ultrabasic intrusive rocks (from 394 to 662 feet), consisting of carbonate-chlorite-serpentine schist and green to black serpentinite.

The ultramafic intrusion is in contact with andesitic tuff, tuff, carbonate-talc schist and quartzite. The AFmag and magnetic

anomalies were interpreted as being caused by the ultramafic body and the serpentinization of the rocks. The assays are not available in the assessment file.

In 1977, Manitoba Mineral Resources Ltd. (AF 93683) conducted an airborne EM survey, with flight lines spaced 1320 feet apart. The survey showed a weak, continuous EM anomaly associated with a magnetic high along Reekie Lake.

In 1990-1991, Noranda Exploration Co. Ltd. (AF 93895, 93901) carried out a gold exploration program, consisting of a ground magnetic survey, an IP survey and detailed geological mapping on three grids along Reekie Lake.

Geophysical surveys:
The total magnetic field measurements were recorded at 12.5m intervals along lines spaced 200m apart. The ultramafic intrusion is associated with an east-trending magnetic anomaly. The IP survey used an in-line pole-pole configuration, with readings taken at 25 m intervals along the lines.

Geochemical survey:
A total of 229 humus samples were taken in the three grid areas with 50m intervals along the lines and 400m intervals between the lines, and analyzed for 27 elements.
A total 123 rock samples were taken from outcrop and analyzed by ICP, XRF, AA, AFS and fire assay for many elements and oxides. Four samples were analyzed by atomic fluorescence spectrometry (AFS) for Pd and Pt.

Geological mapping:
A detail mapping and prospecting was preformed in the Reekie Lake area at a scale of 1:5000.

Highlight of the results:
1. After examination of the results of the IP survey, nine drill targets were recommended but failed to outline any significant disseminated sulphide occurrences or resistive anomalies that are associated with Au mineralization in the carbonized ultramafic bodies.
2. No significant Au anomalies were detected in humus samples.
3. Over 10% of the rock samples contain Au greater than 100 ppb.
4. A sheared and carbonized sample from the east end of Reekie Lake on a small island (2x3m) contains 10% carbonate veins, 2% chalcopyrite, 2% magnetite and >0.5% hematite with 3.8 g/t Au over 0.4 m. Resampling of this outcrop resulted in an assay of 340 ppb Au over 0.3 m. The sample was described as the wall rock to a 3 cm wide brecciated carbonate vein containing 50% magnetite and 5% chalcopyrite. The discrepancy in gold values may be caused by the nugget effect.

MAPPING

Most Detailed Mapping	1:50,000 Munro Lake, 53L/11, Map GR83-1-11
Sketch Map Figure#	No
Regional Mapping	1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry (no REE) and PGE Analyses

Geochemical Features and PGE Abundances

See AF 93901 (Noranda Exploration)

Selected Bibliography

Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p. 17, 53.
Scoates, R.F.J., 1971a: Ultramafic Rocks Project; in Summary of Geological Fieldwork 1971; Man. Mines Br., Geol. Paper 6/71, p. 55.
Gilbert, H.P., 1985: Geology of the Keen Lake-Gods Lake Area; Manitoba Energy and Mines, Geological Report GR83-1B

Name of Intrusion Vivian Lake (Rifle Lake) Ref ID. 42

UTM

Easting	355500
Northing	6052500
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Munro Lake Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	approx. 2500 x 50 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type	Sill
Geochemical Classification	Unknown
General Classification	Mafic-Ultramafic
Other Classification	Unknown

GEOLOGY

Principal Rock Types	Peridotite, serpentinized peridotite, serpentinite and gabbro.
Host Rocks	metasediments and metavolcanics of Munro Lake greenstone belt (unnamed supracrustal rocks).
Layering Features	Unknown

PREVIOUS EXPLORATION

Geophysical Surveys	Airborne magnetic/EM and ground magnetic/EM
Assessment Files	91416, 92005, 93683, 92171, 92172

Mineral Occurrences

Chalcopyrite, pyrrhotite, pyrite

Exploration History

In 1963, Falconbridge Nickel Mines Ltd. (AF 91416) carried out afmag-longwire and magnetometer surveys alone the Rifle Lake, and both readings of afmag and magnetometer have been taken at 100 feet intervals along picket lines spaced 400 feet along a cut base line. The surveys detected four east-west trending and weak afmag conductive zones, some of which are associated with the magnetic anomalies.

In 1968, Falconbridge Nickel Mines Ltd. (AF 92005) drilled five holes along Rifle Lake, and three of them encountered ultramafic rocks. According to the drill data, the ultramafic body (sill?) ranges in horizontal width from about 32 to 52m and may be over 2.5km long.

1. Hole R-1 intersected 216.9 feet long serpentinized peridotite and serpentinite from 427.6 to 644.5 ft. interval, no sulphides were observed.
2. Hole R-2 intersected 225.7 feet long serpentinized peridotite and sheared serpentinite from 167.8 to 393.5 ft. interval, no sulphides were observed.
3. Hole R-5 intersected 137.0 feet long serpentinite and talc-serpentine schist from 178-315 ft. interval. The ultramafic body is in contact with argillite-biotite and biotite-sericite schists, basic tuff-argillite and argillite, and feldspathic quartzite of Munro Lake greenstone belt (unnamed supracrustal rocks). The afmag and magnetic anomalies were interpreted as being caused by the ultramafic body and the serpentinization of the rocks. The assays are not available in the assessment file.

In 1977-1979, Manitoba Mineral Res. Ltd. (AF 93683, 92171, 92172) carried out a base metal exploration program in the area between Munro Lake, Colen Lake and Reekie Lake. The company completed an airborne EM survey in the area, a ground horizontal loop EM survey on 8 grid areas and 19 diamond drill holes. Drill core samples were assayed for Au and Ni.

Four holes encountered mafic-ultramafic rocks.
1. Hole 164-2 is located about 2 miles west of Rifle Lake, and intersected 93.9 feet long greenish-grey, medium- to coarse-grained gabbro from 4.0 to 97.9 feet interval, 11.1 feet long sulphides mineralized zone from 97.9 to 109.0 feet interval and

ended in metasediment. The gabbro contains trace py and po and some massive bands of po and blebs py from 59.7 to 61.8 interval. The sulphidemineralized zone contains po bands and stringers up to 2 " long with 1-2% py.
2. Hole 164-5 is located about 1 mile north of Rifle Lake, and intersected 113.5 feet long dark green, medium- to coarse-grained and porphyritic gabbro from 10-123.5 feet interval, and po, py and cpy mineralized intermediate to mafic volcanic tuff from 123.5 to 196.0 ft.
3. Hole 164-12 is located about ¼ mile south of Munro Lake and 2 miles northeast of Rifle Lake, and it intersected fine-grained basalt from 23.0 to 124.4 feet interval and medium-grained peridotite from 124.4 to 159.0 feet interval. The basalt contains trace py and po generally with a 9.3 feet long suphides mineralized zone (5-10% po + py in bands and stringers) from 105.0-114.3 feet interval. The peridotite is slightly serpentinized, and contains trace, disseminated po and py.
4. Hole 164-21 is located about ¼ mile south of Munro Lake and 1.5 miles northwest of Rifle Lake, and it intersected 114.2 long greenish-grey, medium-grained gabbro, 14.3 feet long sulphides mineralized zone from 118.2 to 132.5 feet interval and basalt from 132.5 to 176.0 feet interval. The sulphides mineralized zone contains 5-10% po and trace to 2% py in bands and stringers.

MAPPING

Most Detailed Mapping	1:50,000 Munro Lake, 53L/11, Map GR83-1-11
Sketch Map Figure#	No
Regional Mapping	1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;
Type Section Figure#	No

GEOCHEMISTRY

Selected Bibliography

Barry, G.S., 1962: Geology of the Munro Lake Area; Man. Mines Br., Pub. 61-1 (with accompanying Map 61-1).
Gilbert, H.P., 1985: Geology of the Keen Lake-Gods Lake Area; Manitoba Energy and Mines, Geological Report GR83-1B
Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p. 17, 53.

Name of Intrusion Western Colen Lake Ref ID. 43

UTM

Easting	348000
Northing	6051250
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Munro Lake Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type	Unknown
Geochemical Classification	Unknown
General Classification	Ultramafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	highly altered, recrystallized ultramafic rocks comprising abundant hornblende and serpentine
Host Rocks	metasediments and metavolcanics of the Munro Lake greenstone belt (unnamed supracrustal rocks).
Layering Features	Unknown
Metamorphic Grade	Amphibolite facies

PREVIOUS EXPLORATION

Geophysical Surveys	Airborne magnetic/EM and ground magnetic/EM
Assessment Files	91180, 93683, 92171

Exploration History

In 1971, Falconbridge Nickel Mines Ltd. (AF 91180) carried out ground magnetic and afmag surveys along the north shore of western Colen Lake (Claim Blocks 2079 and 2078). The magnetometer and afmag reading were taken at 400 feet intervals on picket lines spaced 400 feet along a cut baseline.

In 1977 to 1978, Manitoba Mineral Resources Ltd. (AF 93683, 92171) conducted an airborne EM survey in the area with 1320 feet spacing of the flight lines. The area displays a poor EM conductivity and has good magnetic association. It probably is caused by pyrrhotite in the bedrock. A follow-up ground horizontal loop EM survey was completed in the area (grid M-2) during 1978, and detected two east-west trending EM conductors.

MAPPING

Most Detailed Mapping	1:50,000 Munro Lake, 53L/11, Map GR83-1-11
Sketch Map Figure#	No
Regional Mapping	1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry none

Selected Bibliography

Scoates, R.F.J., 1971: Ultramafic Rocks Project; in Summary of Geological Fieldwork 1971; Man. Mines Br., Geol. Paper 6/71, p. 55.
Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p. 17, 53.

Name of Intrusion Central Knee Lake Ref ID. 44

UTM

Easting	386500
Northing	6092500
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Oxford Lake - Knee Lake Greenstone Belt

SIZE

Area (km2)	1.5
Maximum Dimensions	0.1 x 1.5 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types serpentinized peridotite

Host Rocks Mafic subvolcanic and felsic-intermediate volcanic rocks of Hayes River Group.

Layering Features Unknown

Metamorphic Grade Amphibolite facies

Synoptic Geology

The ultramafic body is spatially associated with gabbro

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping 1:50,000 Knee Lake, 53L/15, Map GR83-1-7;

Sketch Map Figure# No

Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;

Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Selected Bibliography

Scoates, R.F.J., 1971: Ultramafic Rocks Project; in Summary of Geological Fieldwork 1971; Man. Mines Br., Geol. Paper 6/71, pp. 51-55.

Gilbert, H.P. and Elbers, F.J. 1972: Parker Lake-Knee Lake Oxforde House Area; Summary of Geological Fieldwork; Man. Mines Br., Geol. Paper 2/72, pp. 36.

Gilbert, H.P., 1985: Geology of the Knee-Lake-Gods Lake Area; Manitoba Energy and Mines, Geological Report GR83-1b, p. 7, 64-70.

Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p.19, 53.

Name of Intrusion Knee Lake 1 Ref ID. 45

UTM

Easting	384750
Northing	6084750
Zone	15

Location and Access

Locality 1	Superior Province - Gods Lake Domain
Locality 2	Oxford Lake - Knee Lake Greenstone Belt

SIZE

Area (km2)	0.05
Maximum Dimensions	approx. 50 m x 1 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type	Unknown
Geochemical Classification	Unknown
General Classification	Ultramafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	serpentinized peridotite
Host Rocks	gabbro and felsic-intermediate volcanics of Hayes River Group.
Layering Features	Unknown
Metamorphic Grade	Amphibolite facies

Synoptic Geology

The southeast side of the ultramafic body is in contact with gabbro.

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping	1:50,000 Knee Lake, 53L/15, Map GR83-1-7;
Sketch Map Figure#	No
Regional Mapping	1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry	none
Whole-rock Analyses Numbers	2.342 to 2.347

Selected Bibliography

Gilbert, H.P. and Elbers, F.J. 1972: Parker Lake-Knee Lake Oxforde House Area; Summary of Geological Fieldwork; Man. Mines Br., Geol. Paper 2/72, p. 36.
Gilbert, H.P. 1985: Geology of the Knee-Lake-Gods Lake Area; Manitoba Energy and Mines, Geological Report GR83-1b, p. 7, 64-70.

Name of Intrusion Knee Lake 2 Ref ID. 46

UTM

Easting	378000
Northing	6084750
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Oxford Lake - Knee Lake Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	drilled thickness 26m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown

Geochemical Classification Unknown

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types serpentinized peridotite

Host Rocks metamorphosed mafic volcanic rocks of Hayes River Group

Layering Features Unknown

Metamorphic Grade Amphibolite facies

Deformation Moderately to steeply plunging folds with ENE to ESE trend.

Synoptic Geology

The ultramafic body is associated with a gabbro sill at it southern flank.

PREVIOUS EXPLORATION

Assessment Files 91191, 91193

Mineral Occurrences

Pyrrhotite

Exploration History

In 1972, Selco Mining Corporation Ltd. (AF 91191, 91193) completed ground magnetic survey in the area. The magnetic readings were taken at 50 x 400 ft. grid base. The ultramafic intrusion is associated with a large magnetic high.

The company drilled DDH OX-7 about 2 km northeast of Pain Killer Bay and intersected 85 ft. of only peridotite (265-350 ft. interval). The peridotite is dark green, medium grained, serpentinized and is cross-cut by serpentine, talc and magnetite veinlets. The pyrrhotite occurs as angular inclusions in the veinlets and as very small stringers scattered in 4-5 parts of the drill core.

MAPPING

Most Detailed Mapping 1:50,000 Knee Lake, 53L/15, Map GR83-1-7;

Sketch Map Figure# No

Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;

Type Section Figure# No

GEOCHEMISTRY

Whole-rock Analyses Numbers 2.342 to 2.347

Selected Bibliography

Gilbert, H.P., 1985: Geology of the Knee-Lake-Gods Lake Area; Manitoba Energy and Mines, Geological Report GR83-1b, p. 7, 64-70.
Theyer, P. 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology report (Winnipeg) (ER79-2), p. 19, 55.

Name of Intrusion Pain Killer Bay (Knee Lake 3) Ref ID. 47

UTM

Easting	375000
Northing	6082750
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Oxford Lake - Knee Lake Greenstone Belt

SIZE

Area (km2)	0.2
Maximum Dimensions	1 x 0.2 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types serpentinized peridotite and serpentinite.

Host Rocks gabbro and felsic-intermediate volcanics of Hayes Lake Group.

Layering Features Unknown

Metamorphic Grade Amphibolite facies

Deformation Moderately to steeply plunging folds with ENE to ESE trending in the area.

Synoptic Geology

The primary textures were preserved in the serpentinized peridotite.
The ultramafic body is associated with gabbro sill at it southern flank.

PREVIOUS EXPLORATION

Mineral Occurrences

It rarely contains some very fine-grained and disseminated sulphides.

MAPPING

Most Detailed Mapping 1:50,000 Knee Lake, 53L/15, Map GR83-1-7;

Sketch Map Figure# No

Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;

Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Selected Bibliography

Barry, G.S., 1959: Geology of the Oxford House-Knee Lake Area; Man. Mines Br., Pub. 58-3 (with accompanying maps 58-3A and 58-3B).
Gilbert, H.P. and F.J. Elbers, 1972: Parker Lake-Knee Lake Oxforde House Area; Summary of Geological Fieldwork; Man. Mines Br., Geol. Paper 2/72, p. 36.
Scoates, R.F.J., 1971: Ultramafic Rocks Project; in Summary of Geological Fieldwork 1971; Man. Mines Br., Geol. Paper 6/71, p. 54.
Gilbert, H.P., 1985: Geology of the Knee-Lake-Gods Lake Area; Manitoba Energy and Mines, Geological Report GR83-1b, p. 7, 64-70.
Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain

aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p.19, 55.

Name of Intrusion Knee Lake 4 Ref ID. 48

UTM

Easting	370250
Northing	6082250
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Oxford Lake - Knee Lake Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	Drilled thickness 60-120m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type	Unknown
Geochemical Classification	Unknown
General Classification	Ultramafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	serpentinized peridotite, peridotite
Host Rocks	rhyolite and intermediate volcanic of Hayes River Group
Layering Features	Unknown
Metamorphic Grade	Amphibolite facies
Deformation	Moderately to steeply plunging folds with ENE to ESE trending in the area.

PREVIOUS EXPLORATION

Geophysical Surveys	Ground magnetic and EM
Assessment Files	91190, 91192, 91193, 93566, 93585

Mineral Occurrences

Pyrrhotite, pyrite

Exploration History

The ultramafic body is located 4 km west of Pain Killer Bay, north side of south Knee Lake.

In 1960, Canadian Nickel Company, Ltd. (AF 91192) drilled one hole (BH 15470) on the shore of the lake on the claim Nee 22. The hole intersected 392 feet of only serpentinized peridotite. The serpentinized peridotite contains 7% po in stringers from 113 to 235 ft. intervals, 10-12% po in stringers and disseminated from 382-457 ft. intervals and 5-7% po in stringers from 457-505 ft. intervals (the abundance of stringers within peridotite is not known). The assays are not available in the assessment file.

In 1972, Selco Mining Corporation Ltd. (AF 91193, 91190) completed ground magnetic survey in the area. The magnetic readings were taken at 50 ft. intervals along the lines and 400 ft. separation between the lines (50 x 400 ft.). The ultramafic intrusion is associated with several large magnetic high features. Selco Mining Corporation Ltd. drilled two holes in the area, DDH OX-6 and DDHOX-5B are located about 1500 ft. west and 5000 ft. southwest, respectively, of BH 15470 drilled by Canadian Nickel Company, Ltd. Both holes ended in serpentinite and the assays of the core samples are not available in the assessment file.

1. DDH OX-6 encountered 198 feet of serpentinized peridotite from 103-301 ft. intervals, and contains trace pyrrhotite. Minor pyrrhotite was noted in several dark coloured sections of peridotite.
2. DDH OX-5B encountered andesite from 105.2-122 ft. interval and 283 ft. long serpentinized peridotite from 122-405 ft. interval. The peridotite is massive in general, and the medium-grained texture only occurs in 2-3 sections of drill core. The pyrrhotite occurs in the fractures and small veins as “platy flecks” associated with shear planes.

In 1988, Noranda Exploration Co., Ltd. (AF 93566, 93585) carried out a gold exploration program and completed magnetic and horizontal loop EM on the Lake Grid property (Phil 17 claim) located on the north side of Knee Lake. The magnetic field readings were based on 12.5 x 100m grids. The horizontal loop EM readings were taken at 25m intervals along the line with

100m separation of the cable. The ultramafic body is associated with the magnetic anomaly and the weakly conductive anomaly.

DDH Knee 88-3 was drilled on the property about 250 m south of BH 15470. The hole was supposed to intersect a horizontal loop EM conduct at the ultramafic and intermediate volcanic contact within the Hayes River Group. The hole encountered dark green/gray-black, fine-grained serpentinized peridotite from 37.0-69.5m interval, gray-black, fine-grained peridotite from 69.5-112.0m interval, and intermediate volcanic and rhyolite from 112.0-143.7m interval. The serpentinized peridotite and peridotite are crosscut by numerous veinlets which consist of dolomite, magnetite, serpentine and minor hematite, pyrite and pyrrhotite. The drill core samples were sent to TSL and analyzed by neutron activation and ICP.
Three samples of magnetite, pyrrhotite (1-2%) and pyrite mineralized serpentinized peridotite and peridotite from intervals 50.0-51.4, 62.0-63.0 and 77.5-78.5m were assayed for Pt and Pd with <10-20 ppb Pt and 2-10 ppb Pd.
Seventeen serpentinized peridotite and peridotite samples from 41.5 to 69.0 and from 77.5 to 112.0 intervals were assayed formultiple elements by ICP. The Ni content ranged from 870 to 2500 ppm Ni, and the Au content ranges from <6 to 19 ppb Au in the samples.

MAPPING

Most Detailed Mapping	1:50,000 Oxford Lake, 53L/14, Map GR83-1-6; 1:50,000 Knee Lake, 53L/15, Map GR83-1-7;
Sketch Map Figure#	No
Regional Mapping	1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry	Base Metal Assay and PGE Analyses
Whole-rock Analyses Numbers	2.342 to 2.347

Geochemical Features and PGE Abundances

DDH Knee 88-3: Three samples of magnetite, pyrrhotite (1-2%) and pyrite mineralized serpentinized peridotite and peridotite from intervals 50.0-51.4, 62.0-63.0 and 77.5-78.5m were assayed for Pt and Pd with <10-20 ppb Pt and 2-10 ppb Pd. (see assessment files)

Selected Bibliography

Barry, G.S., 1959: Geology of the Oxford House-Knee Lake Area; Man. Mines Br., Pub. 58-3 (with accompanying maps 58-3A and 58-3B).
Scoates, R.F.J., 1971: Ultramafic Rocks Project; in Summary of Geological Fieldwork 1971; Man. Mines Br., Geol. Paper 6/71, p. 54.
Gilbert, H.P. and F.J. Elbers, 1972: Parker Lake-Knee Lake Oxforde House Area; Summary of Geological Fieldwork; Man. Mines Br., Geol. Paper 2/72, p. 36.
Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p.19, 55.
Gilbert, H.P., 1985: Geology of the Knee-Lake-Gods Lake Area; Manitoba Energy and Mines, Geological Report GR83-1b, p. 7, 64-70.

Name of Intrusion Knee Lake 5 Ref ID. 49

UTM

Easting	367500
Northing	6083000
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Oxford Lake - Knee Lake Greenstone Belt

SIZE

Area (km2)	0.7
Maximum Dimensions	0.1 x 0.7 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown

Geochemical Classification Unknown

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types serpentinite, peridotite-pyroxenite

Host Rocks gabbro and felsic-intermediate volcanics of Hayes Lake Group.

Other Igneous Features displays a crude concentric zoning; core: fine-grained serpentinite; intermediate zone: medium-grained serpentinized peridotite-pyroxenite; outer zone: fine-grained serpentinite;

Metamorphic Grade Amphibolite facies

Deformation The body is mildly sheared and fractured.

Synoptic Geology

The ultramafic body is associated with a gabbro sill at its southern flank. The outer zone of fine-grained serpentinite was strongly foliated and crosscut by the asbestos and harsh picrolite-magnetite veinlets near the outer margins.

PREVIOUS EXPLORATION

Mineral Occurrences

Very fine-grained and disseminated sulphides are developed sporadically throughout the body but do not exceed one percent of the rock.

MAPPING

Most Detailed Mapping 1:50,000 Oxford Lake, 53L/14, Map GR83-1-6;

Sketch Map Figure# No

Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;

Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Whole-rock Analyses Numbers 2.342 to 2.347

Selected Bibliography

Barry, G.S., 1959: Geology of the Oxford House-Knee Lake Area; Man. Mines Br., Pub. 58-3 (with accompanying maps 58-3A and 58-3B).

Gilbert, H.P. and F.J. Elbers, 1972: Parker Lake-Knee Lake Oxforde House Area; Summary of Geological Fieldwork; Man. Mines Br., Geol. Paper 2/72, pp. 36.

Scoates, R.F.J., 1971: Ultramafic Rocks Project; in Summary of Geological Fieldwork 1971; Man. Mines Br., Geol. Paper

6/71, p. 54.
Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p.19, 55.
Gilbert, H.P., 1985: Geology of the Knee-Lake-Gods Lake Area; Manitoba Energy and Mines, Geological Report GR83-1b, p. 7, 64-70.

Name of Intrusion Oxford Lake 1 (Bleak Island) Ref ID. 50

UTM

Easting	332250
Northing	6085250
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Oxford Lake - Knee Lake Greenstone Belt

SIZE

Area (km2)	0.04
Maximum Dimensions	approx. 200 m x 20 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type	Sill
Geochemical Classification	Unknown
General Classification	Ultramafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	Peridotite
Host Rocks	pillowed basalt and andesite of Hayes River Group
Layering Features	Unknown
Metamorphic Grade	Amphibolite facies
Deformation	slightly fractured and sheared.

Synoptic Geology

Barry (1960) reported:
A small body of peridotite is intrusive into the volcanic series on the north side Bleak Island. It is a fine- to medium-grained rock with a dark grey mottled weathered surface. The rock consists of serpentinized pyroxene and olivine and minor amounts of plagioclase, carbonate, and iron oxides. The contacts of this body with the volcanic rocks were not observed but its field position suggests an oval-shaped intrusion with irregular borders. The peridotite is only slightly fractured and sheared. Slickensided serpentine and minor picrolite occur along some fractures. Several carbonate veinlets have been noted.

Hubregtse (1985) reported:
The ultramafic sill on Bleak Island contains dusty, pseudomorphic chlorite aggregates, which exhibit a peculiar blue-orange pleochroism. The X-ray pattern and the optical properties closely match the characteristics of a chrome-chlorite (J. Macek, pers. comm.), perhaps kochubeiite or kammererite.

Theyer (1980) concluded:
The ultramafic body is a peridotite sill that cuts an intravolcanic gabbroic sill. The gabbroic sill is overlain by an oligomictic conglomerate layer in which the clasts are largely derived from the gabbro and to a minor extent from an adjacent rhyolitic stock. The relationship between this erosional surface and the emplacement of the ultramafic lens is not resolved, since ultramafic components have not been found in the conglomerate (Hubregtse, pers. comm.). The evidence suggests that an ultramafic intrusive or extrusive (?) episode occurred after emplacement of the gabbro and possibly after the weathering of the latter intrusion.

PREVIOUS EXPLORATION

Mineral Occurrences

Very fine-grained, disseminated sulphides are rare (Scoates, 1971)

MAPPING

Most Detailed Mapping	1:50,000 Carghill Island, 53L/13, Map GR83-1-5;
Sketch Map Figure#	No
Regional Mapping	1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry	none
PGE Analyses Numbers	1.1026

Selected Bibliography

Barry, G.S., 1960: Geology of the Western Oxford Lake-Carghill Island Area; Man. Mines Br., Pub. 59-2, p. 17.
Hubregtse, J.J.M.W., 1985: Geology of the Oxford Lake-Carrot River area; Manitoba Energy and Mines, Geological Report 83-1A, p. 8.
Scoates, R.F.J., 1971: Ultramafic Rocks Project; in Summary of Geological Fieldwork 1971; Man. Mines Br., Geol. Paper 6/71, p. 54.
Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p.19, 55

Name of Intrusion Oxford Lake 2 (Jackson Bay) Ref ID. 51

UTM

Easting	318250
Northing	6078000
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Oxford Lake - Knee Lake Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type	Sill
Geochemical Classification	Unknown
General Classification	Ultramafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	Serpentinized peridotite
Host Rocks	gabbro and pillowed porphyritic andesite and basalt of Hayes River Group
Layering Features	Unknown
Metamorphic Grade	Amphibolite facies

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping	1:50,000 Carghill Island, 53L/13, Map GR83-1-5;
Sketch Map Figure#	No
Regional Mapping	1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;
Type Section Figure#	No

GEOCHEMISTRY

PGE Analyses Numbers 1.1026

Selected Bibliography

Hubregtse, J.J.M.W., 1985: Geology of the Oxford Lake-Carrot River area; Manitoba Energy and Mines, Geological Report 83-1A.

Name of Intrusion Oxford Lake 3 (High Rock Island) Ref ID. 52

UTM

Easting	318500
Northing	6075250
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Oxford Lake - Knee Lake Greenstone Belt

SIZE

Area (km2)	0.14
Maximum Dimensions	approx. 50m x 2.7km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Komatiitic

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types peridotite

Host Rocks north: contact with gabbro of Hayes River Group; south: contact with porphyritic tonalite and minor porphyritic granodiorite of Bayly Lake Complex.

Layering Features Unknown

Igneous Textures Spinifex

Metamorphic Grade Amphibolite facies

Synoptic Geology

Hubregtse (1985) reported:
The ultramafic rocks on High Rock Island display rare spinifex and cumulate textures. Random, feathered crystallites, up to 4 cm in length, define a spinifex texture indicating either extrusion or intrusion of the peridotites at a very shallow level.
In thin section the spinifex crystallites consist of elongate aggregates of chlorite, and green and colourless amphibolites. Ilmenite with rims of sphene, and other opaque minerals occur throughout the rock.
The geological setting of this ultramafic body is strikingly similar to that of the Peridotite Island body. At High Rock Island the ultramafic rocks are also in contact with an iron formation and are overlain by basalt.

Theyer (1980) concluded:
This ultramafic outcrop is part of a differentiated layered ultramafic that is concordant with an underlying iron formation and an overlying variolitic pillow lava. It has been traced along strike for a distance of approximately 3 km and is up to 150 metres wide.
Spinifex textures and partial assimilation of the underlying iron formation, forming local accumulations of hornblendites occur in the ultramafic. In this sections the spinifex textures in the ultramafic are displayed by elongate chlorite and amphibolite aggregates.
Geochemistry data show that this ultramafic is of tholeiitic affinity but very close to a komatiitic composition.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM

Assessment Files 94092, 94086, 94087

Mineral Occurrences

Au up to 830 ppb over 1.5m in a talc altered ultramafic (DDH OXF 88-4, Noranda).
The ultramafic rocks contain trace py, Au up to 700 ppb over 1.5m in ultramafic rock (DDH OXF 91-1, Noranda).

Exploration History

In 1990-1991, Noranda Exploration Company, Limited completed ground magnetic and Max-Min surveys, geological prospecting and mapping, and four drill holes.
DDH OXF91-1 encountered 27.2m ultramafic rock.

MAPPING

Most Detailed Mapping 1:50,000 Carghill Island, 53L/13, Map GR83-1-5;

Sketch Map Figure#	No
Regional Mapping	1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry (no REE)
PGE Analyses Numbers	1.1026

Geochemical Features and PGE Abundances

Limited whole-rock analyses (Chemex) are given in AF 94087 (Noranda Exploration).

Selected Bibliography

Hubregtse, J.J.M.W., 1985: Geology of the Oxford Lake-Carrot River area; Manitoba Energy and Mines, Geological Report 83-1A, p. 7-8.

Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p.19, 55

Name of Intrusion Oxford Lake 4 (Lynx Bay) Ref ID. 53

UTM

Easting	310000
Northing	6071750
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Oxford Lake - Knee Lake Greenstone Belt

SIZE

Area (km2)	0.14
Maximum Dimensions	approx. 180 x 750 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Unknown

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Serpentinized dunitic to peridotitic rocks

Host Rocks meta-gabbro and metasedimentary to the northwest, and a granodiorite-quartz diorite of Bayly Lake Complex to south.

Layering Features Unknown

Metamorphic Grade Amphibolite facies

Synoptic Geology

Barry (1960) reported:
An oval-shaped body of serpentinite and some related gabbro occurs along the south shore of Oxford Lake and adjacent reefs south of Hayes Island. The rock as a whole weathers dark greenish brown or, where more iron is present, reddish brown. It is predominantly massive with minor sheared and schistose phases. In thin section it is composed of 70 to 75 percent serpentine, 20 to 25 percent calcite, and minor talc, epidote, and iron oxides.

Hubregtse (1985) concluded:
Several reefs and smaller islands in Lynx Bay are underlain by ultramafic rocks. Some cumulate textures of olivine, up to 2 cm, are readily visible on glacially polished coarse-grained outcrops. Where contacts are exposed, the ultramafics are always fault-bounded against the surrounding tonalitic rock units of Bayly Lake Complex. The composition is mainly dunitic, but ranges to peridotitic. Serpentine-coated shear zones and slickensides, particularly in the metaperidotites near the east shore of Lynx Bay, indicate that the ultramafic bodies were affected by northeast-trending left-lateral shearing (see Structure). The ultramafic rocks, however, also display an older, east-trending foliation which is conformable with the structural trend of the Hayes River Group.
It is unclear whether the ultramafic rocks in Lynx Bay are part of the Hayes River Group or are younger. It is conceivable that the Lynx Bay ultramafics and the High Rock Island peridotite are part of a single ultramafic body, which was segmented by left-lateral fault movements.

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping 1:50,000 Carghill Island, 53L/13, Map GR83-1-5;

Sketch Map Figure# No

Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987;

Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

PGE Analyses Numbers 1.1026

Selected Bibliography

Barry, G.S., 1960: Geology of the Western Oxford Lake-Carghill Island Area; Man. Mines Br., Pub. 59-2, p. 17.
Hubregtse, J.J.M.W., 1985: Geology of the Oxford Lake-Carrot River area; Manitoba Energy and Mines, Geological Report 83-1A, p. 8.
Scoates, R.F.J. 1971: Ultramafic rocks project; Manitoba Department of Mines, Resources and Environmental Management, Mines Branch, Summary of Geological Field Work, 1971, Geological Paper 6/71, p. 54.

Name of Intrusion Ponask Lake

Ref ID. 57

UTM

Easting	670800
Northing	5970650
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Island Lake Domain
Locality 2	Ponask River Sill

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

Intrusion Type Sill

General Classification Ultramafic

GEOLOGY

Synoptic Geology

Refers to several occurrences of ultramafic rocks reported in Theyer (1980). Regional geology is described by Ermanovics (1973).

PREVIOUS EXPLORATION

MAPPING

Sketch Map Figure# Yes

Regional Mapping ER 79-2-4F

Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Selected Bibliography

Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p. 17, 53.
Ermanovics, I.F. 1973: Precambrian geology of the Norway House and Grand Rapids map-area; Geological Survey of Canada, Paper 72-29, 27p.

Name of Intrusion Clangula Lake 1 Ref ID. 60

UTM

Easting	692300
Northing	5672000
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Rice Lake Belt

SIZE

Area (km2)	
Maximum Dimensions	100m x 100 m

AGE DATA

Age Archean

CLASSIFICATION

GEOLOGY

Principal Rock Types serpentinized ultramafic

PREVIOUS EXPLORATION

Assessment Files C.A.F. 91226;

MAPPING

Most Detailed Mapping Davies (1951)
Sketch Map Figure# No
Regional Mapping Davies (1951)
Type Section Figure# No

GEOCHEMISTRY

Geochemistry none
PGE Analyses Numbers 1.023 to 1.075

Selected Bibliography

Davies, J.F., 1951: Geology of the Manigotagan-Rice River Area, Rice Lake Mining Division, Manitoba; Man. Mines Br., Pub. 50-2.
Wright, J.F., 1932c: Geology and Mineral Deposits, Southeastern Manitoba; GSC, Mem. 169.

Name of Intrusion Clangula Lake 2 Ref ID. 61

UTM

Easting	691500
Northing	5672500
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Rice Lake Belt

SIZE

Area (km2)	
Maximum Dimensions	150 m x 150 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type	Plug
Geochemical Classification	Unknown
General Classification	Ultramafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	peridotite
Host Rocks	Amphibolite, pyroxenite
Layering Features	Unknown

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

McRitchie, W.D., 1971: The petrology and environment of the acidic plutonic rocks of the Wanipigow-Winnipeg Rivers region, SE Manitoba; in Geology and Geophysics of the Rice Lake Region Southeastern Manitoba.
Davies, J.F., 1951: Geology of the Manigotagan-Rice River Area, Rice Lake Mining Division, Manitoba; Man. Mines Br., Pub. 50-2.

Name of Intrusion English Brook 1 Ref ID. 62

UTM

Easting	702350
Northing	5672300
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Rice Lake Belt

SIZE

Area (km2)	
Maximum Dimensions	200 m x 150 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Plug

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types serpentinized peridotite

Host Rocks Hornblende plagioclase gneiss

Layering Features Unknown

Metamorphic Grade Greenschist facies

Synoptic Geology

This serpentinized peridotite plug is part of a chain of ultramafic plugs stretching from Lake Winnipeg to north of western Wanipigow Lake.

PREVIOUS EXPLORATION

Assessment Files C.A.F. 91224

Mineral Occurrences

Minor amounts of disseminated pyrite in peridotite.

Exploration History

The Newmont Mining Company drilled in 1962 a 267 m long hole intersecting hornblende plagioclase gneiss and peridotite.

MAPPING

Most Detailed Mapping Russell (1948)

Sketch Map Figure# No

Regional Mapping Russell (1948)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Selected Bibliography

Davies, J.F., 1951: Geology of the Manigotagan-Rice River Area, Rice Lake Mining Division, Manitoba; Man. Mines Br., Pub. 50-2.
Karup Moller (1958)

Name of Intrusion English Brook 2 Ref ID. 63

UTM

Easting	700000
Northing	5669500
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Rice Lake Belt

SIZE

Area (km2)	
Maximum Dimensions	200 m x 150 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Plug

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types peridotite

Host Rocks diorite

Layering Features Unknown

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping Russell (1948)

Regional Mapping Russell (1948)

GEOCHEMISTRY

Selected Bibliography

Russell, G.A., 1948: Geology of the Wallace Lake Area, Rice Lake Mining Division; Man. Mines Br., Prel. Rept. 48-3.

Name of Intrusion English Brook 3 Ref ID. 64

UTM

Easting	697800
Northing	5670000
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Rice Lake Belt

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Unknown

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types serpentinized pyroxenite

PREVIOUS EXPLORATION

Mineral Occurrences

none

Exploration History

none

MAPPING

Most Detailed Mapping Russell (1948)

Sketch Map Figure# No

Regional Mapping Russell (1948)

Type Section Figure# No

GEOCHEMISTRY

Selected Bibliography

Russell, G.A., 1948: Geology of the Wallace Lake Area, Rice Lake Mining Division; Man. Mines Br., Prel. Rept. 48-3.

Name of Intrusion Wanipigow River (English Brook 4) Ref ID. 65

UTM

Easting	695500
Northing	5670500
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Rice Lake Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types serpentinized ultrabasic

PREVIOUS EXPLORATION

Assessment Files C.A.F. 91222

MAPPING

GEOCHEMISTRY

Name of Intrusion English Lake 5 Ref ID. 66

UTM

Easting	703800
Northing	5676300
Zone	14

Location and Access

Accessibility	All-terrain vehicles/snowmobile
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Rice Lake Belt

SIZE

Area (km2)	
Maximum Dimensions	unknown (drill hole intersection)

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type	Unknown
Geochemical Classification	Unknown
General Classification	Ultramafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	serpentinized peridotite
Host Rocks	Gneiss and greenstones
Layering Features	Unknown
Igneous Textures	none reported

PREVIOUS EXPLORATION

Assessment Files C.A.F. 91221

Mineral Occurrences

Ni

MAPPING

Most Detailed Mapping	Russell (1949)
Sketch Map Figure#	No
Regional Mapping	Russell (1949)
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry none

Recommendations

Traces of millerite reported in an approximately 75 m long drillhole intersection of serpentinized peridotite. Drillhole collared on English Lake, no outcrops of ultramafic rocks were observed on the shore. Not an attractive target for the exploration of PGE.

Selected Bibliography

Russell, G.A. 1949: Geology of the English Brook Area; Manitoba Department of Mines and Natural Resources, Mines Branch, 22 p.

Name of Intrusion Pipestone Islands Ref ID. 67

UTM

Easting	670050
Northing	5696500
Zone	14

Location and Access

Accessibility	Boat
Locality 1	
Locality 2	

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types altered fractured peridotite

PREVIOUS EXPLORATION

Mineral Occurrences

Ni

MAPPING

GEOCHEMISTRY

Name of Intrusion Saxton Lake1 Ref ID. 68

UTM

Easting	302500
Northing	5664000
Zone	15

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types serpentinized ultramafic lense

PREVIOUS EXPLORATION

Assessment Files not yet reviewed

MAPPING

GEOCHEMISTRY

Selected Bibliography

Davies, J.F., 1949: Geology of the Wanipigow Lake Area, Rice Lake Division, Manitoba; Man. Mines Br., Prel. Rept. 48-2.
Scoates, R.F.J. 1971: Ultramafic rocks of the Rice Lake greenstone belt; in Geology and Geolphysics of the Rice Lake Region Southeastern Manitoba (Project Pioneer), Man. Mines Br., Pub. 71-1, Rept. 7, pp. 189-201.

Name of Intrusion Saxton Lake2 Ref ID. 69

UTM

Easting	301800
Northing	5664500
Zone	15

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types serpentinized ultramafic lense

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Davies, J.F., 1949: Geology of the Wanipigow Lake Area, Rice Lake Division, Manitoba; Man. Mines Br., Prel. Rept. 48-2.
Scoates, R.F.J. 1971: Ultramafic rocks of the Rice Lake greenstone belt; in Geology and Geolphysics of the Rice Lake Region Southeastern Manitoba (Project Pioneer), Man. Mines Br., Pub. 71-1, Rept. 7, pp. 189-201.

Name of Intrusion Saxton Lake3 Ref ID. 70

UTM

Easting	298500
Northing	5665500
Zone	15

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types serpentinized ultramafic lense

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Davies, J.F., 1949: Geology of the Wanipigow Lake Area, Rice Lake Division, Manitoba; Man. Mines Br., Prel. Rept. 48-2.
Scoates, R.F.J. 1971: Ultramafic rocks of the Rice Lake greenstone belt; in Geology and Geolphysics of the Rice Lake Region Southeastern Manitoba (Project Pioneer), Man. Mines Br., Pub. 71-1, Rept. 7, pp. 189-201.

Name of Intrusion Wallace Lake

Ref ID. 71

UTM

Easting	337000
Northing	5654800
Zone	15

Location and Access

Accessibility	All-weather road
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Rice Lake Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

Age Archean

CLASSIFICATION

GEOLOGY

Principal Rock Types serpentinized ultramafic lense

PREVIOUS EXPLORATION

Assessment Files not yet reviewed

MAPPING

GEOCHEMISTRY

Selected Bibliography

Scoates, R.F.J., 1968: Mafic and ultramafic rocks of the Bissett area; in Summary of Geological Fieldwork, 1968; Man. Mines Br., Geol. Paper 3/68, p. 14-17.

Name of Intrusion Wanipigow Bay

Ref ID. 72

UTM

Easting	690000
Northing	5675000
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Rice Lake Belt

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types serpentine schist

PREVIOUS EXPLORATION

Assessment Files 91233, 91242, 91086

Mineral Occurrences

Ni

MAPPING

GEOCHEMISTRY

Selected Bibliography

Ermanovics (1969);
Scoates, R.F.J., 1969a: Ultramafic Rocks of Manitoba; Man. Mines Br., Prel. Map No. 1969A.
Scoates, R.F.J., 1969b: Ultramafic Project; in Summary of Geological Fieldwork, 1969; Man. Mines Br., Geol. Paper 4/69, p. 90-101.
McRitchie and Weber (1971);

Name of Intrusion Wanipigow Lake 1 Ref ID. 73

UTM

Easting	708100
Northing	5674500
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Rice Lake Belt

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types serpentinized pyroxenite

PREVIOUS EXPLORATION

Assessment Files 91214

MAPPING

GEOCHEMISTRY

Name of Intrusion Wanipigow Lake 2 Ref ID. 74

UTM

Easting	708000
Northing	5668900
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Rice Lake Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types serpentinized pyroxenite

PREVIOUS EXPLORATION

Assessment Files 91214

MAPPING

GEOCHEMISTRY

Name of Intrusion Wanipigow Lake 3 Ref ID. 75

UTM

Easting	707850
Northing	5674500
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Rice Lake Belt

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types serpentinized pyroxenite

PREVIOUS EXPLORATION

Assessment Files 91215

Mineral Occurrences

Ni

MAPPING

GEOCHEMISTRY

Name of Intrusion Wanipigow Lake 4 Ref ID. 76

UTM

Easting	705500
Northing	5668000
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Rice Lake Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types serpentinized pyroxenite

PREVIOUS EXPLORATION

Assessment Files 91216, 91218, 91219

MAPPING

GEOCHEMISTRY

Name of Intrusion Wanipigow Lake 5 Ref ID. 77

UTM

Easting	294000
Northing	5666000
Zone	15

Location and Access

Accessibility	All-weather road
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Rice Lake Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types serpentinized ultramafic lens

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Davies, J.F., 1949: Geology of the Wanipigow Lake Area, Rice Lake Division, Manitoba; Man. Mines Br., Prel. Rept. 48-2.
Scoates, R.F.J., 1971d: Ultramafic rocks of the Rice Lake greenstone belt; in Geology and Geolphysics of the Rice Lake Region Southeastern Manitoba (Project Pioneer), Man. Mines Br., Pub. 71-1, Rept. 7, pp. 189-201.

Name of Intrusion Clangula Lake (Wanipigow River) Ref ID. 78

UTM

Easting	691000
Northing	5671500
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Rice Lake Belt

SIZE

Area (km2)	
Maximum Dimensions	150 m x 50 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type	Plug
Geochemical Classification	Unknown
General Classification	Ultramafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	peridotite
Host Rocks	Amphibolite, quartz diorite
Layering Features	Unknown

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping	Davies (1951)
Regional Mapping	Davies (1951)

GEOCHEMISTRY

Selected Bibliography

Davies, J.F., 1951: Geology of the Manigotagan-Rice River Area, Rice Lake Mining Division, Manitoba; Man. Mines Br., Pub. 50-2.

Name of Intrusion Crystal Lake

Ref ID. 79

UTM

Easting	347700
Northing	5650000
Zone	15

Location and Access

Locality 1	Superior Province - southeastern Manitoba
Locality 2	Rice Lake Belt

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types hornblendite

PREVIOUS EXPLORATION

Assessment Files not yet reviewed

MAPPING

GEOCHEMISTRY

Selected Bibliography

McRitchie, W.D. 1971: The petrology and environment of the acidic plutonic rocks of the Wanipigow-Winnipeg Rivers region, southeastern Manitoba; in Geology and Geophysics of the Rice Lake Region, Southeastern Manitoba (Project Pioneer), Manitoba Mines Branch Publication 71-1, Report

Name of Intrusion Hawk Lake

Ref ID. 80

UTM

Easting	342500
Northing	5512000
Zone	15

Location and Access

Accessibility	All-weather road
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Falcon Lake - West Hawk Lake area

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types peridotite

PREVIOUS EXPLORATION

Assessment Files Not yet reviewed; 91071

Mineral Occurrences

Ni, Fe

MAPPING

GEOCHEMISTRY

Name of Intrusion Lily Lake (Trans Canada Hwy) Ref ID. 81

UTM

Easting	338800
Northing	5518300
Zone	15

Location and Access

Accessibility	All-weather road
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Falcon Lake - West Hawk Lake area

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types hypersthene - pyroxenite

PREVIOUS EXPLORATION

Assessment Files not yet reviewed

MAPPING

GEOCHEMISTRY

Selected Bibliography

Springer 1952

Name of Intrusion Vermilyea Lake North Ref ID. 82

UTM

Easting	383000
Northing	6048000
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Munro Lake Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	from 4.1m to 10.8m long in drill core

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type	Unknown
Geochemical Classification	Unknown
General Classification	Ultramafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	Peridotite
Host Rocks	directly in contact with a diorite which is interbanded with iron formation, talc, and chlorite schist surrounded by amphibolite schist and granodiorite.
Layering Features	Unknown
Metamorphic Grade	Amphibolite facies

PREVIOUS EXPLORATION

Geophysical Surveys	Airborne magnetic and EM
Assessment Files	91178, 93683

Exploration History

In 1961, Canadian Nickel Company Ltd. (AF 91178) completed two holes (Hole No. 20756 and 20757) in the north Vermilyea Lake area on Chubb 5 and Chub 14 claims, respectively.
Hole 20756 encountered 34.2 feet long peridotite from 271.8 to 306.0 feet interval. Hole 20757 encountered 35.5 and 13.5 feet long peridotite from 553.5 to 589.0 and from 599.9 to 613.0 feet intervals, respectively. The peridotite is directly in contact with a diorite which is interbanded with iron formation and talc-chlorite schists. The assays are not available in the assessment file.

In 1977, Manitoba Mineral Resources Ltd. (AF 93683) conducted an airborne EM survey in the area with 1320 feet spacing of the flight lines. The area displays a poor EM response but does have good magnetic association. The latter is probably due to ultramafic rocks.

MAPPING

Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987; 1:50,000 Vermilyea Lake, 53L/10, Map GR83-1-12;

GEOCHEMISTRY

Selected Bibliography

Theyer, P., 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel copper deposits in the Thompson nickel belt; Economic Geology Report (Winnipeg) (ER79-2), p. 53.

Name of Intrusion Whitemouth River Ref ID. 83

UTM

Easting	294500
Northing	5483500
Zone	15

Location and Access

Accessibility	Winter road
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Falcon Lake - West Hawk Lake area

SIZE

Area (km2)	
Maximum Dimensions	566 feet long in drill core

AGE DATA

Age not known

CLASSIFICATION

Intrusion Type	Unknown
Geochemical Classification	Unknown
General Classification	Ultramafic
Other Classification	Unknown

GEOLOGY

Principal Rock Types	serpentinized peridotite and serpentinized peridotite-pyroxenite
Host Rocks	Mafic to felsic volcanics and sedimentary rocks
Layering Features	Unknown

PREVIOUS EXPLORATION

Geophysical Surveys	Ground EM
Assessment Files	93480, 91069, 93378

Mineral Occurrences

In 1962, Selco Exploration (AF 91069, 93480) drilled Spike-1 encountered 566 ft. serpentinized peridotite and serpentinized peridotite-pyroxenite in the hole on Spike 8 claim.
In 1984, MMR-File Explorco Ltd. Joint venture (AF 93378) completed ground EM on six separate grids, and drilled eight holes in the area. Hole 49A-2 encountered 11m ultramafic rock and it contains minor pyrite. The drill core samples were analyzed for Cu, Zn, Ag and Au.

MAPPING

GEOCHEMISTRY

Name of Intrusion Osik Lake

Ref ID. 84

UTM

Easting	501092
Northing	6202403
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	Trans-Hudson Orogen - Kisseynew Domain
Locality 2	

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

Age not known

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

Principal Rock Types Serpentinized Peridotite and pyroxenite

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Ni ? UM body centred under Osik Lake.
Um float, geochemical and geophysical signature for hidden UM body.

Exploration History

Discovered by DiLabio & Kaszycki in 1988. DiLabio and Kaszychi postulated the presence of two ultramafic units under the lake surface to explain the anomaly in the vicinity og the magnetic high. High nickel levels in the UM rocks in this study prompted follow-up by Cominco. Canfor Mines, Sherit Gordon Ltd., Cominco, 1994-95. All previous assesssment work was carried out to the east and west of the lake.
More recent drilling by Canmine Resources.

MAPPING

Sketch Map Figure# No

Regional Mapping GSC Map 7025G; Man Min Res. Maps 78-3-13, -14

Type Section Figure# No

GEOCHEMISTRY

Geochemical Features and PGE Abundances

The ultramafic rocks have high MgO (21-37% hydrous) and low Ni contents compared to TNB and low S contents (100-400 ppm). Pelitic gneisses in the area are sulphide-rich.

Name of Intrusion Jackfish Lake Intrusion Ref ID. 85

UTM

Easting	411000
Northing	6058729
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Trans-Hudson Orogen - Flin Flon-Snow Lake Domain
Locality 2	Flin Flon Belt

SIZE

Area (km2)	10
Maximum Dimensions	4.5-5.0 x 2.5-3.0 km

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Stock

General Classification Mafic-Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro, pyroxenite, troctolite, quartz gabbro, anorthosite

Host Rocks Granodiorite and mafic metavolcanic rocks

Layering Features Local modal layering

Other Igneous Features Agmatitic contact zones, local mafic pegmatite veins/pods

Deformation syntectonic

Synoptic Geology

See Young and Ayers (1984). A multiphase differentiated gabbroic intrusion with locally well-developed modal layering. Multiple periods of magma emplacement into the chamber are recorded by local autobreccia zones.

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Disseminated to local massive Cu-Fe-Ni sulphide mineralization. Sulphides may be related to volcanic rock xenoliths.

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping See Young and Ayers (1984)

Sketch Map Figure# Yes

Regional Mapping G.S.C. Map 906A

Type Section Figure# No

GEOCHEMISTRY

Selected Bibliography

Young, J., Ayres, L.D. 1984: Character of mafic-ultramafic rocks in the Flin Flon - Snow Lake area, Manitoba; Progress Report.
Harrison, J.M. 1949: Geology and mineral deposits of the File-Tramping lakes area, Manitoba; Geological Survey of Canada. Memoir 250, inc. Map 906A.
Stanton, M.S. 1949: Tramping Lake, Manitoba; Geological Survey of Canada. Map 906A.

Name of Intrusion Chisel Lake Pluton Ref ID. 86

UTM

Easting	427736
Northing	6076610
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Trans-Hudson Orogen - Flin Flon-Snow Lake Domain
Locality 2	

SIZE

Area (km2)	15
Maximum Dimensions	10 x 1.5 km

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Plug

General Classification Mafic-Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Peridotite to gabbro-diorite pluton with concordant anorthosite pods

Host Rocks Metavolcanics of the Flin Flon - Snow Lake Belt

Layering Features Local modal layering

Synoptic Geology

See Williams (1966) and Ayers and Young (1989). Teardrop shaped outcrop pattern. Concentrically zoned body with outer peridotite zone enclosing increasingly more mafic towards to centre of the intrusion. Local rhythmic modal layering.

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Unmineralized pluton cuts off VMS deposit.

Exploration History

Exploration has focussed on adjacent VMS deposits (Chisel Lake Mine).

MAPPING

Most Detailed Mapping Williams (1966)

Sketch Map Figure# Yes

Regional Mapping 1:250,000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63K)

Type Section Figure# Yes

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.0172, 1.1425

Whole-rock Analyses Numbers 2.169, 2.833

Selected Bibliography

Ayres, L.D., Young, J., 1989: Characterization of mafic-ultramafic intrusive rocks in the Flin Flon-Snow Lake area, Manitoba; in Investigations by the Geological Survey of Canada in Manitoba and Saskatchewan during the 1984-1989 Mineral Development Agreements, , ed(s). A.G. Galley; Geological Survey of Canada, Open File 2133, p. 64-68.

Young, J., Ayres, L.D. 1984: Character of mafic-ultramafic rocks in the Flin Flon - Snow Lake area, Manitoba; Progress Report.

Harrison, J.M. 1949: Geology and mineral deposits of the File-Tramping lakes area, Manitoba; Geological Survey of Canada. Memoir 250, inc. Map 906A.

Williams, H. 1966: Geology and mineral deposits of the Chisel Lake Map area, Manitoba; Geological Survey of Canada. Memoir 342.

Name of Intrusion Reed Lake Intrusion (Reed Lake mafic complex) Ref ID. 87

UTM

Easting	400028
Northing	6055279
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Trans-Hudson Orogen - Flin Flon-Snow Lake Domain
Locality 2	Flin Flon Belt

SIZE

Area (km2)	40
Maximum Dimensions	10 km x 4 km

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro, pyroxenite, leucogabbro, anorthosite, peridotite and tonalite

Host Rocks Mafic metavolcanic

Layering Features Local modal layering

Igneous Textures Autobreccia

Other Igneous Features Steeply dipping, west-facing sill

Deformation Pretectonic, subvolcanic

Synoptic Geology

See Williamson (1995) for details. Subdivided into a Lower (melagabbro and pyroxenite), Middle (melagabbro to anorthosite) and Upper (quartz-bearing pyroxenite to gabbro) zones (Williamson, 1995).

PREVIOUS EXPLORATION

Assessment Files Not reviewed.

Mineral Occurrences

Not reviewed.

Exploration History

Not reviewed.

MAPPING

Most Detailed Mapping See Williamson (1995)

Sketch Map Figure# Yes

Regional Mapping 1:250 000 scale (NTS 63K; Bedrock Geology of Manitoba Compilation Series Map)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.1107 to 1.1299

Whole-rock Analyses Numbers 2.598 to 2.790

Recommendations

Local anomalously high PGE contents were recognized by Williamson (1995) and may indicate a favourable magmatic environment in the Reed Lake intrusion for concentrating PGE.

Selected Bibliography

Young, J., Ayres, L.D. 1984: Character of mafic-ultramafic rocks in the Flin Flon - Snow Lake area, Manitoba; Progress Report.
Harrison, J.M. 1949: Geology and mineral deposits of the File-Tramping lakes area, Manitoba; Geological Survey of Canada.

Memoir 250, inc. Map 906A.
Rousell, D.H. 1970: Geology of the Iskwasum Lake area (east half), Manitoba; Manitoba Mines Br., Publication 66-3.
Williamson, B.L. 1993: Petrologic studies of the Reed Lake Gabbro and Claw Lake Gabbroic Complex; Manitoba Energy and Mines, Geological Services, Report of activities 1993, p. 119.
Williamson, B.L., Eckstrand, O.R. 1995: A Summary of new contributions in the Reed Lake Mafic Complex; Manitoba Energy and Mines, Geological Services, Report of activities 1995, p. 61-70.

Name of Intrusion Mikanagan Lake Sill Ref ID. 88

UTM

Easting	330796
Northing	6077354
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Trans-Hudson Orogen - Flin Flon-Snow Lake Domain
Locality 2	Flin Flon Belt

SIZE

Area (km2)	
Maximum Dimensions	15 km long x 1.2 km thick

AGE DATA

CLASSIFICATION

Intrusion Type Sill

GEOLOGY

Principal Rock Types Multiphase gb, qz diorite, tonalite sill.

Host Rocks metavolcanics

Layering Features Local modal layering

Igneous Textures Local country rock inclusions and gabbro pegmatite veins and pods

Other Igneous Features Steeply dipping, east-facing lenticular sill

Deformation prefolding

Synoptic Geology

See Bailes and Syme (1989). Suddivided into a gabbronorite zone, a gabbro zone, an oikocrystic (poikilitic) gabbronorite zone, a transition gabbro unit, a gabbro pegmatite unit, a ferrogabbro zone, a quartz ferrodiorite/ferrotonalite zone and a leucotonalite zone. Total thickness is approx. 1.25 km (maximum exposed).

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Not reviewed

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping 1:20 000 scale (Bailes and Syme, 1989).

Sketch Map Figure# Yes

Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63K)

Type Section Figure# Yes

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.1003 to 1.1025

Whole-rock Analyses Numbers 2.510 to 2.551

Geochemical Features and PGE Abundances

See Tables 1 and 2 and Bailes and Syme (1989)

Recommendations

One of the largest, well-preserved mafic intrusions in the Flin Flon region. Exploration of the transition zone and associated pegmatitic gabbro and ferroan mafic rocks for deuteric and/or oxide-related PGE mineralization should be undertaken.

Selected Bibliography

Bailes, A.H., Syme, E.C. 1980: White Lake-Mikanagan Lake project; Manitoba Min. Res. Div., Report of field activities 1979, p. 43-50.

Bailes, A.H., Syme, E.C., 1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 87-1, 313p.
Bateman, J.D., Harrison, J.M. 1945: Mikanagan Lake, Manitoba; Geological Survey of Canada. Map 832A.
Young, J., Ayres, L.D. 1984: Character of mafic-ultramafic rocks in the Flin Flon - Snow Lake area, Manitoba; Progress Report.
Young, J., Ayers, L.D. 1985: Characterization of mafic-ultramafic rocks in the Flin Flon-Snow Lake area, Manitoba; Dept. of Earth Sciences, University of Manitoba.

Name of Intrusion Fish Lake Sill (Setting Lake) Ref ID. 89

UTM

Easting	541322
Northing	6122589
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

Principal Rock Types UM intrusion at fault junction

Host Rocks migmatite

PREVIOUS EXPLORATION

Mineral Occurrences

Ni-bearing diss po, pn in UM intrusion at junction of two faults along Setting L.-Ospwagan L. fault zone

MAPPING

Regional Mapping G.S.C.prelim. Map 54-13

GEOCHEMISTRY

Selected Bibliography

Canadian Nickel Co. Ltd. Internal report
Noranda MJay Ray Syndicate and W.M. RobertInternal report
Quinn, H.A. 1953: Preliminary map 54-13, Nelson House, Manitoba, sheet 63-O; Geological Survey of Canada.

Name of Intrusion Kipahigan Lake Plug Ref ID. 90

UTM

Easting	681798
Northing	6147793
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2) 0.07

Maximum Dimensions 105 x 75 m

AGE DATA

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

Principal Rock Types pyroxenite to wehrlite

Host Rocks Nokomis Gp. paragneiss rock

Deformation shear zone

PREVIOUS EXPLORATION

Mineral Occurrences

Diss py, cpy, po, violarite, mar

MAPPING

Regional Mapping Man. Mines Br. Map 61-6

GEOCHEMISTRY

Selected Bibliography

Netolitzk, R.K. 1967: Geology of the Kipahigan Lake Cu-Ni sulfide deposit, Saskatchewan; M.Sc. thesis, University of Saskatchewan.
Pyke, M.N. 1965: The geology of the Nemei Lake area (east half), Saskatchewan; Saskatchewan Dept. Min. Res., Report 97.
Pollock, G.D. 1964: Geology of the Duval Lake area; Manitoba Mines Br., Publication 61-6, inc. map 61-6.

Name of Intrusion Laurie Lake

Ref ID. 92

UTM

Easting	322889
Northing	6277982
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

Principal Rock Types Serp. peridotite to pyroxenite

Host Rocks metased-metavolcanics

PREVIOUS EXPLORATION

Mineral Occurrences

Diss to ms py, po, cpy, sph, ga

MAPPING

Regional Mapping Map No. 4, Masn. Mines Br.

GEOCHEMISTRY

Selected Bibliography

Milligan, G.C. 1952: Geology of the Laurie Lake area; Manitoba Mines Br., Publication 50-7.
Lyon, S.R. 1966: Wide activity spurs Manitoba expansion; Western Miner, v. 39, p. 107.
Milligan, G.C. 1960: Geology of the Lynn Lake District, Granville Lake Mining Division, Manitoba; Manitoba Mines Br., Publication 57-1, inc. Map No. 4 Laurie Lake geology

Name of Intrusion Lynn Lake Intrusions (A Plug and EL Plug) Ref ID. 94

UTM

Easting	375899
Northing	6302724
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Trans-Hudson Orogen - Lynn Lake Domain
Locality 2	Lynn Lake Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	3.6 x 1.5 km

AGE DATA

Age	Proterozoic
Geochronological Data	mineral.- 1705 to 2045 Ma

CLASSIFICATION

Intrusion Type	Plug
General Classification	Mafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	Gabbro
Host Rocks	Wasekwan Group volcanic-sedimentary
Layering Features	Local modal layering
Other Igneous Features	Pipe-like differentiated intrusion

Synoptic Geology

See Pinsent (1980) for details. See Gilbert et al. (1980) for regional geology. Type location for the"Lynn Lake gabbros". Host of the first nickel mine in Manitoba. This reocrd includes two plug-like mafic-ultramafic intrusions with massive sulphide deposits, the A and EL plugs (Pinsent, 1980). Related to sill-like, more mafic intrusions (e.g., Cartwright Lake) within the Wasekwan Group in the Lynn Lake area.

PREVIOUS EXPLORATION

Mineral Occurrences

Host to the A

MAPPING

Most Detailed Mapping	1:50 000 scale (Gilbert et al., 1980) and plans and sections from mines (Pinsent, 1980).
Sketch Map Figure#	Yes
Regional Mapping	1:250 000 scale (NTS 64C)
Type Section Figure#	Yes

GEOCHEMISTRY

Geochemistry	Base Metal Assay and PGE Analyses
PGE Analyses Numbers	1.0488 to 1.0701

Geochemical Features and PGE Abundances

See Table 1. Relatively PGE-poor massive Ni-Cu sulphides from A and EL plugs.

Selected Bibliography

Allan, J.D. 1950: The Lynn Lake nickel area, Manitoba; Trans. Can. Inst. Min. and Met., v.53, p. 343-348.
Coats, C.J.A., Quirke, T.T. 1972: Geology and mineral deposits of the Flin Flon, Lynn Lake and Thompson areas, Manitoba, and the Churchill-Superior front of the western Precambrian Shield; International Geol. Congress, 24th
Gilbert, H.P., Syme, E.C., Zwanzig, H.V., 1980: Geology of the metavolcanic and volcaniclastic metasedimentary rocks in the Lynn Lake area; Manitoba Energy and Mines, Mineral Resources Division, Geological Paper 80-1, 118p.

Hulbert, L.J., 1978: Geology of the Fraser Lake gabbro complex, Manitoba; M.Sc. thesis, University of Regina.
Milligan, G.C., 1960: Geology of the Lynn Lake district; Manitoba Mines and Natural Resources, Mines Branch, Publication 57-1, 317p.
Pinsent, R.H., 1980: Nickel-copper mineralization in the Lynn Lake gabbro; Manitoba Energy and Mines, Mineral Resources Division, Economic Geology Report 79-3.

Turek, A. 1967: Age of sulfide mineralization at Lynn Lake, Manitoba; Canadian Journal of Earth Sciences, v. 4.

Name of Intrusion Sickle Lake Intrusion Ref ID. 95

UTM

Easting	397852
Northing	6281310
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	Trans-Hudson Orogen - Lynn Lake Domain
Locality 2	Lynn Lake Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro

Host Rocks Deformed sill within metavolcanics

Synoptic Geology

Possibly part of the Lynn Lake gabbro suite (Pinsent, 1980; Milligan, 1965). See Syme (1977) and Milligan for local geology.

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Not reviewed

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping See Syme (1977) and Gilbert et al. (1980)

Sketch Map Figure# No

Regional Mapping 1:250 000 scale (NTS 64C)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Base Metal Assay and PGE Analyses

PGE Analyses Numbers 1.1306 to 1.1338

Geochemical Features and PGE Abundances

See Table 1

Selected Bibliography

Campbell, F.H.A. 1972: Stratigraphic and structural studies in the Granville Lake-Lynn Lake region; Manitoba Mines Br., Publication 71-2A.

Gilbert, H.P., Syme, E.C., Zwanzig, H.V., 1980: Geology of the metavolcanic and volcaniclastic metasedimentary rocks in the Lynn Lake area; Manitoba Energy and Mines, Mineral Resources Division, Geological Paper 80-1, 118p.

Milligan, G.C., 1960: Geology of the Lynn Lake district; Manitoba Mines and Natural Resources, Mines Branch, Publication 57-1, 317p. , 16 maps.

Pinsent, R.H. 1977: The Lynn Lake Ni-Cu deposits; Manitoba Dept. Mines, Resources and Environment, Rpt. of field activities

Syme, R. 1976: Geology of the southern Lynn Lake greenstone belt; Manitoba Min. Res. Div., Rpt. of field activities.

Syme, E.C., 1977: Sickle Lake-Hughes Lake area; Manitoba Department of Mines, Resources and Environmental

Management, Mineral Resources Division, Report of Field Activities 1977, p. 31-36.

Name of Intrusion Seal River Diabase

Ref ID. 96

UTM

Easting	644858
Northing	6524743
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

Geochronological Data 2745 and 2636 Ma

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Diabase dyke

Host Rocks black shale

PREVIOUS EXPLORATION

Mineral Occurrences

Contains up to 0.17% Ni.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Milligan, G.C. 1955: Lower Seal River, Manitoba; Manitoba Mines Br., Summary report.
Schledewitz, D.C.P. 1975: Seal River project; Manitoba Min. Res. Div., Summary of fieldwork 1974.
Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Name of Intrusion Seal River Chromite Ref ID. 97

UTM

Easting	371452
Northing	6534566
Zone	15

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

Geochronological Data 2745 and 2636 Ma

CLASSIFICATION

GEOLOGY

PREVIOUS EXPLORATION

Mineral Occurrences

Cr and Ba anomalies

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.
NMI Index 2

Name of Intrusion Joe Group

Ref ID. 98

UTM

Easting	372696
Northing	6337940
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Gabbro

Host Rocks biotite schist

PREVIOUS EXPLORATION

Mineral Occurrences

Diss py, po containing up to .11% Ni, .1% Cu

MAPPING

Regional Mapping G.S.C. Map 1001A

GEOCHEMISTRY

Selected Bibliography

NMI Index 2
Gadd, N.R. 1950: Geological Survey of Canada. Map 1001A.

Name of Intrusion Melvin Lake Intrusion Ref ID. 99

UTM

Easting	423437
Northing	6331365
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	Trans-Hudson Orogen - Lynn Lake Domain
Locality 2	Lynn Lake Greenstone Belt

SIZE

Area (km2)	16
Maximum Dimensions	8 km x 2 km

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Unknown

General Classification Mafic-Ultramafic

Other Classification Unknown

GEOLOGY

Principal Rock Types Gabbronorite, leucogabbronorite, norite, anorthosite and diorite

Host Rocks Migmatitic gneiss (paragneiss) and granitoid rocks

Igneous Textures Local pegmatitic hornblende gabbro units

Other Igneous Features Igneous lamination defined by alignment of plagioclase long axes

Synoptic Geology

See Gilbert (1993). Differentiated, orthopyroxene-rich mafic intrusion.

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Ni in po in anorthosite.

Exploration History

Limited surface exploration for PGE-Cu-Ni mineralization by Strider Resources Ltd. in 1998/99

MAPPING

Most Detailed Mapping Gilbert (1993)

Regional Mapping 1:250 000 scale (NTS 64C)

GEOCHEMISTRY

Geochemical Features and PGE Abundances

See Gilbert (1993). Local Ti-rich subunits (ilmenite locally present).

Selected Bibliography

Davies, J.F. Bannatyne, B.B., Barry, G.S. and McCabe, H.R. 1962: Geology and mineral resources of Manitoba; Manitoba Mines Br., p. 126.
Hunter, H.E., 1952: Geology of the Melvin Lake area; Manitoba Mines Br., Publication 51-5.
Gilbert, H.P., 1993: Geology of the Barrington Lake-Melvin Lake-Fraser Lake area; Manitoba Energy and Mines, Geological Services, Geological report 87-3, 97p.

Name of Intrusion Missi Rapid

Ref ID. 100

UTM

Easting	548719
Northing	6350055
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Schist?

Host Rocks Biotite schist

PREVIOUS EXPLORATION

Mineral Occurrences

Disseminated pyrite, pyrrhotite and chalcopyrite with up to 0.05% Cu and 0.17% Ni

MAPPING

GEOCHEMISTRY

Selected Bibliography

Cranstone, J.R. 1972: Geology of the South Indian Lake area, northeastern portion; Manitoba Mines Br., Publication 71-2J.
Quinn, H.A. 1956: Mineral occurrences between Chipewyan and Herb lakes, Manitoba; Precambrian, v. 29, p. 13.

Name of Intrusion Tony-Tom

Ref ID. 102

UTM

Easting	453081
Northing	6331726
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions 2.5 ml x 100 ft

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Granodiorite

Host Rocks gneiss

PREVIOUS EXPLORATION

Mineral Occurrences

Diss py, po, cpy (Ni, Cu) in gneiss and intrusion

MAPPING

GEOCHEMISTRY

Selected Bibliography

Quinn, H.A. 1956: Mineral occurrences between Chipewyan and Herb lakes, Manitoba; Precambrian, v. 29, p. 13.
Hinds, R.W. 1972: Geology of the Opachanau Lake-Fraser Lake-Lemay Island area; Manitoba Mines Br., Publication 71-2G, p. 39-43.

Name of Intrusion New Colony Group Ref ID. 104

UTM

Easting	411790
Northing	6060662
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Norite, gabbro, qtz gabbro

Host Rocks gneiss and schist

PREVIOUS EXPLORATION

Mineral Occurrences

Diss po, cpy, mar in intrusions; up to .13% Cu, .23% Ni.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Wright, J.F. 1931: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summ. Rpt. 1930, pp. 74, 101-106.
Harrison, J.M. 1949: Geology and mineral deposits of the File-Tramping lakes area, Manitoba; Geological Survey of Canada. Memoir 250, inc. Map 906A.

Name of Intrusion Jackpot Ref ID. 105

UTM

Easting	410944
Northing	6061327
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Mafic-Ultramafic

GEOLOGY

Principal Rock Types Pyroxenite, gabbro, qtz gabbro, peridotite

PREVIOUS EXPLORATION

Mineral Occurrences

Diss to ms po, cpy; 1.01% Ni, .32% Cu

MAPPING

GEOCHEMISTRY

Selected Bibliography

Wright, J.F. 1931: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summ. Rpt. 1930, pp. 74, 101-106.
Harrison, J.M. 1949: Geology and mineral deposits of the File-Tramping lakes area, Manitoba; Geological Survey of Canada. Memoir 250, inc. Map 906A.

Name of Intrusion Cabin #9 Ref ID. 106

UTM

Easting	413486
Northing	6059423
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Mafic-Ultramafic

GEOLOGY

Principal Rock Types Norite, gabbro, qz gabbro, amphibolite

PREVIOUS EXPLORATION

Mineral Occurrences

Diss po with .27% Ni, ~3% sulphides

MAPPING

GEOCHEMISTRY

Selected Bibliography

Dumas, J.K. Cabin claims, NW 9, 63 K; Assessment file. Manitoba Min. Res. Div.

Name of Intrusion Rusty 2 Ref ID. 107

UTM

Easting	415820
Northing	6058699
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro

Host Rocks Granitic to volcanic rocks

PREVIOUS EXPLORATION

Mineral Occurrences

Diss to ms py, cpy, po

MAPPING

GEOCHEMISTRY

Selected Bibliography

Harrison, J.M. 1949: Geology and mineral deposits of the File-Tramping lakes area, Manitoba; Geological Survey of Canada. Memoir 250, inc. Map 906A.
Bailes, A.H. 1979: Preliminary compilation of the geology of the Snow Lake - Flin Flon - Sherridon area; Manitoba Mines Br., Geology Paper 1/71.

Name of Intrusion Rice Island

Ref ID. 108

UTM

Easting	440951
Northing	6074562
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Trans-Hudson Orogen - Flin Flon-Snow Lake Domain
Locality 2	

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Qtz gabbro, porphyritic

Host Rocks metasediments

Deformation Intrusion plunges 45 degrees N along syncline

PREVIOUS EXPLORATION

Mineral Occurrences

Veinlets containing po, cpy, pn.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Wright, J.F. 1931: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summ. Rpt. 1930, pp. 74, 101-106.
Bell, C.K. 1978: Wekusko Lake map area; Memoir 384, p. 73.
Russell, G.A. 1957: Structural studies of the Snow Lake - Herb Lake area; Manitoba Mines Br., Publication 55-3, p. 27-28.

Name of Intrusion Mundic Group

Ref ID. 109

UTM

Easting	455715
Northing	6090869
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2) 7.5

Maximum Dimensions 6.4 X 0.75 km

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Qtz gabbro

Host Rocks granite dykes

PREVIOUS EXPLORATION

Mineral Occurrences

Veinlet & diss po, cpy. Cu+Ni approx. .5-1%

MAPPING

GEOCHEMISTRY

Selected Bibliography

Wright, J.F. 1931: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summ. Rpt. 1930, pp. 74, 101-106.
Northern Miner; Nov. 15 195p. 25

Name of Intrusion Eureka Island Ref ID. 110

UTM

Easting	442225
Northing	6069476
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Trans-Hudson Orogen - Flin Flon-Snow Lake Domain
Locality 2	

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Gabbro

Host Rocks Andesite of Amisk Group

Deformation Sheared contact with andesite

PREVIOUS EXPLORATION

Mineral Occurrences

Diss po, py, cpy minor po stringers.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Wright, J.F. 1931: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summ. Rpt. 1930, pt. 74, p.101-106.
Russell, G.A. 1957: Structural studies of the Snow Lake -Herb Lake area; Manitoba Mines Br., Publication 55-3, p. 27-28.

Name of Intrusion Gormley Lake

Ref ID. 111

UTM

Easting	503013
Northing	6053127
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	
Locality 2	

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types	Sheared serpentinite
Host Rocks	metavolcano-sedimentary

PREVIOUS EXPLORATION

Mineral Occurrences

Diss po, py, pn, millerite. Amax DDH: up to .16% Ni between 155' and 395'.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Assessment file Reservation 26; Manitoba Ministry of Natural Resources.

Name of Intrusion Copper Dome (C.N.3) Ref ID. 112

UTM

Easting	453491
Northing	6082236
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Gabbro

Deformation pre-folding

PREVIOUS EXPLORATION

Mineral Occurrences

Diss po, cpy

MAPPING

GEOCHEMISTRY

Selected Bibliography

Wright, J.F. 1931: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summ. Rpt. 1930, pp. 74, 101-106.
Russell, G.A. 1957: Structural studies of the Snow Lake - Herb Lake area; Manitoba Mines Br., Publication 55-3, p. 27-28.

Name of Intrusion TAG 4 - TUC 1 (Arctic Extension) Ref ID. 113

UTM

Easting	452663
Northing	6081410
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2) 7.6

Maximum Dimensions 6.4 X 1.2 km

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Qtz gabbro

Host Rocks gneisses

PREVIOUS EXPLORATION

Mineral Occurrences

Ms to diss py, cpy, po. Mineralized zone 300X75 ft.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Wright, J.F. 1931: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summ. Rpt. 1930, pp. 74, 101-106.
Davies, J.F. Bannatyne, B.B., Barry, G.S. and McCabe, H.R. 1962: Geology and mineral resources of Manitoba; Manitoba Mines Br., p. 126.
Bailes, A.H. 1979: Preliminary compilation of the geology of the Snow Lake - Flin Flon - Sherridon area; Manitoba Mines Br., Geology Paper 1/71.
Bell, C.K. 1978: Wekusko Lake map area; Memoir 384, p. 73.

Name of Intrusion Embury Lake (Trout Lake) Ref ID. 114

UTM

Easting	318754
Northing	6079215
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Trans-Hudson Orogen - Flin Flon-Snow Lake Domain
Locality 2	Flin Flon Belt

SIZE

Area (km2)	
Maximum Dimensions	1.5 km x 0.75 km

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Unknown

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro, quartz diorite; includes small occurrences of serpentinized peridotite and clinopyroxenite in the same area

Host Rocks Metasedimentary rocks of the Flin Flon Belt

Layering Features Massive/modally uniform

Other Igneous Features Rare gabbroic pegmatite pods

Synoptic Geology

See Bailes and Syme (1989)

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

In the spatially associated ultramafic rocks, strong talc-carbonate-serpentine altered contact is associated with disseminated chr, mgt, po.

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping 1:20 000 scale (Bailes and Syme, 1989)

Sketch Map Figure# No

Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63K)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.0226 to 1.0228

Whole-rock Analyses Numbers 2.241 to 2.244

Geochemical Features and PGE Abundances

See Tables 1 and 2

Selected Bibliography

Bailes, A.H., Syme, E.C., 1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 87-1, 313p.
Williams, H. 1966: Geology and mineral deposits of the Chisel Lake Map area, Manitoba; Geological Survey of Canada.

Memoir 342.
Russell, G.A. 1957: Structural studies of the Snow Lake - Herb Lake area; Manitoba Mines Br., Publication 55-3, p. 27-28.
Scoates, R.F.J. 1969: Summary of geological fieldwork, ultramafic project; Manitoba Mines Br., Geological Paper 4/69.
Tanton, T.L. 1941: Flin Flon, Saskatchewan and Manitoba; Geological Survey of Canada Map 632A.

Name of Intrusion Athapapuskow Lake (southeast) Ref ID. 115

UTM

Easting	340955
Northing	6048087
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Trans-Hudson Orogen - Flin Flon-Snow Lake Domain
Locality 2	Flin Flon Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Unknown

General Classification Mafic-Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Peridotite, Gabbro

Host Rocks metavolcanic

Synoptic Geology

Poorly exposed mafic and buried ultramafic rocks along the southeastern shoreline of Athapapuskow Lake. See Bailes and Syme for descriptions of mafic intrusions in this part of the Flin Flon Belt.

PREVIOUS EXPLORATION

Mineral Occurrences

not reviewed

Exploration History

not reviewed

MAPPING

Most Detailed Mapping 1:20 000 scale (Bailes and Syme, 1989)

Sketch Map Figure# No

Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Series, NTS 63K)

Type Section Figure# No

GEOCHEMISTRY

PGE Analyses Numbers 1.0216-1.0218;1.1300;1.393-1.1398;1.0482-1.0487;

Whole-rock Analyses Numbers 2.000 to 2.020 and 2.355 to 2.358 + 2.791 to 2.792

Geochemical Features and PGE Abundances

see Tables 1 and 2. Included here are analyses for the Schist Creek gabbro (Table 1, analyses # 1.1300 to 1.1305).

Selected Bibliography

Bailes, A.H., Syme, E.C., 1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 87-1, 313p.
Scoates, R.F.J. 1969: Summary of geological fieldwork, ultramafic project; Manitoba Mines Br., Geological Paper 4/69.

Name of Intrusion Schist Lake Mine

Ref ID. 116

UTM

Easting	317978
Northing	6067053
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	
Locality 2	

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro

Host Rocks metavolcanic

PREVIOUS EXPLORATION

Mineral Occurrences

Ms py, po, cpy lenses. Remobilization of cpy evident.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.
Scoates, R.F.J. 1969: Summary of geological fieldwork, ultramafic project; Manitoba Mines Br., Geological Paper 4/69.
Scoates, R.F.J. 1971: The mineral potential of ultramafic rocks of Manitoba; Manitoba Mines Br., Geological Paper 3/71

Name of Intrusion Iskwasum Lake Intrusion Ref ID. 117

UTM

Easting	382077
Northing	6050669
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Trans-Hudson Orogen - Flin Flon-Snow Lake Domain
Locality 2	Flin Flon Belt

SIZE

Area (km2)	
Maximum Dimensions	Approximately 5 km x 300 m

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic-Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Peridotite, pyroxenite, gabbro

Host Rocks mafic metavolcanics rocks (McDougalls Point basalt)

Layering Features Modally graded/weakly differentiated

Synoptic Geology

See Ayers and Young (1989) ans Syme (1994). A stratiform mafic-ultramafic intrusion. Complex deformation and intense talc-carboante alteration of ultramafic rocks. Possibly part of a much larger stratiform mafic-ultramafic intrusion (Syme, 1994).

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Rare sulphides in talcose rock.

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping 1:50 000 scale (GSC, 1983)

Sketch Map Figure# Yes

Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63K)

Type Section Figure# No

GEOCHEMISTRY

Selected Bibliography

Ayres, L.D., Young, J., 1989: Characterization of mafic-ultramafic intrusive rocks in the Flin Flon-Snow Lake area, Manitoba; in Investigations by the Geological Survey of Canada in Manitoba and Saskatchewan during the 1984-1989 Mineral Development Agreements, , ed(s). A.G. Galley; Geological Survey of Canada, Open File 2133, p. 64-68.

Davies, J.F. Bannatyne, B.B., Barry, G.S. and McCabe, H.R. 1962: Geology and mineral resources of Manitoba; Manitoba Mines Br., p. 126.

Hess, H.H. 1955: Serpentinites, orogeny and epeirogeny in crust of the Earth; Geological Society of America, Special Paper 62, p. 391-408.

Hunt, G.H. 1970: Geology of the Iskwasum Lake area; Manitoba Mines Br., Publication 65-3.

Scoates, R.F.J. 1969: Summary of geological fieldwork, ultramafic project; Manitoba Mines Br., Geological Paper 4/69.

Geological Survey of Canada 1983: Iskwasum Lake, Manitoba; Geological Survey of Canada, Geophysical Series Map,

Map C20341G, Scale 1:50 000.
Syme, E.C., 1994: Supracrustal rocks of the Iskwasum Lake area (NTS 63K/10W); Manitoba Energy and Mines, Geological Services, Report of activities 1994, p. 47-56.

Name of Intrusion Fox River Sill Ref ID. 118

UTM

Easting	841000
Northing	6193000
Zone	14

Location and Access

Accessibility	Helicopter
Locality 1	Superior Boundary Zone and Pikwitonei Domain
Locality 2	Fox River Belt

SIZE

Area (km2)	500
Maximum Dimensions	260 x 2 km

AGE DATA

Age	Proterozoic
Geochronological Data	1883 +/- 1.5 Ma (Heaman et al., 1986)

CLASSIFICATION

Intrusion Type	Sill
Geochemical Classification	Komatiitic
General Classification	Mafic-Ultramafic
Other Classification	Marginal rift basin

GEOLOGY

Principal Rock Types	Dunite, peridotite, pyroxenite, gabbro, anorthosite
Host Rocks	Middle sedimentary formation, Fox River Belt
Layering Features	Megacyclic Units
Igneous Textures	Olivine, pyroxene and plagioclase cumulates. Commonly medium- to coarse-grained.
Other Igneous Features	Rare pyroxene megacrysts (see Peck et al., 1999).

Synoptic Geology

Scoates (1981, 1990) provides comprehensive geological descriptions of the Fox River Belt, including a 1:50 000 scale map of the western part of the belt and a review of exploration and previous mapping.

The Paleoproterozoic Fox River Belt is a ca. 250 km long and 10 to 15 km wide, east-striking, north-dipping and north-facing supracrustal succession containing both the conformable, ca. 2 km thick Fox River Sill and a series of smaller, stratiform, sill-like ultramafic-mafic intrusions (Lower differentiated intrusions). Across the belt, metamorphic grades increase systematically from prehnite-pumpellyite facies in the north to greenschist facies in the south. No evidence has been found for major folding or faulting. Minor structures observed to date include discontinuous shear and brittle deformation zones that are typically parallel to bedding and flow contacts. To the south, the Fox River Belt is in contact (possibly faulted) with intermediate gneisses and granodiorite, both assumed to be of Archean age and recording at least one episode of amphibolite facies metamorphism. The contact between the Fox River Belt and paragneisses of presumed Proterozoic age that occur to the north is not exposed.

The supracrustal sequence within the Fox River Belt comprises two komatiitic basalt formations (Lower and Upper volcanic formations) and three sedimentary formations (Lower, Middle and Upper sedimentary formations). The Lower and Upper volcanic formations comprise multiple <10 to >30 m thick massive, pillowed and compound flow units that lack significant amounts of interflow sedimentary rocks. Detailed volcanological descriptions of measured sections obtained from both of these formations are given in Scoates (1981) and Syme et al. (1999).

The three sedimentary sequences recognized within the Fox River Belt are poorly exposed and have only rarely been intersected by drilling. Based on limited available data, they appear to comprise abundant, thin-bedded, fine-grained clastic sedimentary rocks (distal marine or lacustrine facies; mudstone, argillite, pyritic argillite and siltstone) and subordinate amounts of chemical sedimentary rocks (starved basin marine or lacustrine facies; sulphide and oxide facies banded iron formation and subordinate dolomitic limestone).

The Lower differentiated intrusions are typically <1 to 20 km long and <500 m thick. They are extremely well differentiated (dunite to anorthosite) stratiform intrusions and were emplaced within the upper part of the Lower sedimentary formation (Fig. GS-12-1).

The Fox River Sill, with an age of 1883 +/- 1.5 Ma (Heaman et al., 1986), was emplaced within a relatively thin metasedimentary sequence (Middle sedimentary formation). It has an average true thickness of ca. 2 km, and has a strike length, based on the interpretation of airborne magnetic data (Scoates, 1990), of >250 km; its third dimension is at least several kilometres. These dimensions show the Fox River Sill to be one of the largest stratiform ultramafic-mafic intrusions on Earth (cf. Scoates, 1990). Gravity data support an interpretation that the sill widens at depth and dips moderately to steeply to the north (Scoates, 1990). The sill comprises four major sub-units, viz. (from base to top): 1) the Marginal Zone, a ca. 300 m thick sequence containing 3 cyclic units having a lower olivine-rich zone, a central pyroxene-rich zone and an upper plagioclase-rich zone; 2) the Lower Central Layered Zone, a ca. 1 km thick sequence comprising multiple, decametre-scale

cyclic units containing a thick dunite-peridotite unit grading into an uppermost clinopyroxene-rich (+/- plagioclase) unit; 3) the Upper Central Layered Zone, a ca. 1 km thick sequence comprising at least 20 cyclic units containing variable proportions olivine and clinopyroxene +/- orthopyroxene +/- plagioclase; 4) The Hybrid Roof Zone, averaging 50 m in thickness and containing a variety of quartz and granophyre-bearing ultramafic to mafic rock types, xenoliths of the overlying Middle sedimentary formation rocks and derivative aplite and granophyre melt inclusions (Scoates, 1990).

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM

Assessment Files 93695

Mineral Occurrences

Disseminated pyrrhotite and chalcopyrite mineralization containing up to 5 ppm combined Pd + Pt, 2% Cu and approximately 1% Ni was identified in surface outcrops of the Marginal Zone in the Great Falls outcrop area. This occurrence is described in Peck et al. (1999). , and in drill core from the Fox River sill.

Exploration History

Most of the previous exploration in the belt was conducted by INCO Limited and focused on the potential for large massive Ni sulphide deposits at the base of the Fox River Sill (Thompson-type deposits). The earliest, major exploration was conducted by INCO Limited between the mid 1950s until the mid 1970s, and involved geophysical surveys (ground and airborne magnetic and electromagnetic) and diamond drilling. Also in the 1970s, Falconbridge explored the western end of the Fox River Belt for Ni sulphide deposits (Atkinson Lake area). In the mid- to late-1980s, B.P. Minerals explored for platinum-group elements (PGE) in the Fox River Sill and completed a detailed airborne magnetic survey that covers a large portion of the Fox River Belt. In the early 1990s, Westminer Limited (currently Western Mining International Limited) completed a small drill program that tested coincident magnetic and electromagnetic anomalies in the western part of the Fox River Belt along the contact between the Lower volcanic formation and the Lower sedimentary formation. In l999, Falconbridge Limited acquired permits covering most of the Fox River sill.

MAPPING

Most Detailed Mapping Scoates (1990)

Sketch Map Figure# Yes

Regional Mapping 1:50 000 (Scoates, 1990)

Type Section Figure# Yes

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.0273 to 1.0363

Whole-rock Analyses Numbers 2.272

Geochemical Features and PGE Abundances

See Scoates (1990), Schwann (1989) and Naldrett et al. (1994). Currently there is insufficient, published geochemical data to develop geochemical exploration models for PGE in the Fox River sill. As shown by Schwann (1989) and B.P. Minerals geologists, the lower 600 m of the Upper Central Layered Zone contains anomalously high PGE contents that are associated with local concentrations of Fe-Cu-Ni sulphides. Details of the geochemistry of this mineralization are given in Schwann (1989) and Naldrett et al. (1994). Additional PGE-rich sulphide mineralization was discovered in 1999 in outcrops in the Fox River (Great Falls area) by Falconbridge Limitied, Manitoba Geological Survey and Geological Survey of Canada staff (see Peck et al., 1999), including a 20 cm-thick net-textured sulphide band containing up to 5 g/t combined Pd+Pt (Peck et al., 1999).

Recommendations

The Fox River sill is one of the largest mafic-ultramafic intrusions on earth. The enormous size of the complex, coupled with its stratifrom, mafic-ultramafic character, limited PGE exploration, favourable geology and known PGE mineralization (e.g., Schwann, 1989; Naldrett et al., 1994; Peck et al., 1999) make it a very prospective, PGE exploration target.

Selected Bibliography

Eckstrand, O.R., Grinenko, L.N., Krouse, H.R., Paktunc, A.D., Schwann, P.L., Scoates, R.F.J., 1989: Preliminary data on sulphur isotopes and Sp/S ratios, and the source of sulphur in magmatic sulphides from the Fox River sill, Molson Dykes, and Thompson nickel deposits, northern Manitoba; Geological Survey of Canada, Current Research, Part C, Paper 89-1C, p. 235-242.

Heaman, L.M., Machado, N., Krogh, T.E., Weber, W., 1986: Precise U-Pb zircon ages for the Molson dyke swarm and the Fox River sill; constraints for early Proterozoic crustal evolution in northeastern Manitoba, Canada; Contributions to Mineralogy

and Petrology, v. 94, no. 1, p. 82-89.
Naldrett, A.J., Asif, M., Scoates, R.F.J., Eckstrand, O.R. and Schwann, P.L., 1994. Platinum-group elements at Fox River sill, Manitoba, Canada. Implications with respect to influxes of fresh magma and exploration for PGE deposits. Institution of Mining and Metallurgy, v. 103, p. B10 to B21.
Peck, D.C., Huminicki, M., Wegleitner, C., Theyer, P., Olshefsky, K., Potter, L., Hulbert, L., Scoates, R.F.J. 1999: Lithostratigraphic framwork for Platinum-group element-copper-nickel sulphide mineralization in the marginal zone of the Fox River sill (Parts of NTS 53M/16 and 53N/13); Manitoba Industry, Trade and Mines, Geological Services, Report of Activities 1999, p. 46-50.
Schwann, P.L., 1989: Petrography, geochemistry and platinum-group element distribution of part of the upper central layered zone, main layered series, Fox River Sill, northeastern Manitoba; M.Sc. thesis, Carleton University.
Scoates, R.F.J. 1981: Volcanic rocks of the Fox River Belt, northwestern Manitoba; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 81-1, 109p. 1 map @ 1:50 000.
Scoates, R.F.J. 1990: The Fox River sill, northeastern Manitoba - a major stratiform intrusion; Manitoba Energy and Mines, Geological Services, Geological Report 82-3, 192p. 1 map @ 1:50 000.
Syme, E.C., Peck, D.C., Wegleitner, C., 1999: Volcanic stratigraphy of selected sections in the Fox River Belt (Parts of NTS 53M/16 and 53N/13); Manitoba Industry, Trade and Mines, Geological Services, Report of activities 1999, p. 51-60.

Name of Intrusion Russell Lake

Ref ID. 120

UTM

Easting	344765
Northing	6227230
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions 500 x 100 m

AGE DATA

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

Principal Rock Types Hornblende peridotite

Host Rocks Kisseynew paragneiss-migmatite

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Theyer, P. 1980: Stratigraphic setting of selected U.M. bodies in Superior and Churchill provinces; Manitoba Dept. of Energy and Mines, Min. Res. Div., Economic Geology Report ER 79-2.
McRitchie, W.D. 1975: Russell Lake south; Summary of geological fieldwork 1975. Manitoba Mines Br., Geological Paper 2/75, p. 19-22.
Lenton, P.G. 1981: Geology of the McKnight-McCallum lakes area; Mineral Res. Div., Geological Report GR 79-1 and map GR 79-1-3.

Name of Intrusion Tod Lake Group (Laurie Lake West) Ref ID. 121

UTM

Easting	327888
Northing	6274586
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

Principal Rock Types Ultramafic lenses

Host Rocks Wasekwan Gp. mafic flows.

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

McRitchie, W.D. 1975: Russell Lake south; Summary of geological fieldwork 1975. Manitoba Mines Br., Geological Paper 2/75, p. 19-22.
Zwanzig, H.V. 1976: Laurie Lake area (Fox Lake project); Rept. of field activities 1976. Manitoba Min. Res. Div., p. 26-32.

Name of Intrusion Kamuchawie Lake Ref ID. 122

UTM

Easting	320338
Northing	6262548
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

Principal Rock Types Ultramafic lenses

Host Rocks migmatitic metasedimentary rock

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Theyer, P. 1980: Stratigraphic setting of selected U.M. bodies in Superior and Churchill provinces; Manitoba Dept. of Energy and Mines, Min. Res. Div., Economic Geology Report ER 79-2.
Zwanzig, H.V. Wielezynski 1975: Geology of Kamuchawie area;

Name of Intrusion Mynarski Lake

Ref ID. 123

UTM

Easting	489639
Northing	6219791
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	
Locality 2	

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

CLASSIFICATION

Intrusion Type Sill

General Classification Ultramafic

GEOLOGY

Principal Rock Types Ultramafic sill

Host Rocks Wasekwan Gp amphibolite-gneiss rock

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Theyer, P. 1980: Stratigraphic setting of selected U.M. bodies in Superior and Churchill provinces; Manitoba Dept. of Energy and Mines, Min. Res. Div., Economic Geology Report ER 79-2.
Elphick, S.C. 1972: Geology of Mynarski-Notigi lakes area; Manitoba Mines Br., Publication 71-2C.
Wright, G.M. 1953: Uhlman Lake map area, Manitoba; Geological Survey of Canada, Paper 53-12.

Name of Intrusion Suwannee Lake (Black Trout Diorite/Gabbro) Ref ID. 125

UTM

Easting	427393
Northing	6215754
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions ~4X.7 km

AGE DATA

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

GEOLOGY

Principal Rock Types Quartz diorite to gabbro

Host Rocks migmatitic metasedimentary rocks

PREVIOUS EXPLORATION

Mineral Occurrences

Sulphide zone on S shore Suwannee L.- 250X25 ft, py, po

MAPPING

GEOCHEMISTRY

Selected Bibliography

Campbell, F.H.A. 1972: Stratigraphic and structural studies in the Granville Lake-Lynn Lake region; Manitoba Mines Br., Publication 71-2A.
Barry, G.S. Gait, R.I. 1966: Geology of the Suwannee Lake area; Manitoba Mines Br., Publication 64-2.

Name of Intrusion Southern Indian Lake Diabase Ref ID. 126

UTM

Easting	469517
Northing	6302443
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	
Locality 2	

SIZE

Area (km2)	
Maximum Dimensions	1400X1250 m

AGE DATA

CLASSIFICATION

Intrusion Type Dyke

GEOLOGY

Principal Rock Types Diabase

Host Rocks pegmatitic monzonite

PREVIOUS EXPLORATION

Mineral Occurrences

Dyke trend 130 deg, 40-50% hbd.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Hinds, R.W. 1972: Geology of the Opachanau Lake-Fraser Lake-Lemay Island area; Manitoba Mines Br., Publication 71-2G, p. 39-43.

Thomas, K.A. 1972: Geology of the S. Indian Lake area, southeastern portion; Manitoba Mines Br., Publication 71-2H, p. 13.

Name of Intrusion Pine Lake

Ref ID. 127

UTM

Easting	510089
Northing	6332028
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions 700X650 m

AGE DATA

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro to diorite

Host Rocks paragneiss and orthoamphibolite rocks

PREVIOUS EXPLORATION

Mineral Occurrences

Minor diss to ms py, po, cpy

MAPPING

GEOCHEMISTRY

Selected Bibliography

Hinds, R.W. 1972: Geology of the Opachanau Lake-Fraser Lake-Lemay Island area; Manitoba Mines Br., Publication 71-2G, p. 39-43.
Thomas, K.A. 1972: Geology of the S. Indian Lake area, southeastern portion; Manitoba Mines Br., Publication 71-2H, p. 13.
Frohlinger, T.G. 1972: Geology of the Southern Indian Lake area, central portion; Manitoba Mines Br., Publication 71-2I.
Frohlinger, T.G. Cranstone, J.R. xxxx: Pine Lake map 71-2-16; Manitoba Dept. of Mines.

Name of Intrusion Long Point

Ref ID. 128

UTM

Easting	520178
Northing	6332065
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions 700X650 m

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Diorite

Host Rocks anatexite

PREVIOUS EXPLORATION

Mineral Occurrences

Minor diss to ms py, po, cpy. UM intrusion 4 km to SW

MAPPING

GEOCHEMISTRY

Selected Bibliography

Thomas, K.A. 1972: Geology of the S. Indian Lake area, southeastern portion; Manitoba Mines Br., Publication 71-2H, p. 13.
Frohlinger, T.G. 1972: Geology of the Southern Indian Lake area, central portion; Manitoba Mines Br., Publication 71-2I.
Frohlinger, T.G. Cranstone, J.R. xxxx: Pine Lake map 71-2-16; Manitoba Dept. of Mines.

Name of Intrusion Southern Indian Lake

Ref ID. 130

UTM

Easting	479596
Northing	6285684
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	
Locality 2	

SIZE

Area (km2)	
Maximum Dimensions	1300X300 m

AGE DATA

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

Principal Rock Types Peridotite

Host Rocks qtz monzonite-granite rocks

PREVIOUS EXPLORATION

Mineral Occurrences

minor sulphides

MAPPING

GEOCHEMISTRY

Selected Bibliography

Hinds, R.W. 1972: Geology of the Opachanau Lake-Fraser Lake-Lemay Island area; Manitoba Mines Br., Publication 71-2G, p. 39-43.
Thomas, K.A. 1972: Geology of the S. Indian Lake area, southeastern portion; Manitoba Mines Br., Publication 71-2H, p. 13.
Frohlinger, T.G. 1972: Geology of the Southern Indian Lake area, central portion; Manitoba Mines Br., Publication 71-2I.
Thomas, K.A. Hinds, R.W. and Frohlinger, T.G. xxxx: Lemay Island map 71-2-12; Manitoba Mines Br.

Name of Intrusion Hammond Point

Ref ID. 131

UTM

Easting	536773
Northing	6384288
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro transitional to int. intr.

Host Rocks metatexite to monzonite

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Cranstone, J.R. 1972: Geology of the South Indian Lake area, northeastern portion; Manitoba Mines Br., Publication 71-2J.
Frohlinger, T.G. Cranstone, J.R. xxxx: Pine Lake map 71-2-16; Manitoba Dept. of Mines.
Cranstone, J.R. 1969: Moss Lake (east half), Map 71-2-20;
Cranstone, J.R. 1969a: Hammond Point, Map 71-2-21;
Cranstone, J.R. 1970: Southern Indian Lake, northern and eastern areas; Summary of geological fieldwork 1970. Manitoba Mines Br., Geological Paper 4/70.

Name of Intrusion Brochet Bay

Ref ID. 134

UTM

Easting	346609
Northing	6412872
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Diorite to gabbro

Host Rocks granodiorite-tonalite

Deformation Sheared intrusion

PREVIOUS EXPLORATION

Mineral Occurrences

Minor po, py with trace Ni, Cu.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Davies, J.F. Bannatyne, B.B., Barry, G.S. and McCabe, H.R. 1962: Geology and mineral resources of Manitoba; Manitoba Mines Br., p. 126.
Quinn, H.A. 1956: Mineral occurrences between Chipewyan and Herb lakes, Manitoba; Precambrian, v. 29, p. 13.
Gadd, N.R. 1949: Preliminary map and descriptive notes, Brochet Lakes, Manitoba; Geological Survey of Canada, Paper 49-12.

Name of Intrusion Howard Lake Ref ID. 135

UTM

Easting	384201
Northing	6543447
Zone	15

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions 2500X100 ft

AGE DATA

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro

Host Rocks metavolcanics.

PREVIOUS EXPLORATION

Mineral Occurrences

Minor diss and ms po, py, cpy

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.
Davies, J.F. Bannatyne, B.B., Barry, G.S. and McCabe, H.R. 1962: Geology and mineral resources of Manitoba; Manitoba Mines Br., p. 126.
Johnston, A.W. 1935: A geological reconnaissance of Seal River, northern Manitoba; Geological Survey of Canada, Paper 35-2.

Name of Intrusion Hebner Lake

Ref ID. 136

UTM

Easting	667299
Northing	5956500
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

Intrusion Type Dyke

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro

Host Rocks metavolcanics

PREVIOUS EXPLORATION

Mineral Occurrences

Diss py, po in gabbro

MAPPING

GEOCHEMISTRY

Selected Bibliography

Milligan, G.C. 1955: Lower Seal River, Manitoba; Manitoba Mines Br., Summary report.
Schledewitz, D.C.P. 1975: Seal River project; Manitoba Min. Res. Div., Summary of fieldwork 1974.

Name of Intrusion Nichol Lake

Ref ID. 137

UTM

Easting	665878
Northing	6513325
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

Intrusion Type Dyke

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro

Host Rocks metavolcanic and granitic rocks

PREVIOUS EXPLORATION

Mineral Occurrences

Diss py, po in gabbro

MAPPING

GEOCHEMISTRY

Selected Bibliography

Milligan, G.C. 1955: Lower Seal River, Manitoba; Manitoba Mines Br., Summary report.
Schledewitz, D.C.P. 1975: Seal River project; Manitoba Min. Res. Div., Summary of fieldwork 1974.
Bostock, H.H. 1967: Geology of Hudson Bay lowlands; Geological Survey of Canada, Paper 67-60.

Name of Intrusion Karaskuwigamak Lake North Ref ID. 138

UTM

Easting	461554
Northing	6248056
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions largest 5000X400 m

AGE DATA

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

GEOLOGY

Principal Rock Types Hornblendite gabbro

Host Rocks metavolcanic and granitic rocks

Other Igneous Features Large and smaller lensoid intrusions

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gilbert, H.P. 1974: Karsakuwigamak Lake project; Summary of geological fieldwork. Manitoba Min. Res. Div., Geological Paper 2/74, p. 17-20.
Baldwin, D.A. 1979: Ruttan Lake, Karaskuwigamak Lake, Eagle Lake project; Manitoba Min. Res. Div., Report of field activities 1979.
Pearse, G. 1964: Geology of the Pemichigaman Lake area (east half); Manitoba Mines Br., Publication 61-3.

Name of Intrusion Northern Indian Lake Ref ID. 139

UTM

Easting	590305
Northing	6355275
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro

Host Rocks granite and gneiss to migmatite

PREVIOUS EXPLORATION

Mineral Occurrences

Trace cpy.

MAPPING

GEOCHEMISTRY

Selected Bibliography

McRitchie, W.D. 1978: GS-5 Northern Indian Lake; Report of field activities 1978. Manitoba Dept. of Mines, Resources and Environmental Management.
Kretz, R. 1958: Geology of North Indian Lake, Manitoba; Geological Survey of Canada, Preliminary map 2-1959.

Name of Intrusion Stag Lake

Ref ID. 140

UTM

Easting	412997
Northing	6257495
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions 5700X2000 m

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Hornblendite-metapyroxenite

Host Rocks paragneiss and schist

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Campbell, F.H.A. 1972: Geology of the Turnbull Lake (west half) area; Manitoba Mines Br., Publication 71-2D.

Name of Intrusion Southern Indian Lake Ref ID. 141

UTM

Easting	486749
Northing	6289397
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	
Locality 2	

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types	Amphibolite to hb+di gneiss
Host Rocks	qtz monzonite

PREVIOUS EXPLORATION

Mineral Occurrences

Diss po, cpy in hb+di gneiss; .045% Cu, tr Ni

MAPPING

GEOCHEMISTRY

Selected Bibliography

Hinds, R.W. 1972: Geology of the Opachanau Lake-Fraser Lake-Lemay Island area; Manitoba Mines Br., Publication 71-2G, p. 39-43.
Thomas, K.A. Hinds, R.W. and Frohlinger, T.G. xxxx: Lemay Island map 71-2-12; Manitoba Mines Br.

Name of Intrusion Barrington River Ref ID. 142

UTM

Easting	438926
Northing	6295356
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Trans-Hudson Orogen - Lynn Lake Domain
Locality 2	Lynn Lake Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Unknown

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Hb gabbro, gabbro

Host Rocks mafic metavolcanics

Deformation foliated intrusion

Synoptic Geology

See Milligan (1960), Gilbert (1993) and Pinsent (1980). Part of the Pre-Sickle suite of mafic intrusions (Lynn Lake gabbros).

PREVIOUS EXPLORATION

Mineral Occurrences

Diss py, po and tr cpy

MAPPING

Most Detailed Mapping See Milligan (1960)

Sketch Map Figure# No

Regional Mapping 1:250 000 (Bedrock Geology of Manitoba Compilation Series, NTS 64C)

Type Section Figure# No

GEOCHEMISTRY

Selected Bibliography

Gilbert, H.P., 1993: Geology of the Barrington Lake-Melvin Lake-Fraser Lake area; Manitoba Energy and Mines, Geological Services, Geological report 87-3, 97p.

Hinds, R.W. 1972: Geology of the Opachanau Lake-Fraser Lake-Lemay Island area; Manitoba Mines Br., Publication 71-2G, p. 39-43.

Kilburn, L.C. 1956: Geology of the MacBride Lake area; Manitoba Mines Br., Publication 55-2.

Milligan, G.C., 1960: Geology of the Lynn Lake district; Manitoba Mines and Natural Resources, Mines Branch, Publication 57-1, 317p.

Pinsent, R.H., 1980: Nickel-copper mineralization in the Lynn Lake gabbro; Manitoba Energy and Mines, Mineral Resources Division, Economic Geology Report 79-3, 138p.

Name of Intrusion White Lake Gabbro Ref ID. 143

UTM

Easting	324783
Northing	6066073
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions 10000X330 m

AGE DATA

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro, qtz diorite at base of sill

Host Rocks E-facing pyroclastic rocks

Other Igneous Features Sill contains igneous layering topping to west.

Deformation intruded after recumbent folding

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Bailes, A.H., Syme, E.C. 1980: White Lake-Mikanagan Lake project; Manitoba Min. Res. Div., Report of field activities 1979, p. 43-50.

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Name of Intrusion Beaucage Lake Gabbro (Black Trout diorite) Ref ID. 144

UTM

Easting	401203
Northing	6253392
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	Trans-Hudson Orogen - Lynn Lake Domain
Locality 2	Lynn Lake Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	25 metres wide

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro-diorite

Host Rocks metasedimentary

Other Igneous Features Diorite has chilled margins.

Synoptic Geology

See Milligan (1951).

PREVIOUS EXPLORATION

Assessment Files not reviewed

Mineral Occurrences

not reviewed

Exploration History

not reviewed

MAPPING

Most Detailed Mapping See Milligan (1951)

Sketch Map Figure# No

Regional Mapping 1:250 000 (Bedrock Geology of Manitoba Compilation Series, NTS 64C)

Type Section Figure# No

GEOCHEMISTRY

Selected Bibliography

Cranstone, D.A. 1968: Geology of the Watt Lake area (east half); Manitoba Mines Br., Publication 61-5, p. 21.
Fawley, A.P. 1949: Geology of the Sickle Lake area; Manitoba Mines Br., Publication 48-6.
Milligan, G.C. 1951: Geology of the Beaucage Lake area; Manitoba Mines Br., Publication 57-1.

Name of Intrusion Granville Lake Intrusion Ref ID. 145

UTM

Easting	399891
Northing	6237648
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	Trans-Hudson Orogen - Lynn Lake Domain
Locality 2	

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro to granite differentiate

Host Rocks Sickle Group metasedimentary rocks

Other Igneous Features Differentiated, basal gabbro transitional to granitic roof

Deformation NW strike, SW dip

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping Zwanzig (1984)

Regional Mapping Zwanzig (1984)

GEOCHEMISTRY

PGE Analyses Numbers 1.0398 to 1.0414

Selected Bibliography

Cranstone, D.A. 1964: Petrology of the Granville Lake gabbro; M.Sc. thesis, University of Manitoba, 150 p.

Cranstone, D.A. 1968: Geology of the Watt Lake area (east half); Manitoba Mines Br., Publication 61-5, p. 21.

Norman, G.W.H. 1934: Granville Lake District, N. Manitoba; Geological Survey of Canada, Summary Report (1933), Part C, p. 23-41.

Zwanzig, H.V., 1984: Granville Lake: provisional compilation map; Manitoba Energy and Mines, Mineral Resources, Preliminary Map 1984C-2

Name of Intrusion Tow Lake Gabbro Ref ID. 146

UTM

Easting	427928
Northing	6295253
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	Trans-Hudson Orogen - Lynn Lake Domain
Locality 2	Lynn Lake Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	Aprrox. 10 km x 2.5 km

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro

Host Rocks Wasekwan Group supracrustal rocks

Other Igneous Features Zoned

Synoptic Geology

See Hunter (1954) for detailed description. One of several sill-like mafic intrusions belonging to the Lynn Lake gabbro suite.

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Not reviewed

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping 1:50 000 scale (Gilbert et al., 1980) and Gilbert (1993);

Sketch Map Figure# Yes

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Base Metal Assay and PGE Analyses

PGE Analyses Numbers 1.1339 to 1.1388

Geochemical Features and PGE Abundances

See Table 1

Selected Bibliography

Gilbert, H.P., Syme, E.C., Zwanzig, H.V., 1980: Geology of the metavolcanic and volcaniclastic metasedimentary rocks in the Lynn Lake area; Manitoba Energy and Mines, Mineral Resources Division, Geological Paper 80-1, 118p.
Gilbert, H.P., 1993: Geology of the Barrington Lake-Melvin Lake-Fraser Lake area; Manitoba Energy and Mines, Geological Services, Geological report 87-3, 97p.
Hunter, H.E., 1954: Petrology of the Tow Lake gabbro, Barrington Lake area, northern Manitoba; Ph.D. thesis.
Hunter, H.E. 1958: A study of the Tow Lake gabbro; Manitoba Mines Br., Publication 53-5.

Name of Intrusion Flatrock Lake North Ref ID. 147

UTM

Easting	379439
Northing	6170433
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions 120 m long

AGE DATA

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

GEOLOGY

Principal Rock Types Anorthositic gabbro

Host Rocks metatexite and calc-silicate gneiss

Deformation Cut by granodiorite

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Davies, J.F. 1948: The origin of the Cree Lake intrusives and basic gneisses; M.Sc. thesis, University of Manitoba.
McRitchie, W.D. 1971: Preliminary geological investigations of the Nelson House-Pukatawagan region (Burntwood project); Manitoba Mines Br., GP 2/71.

Name of Intrusion Russick Lake

Ref ID. 148

UTM

Easting	332893
Northing	6132974
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

Principal Rock Types Pyroxenite

Host Rocks Kisseynew paragneiss

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Pollock, G.D. 1964: Geology of the Duval Lake area; Manitoba Mines Br., Publication 61-6, inc. map 61-6.
Davies, J.F. Bannatyne, B.B., Barry, G.S. and McCabe, H.R. 1962: Geology and mineral resources of Manitoba; Manitoba Mines Br., p. 126.
Pollock, G.D. 1965: Geology of the Russick Lake area; Manitoba Mines Br., Publication 63-2, inc. map 63-2.

Name of Intrusion Russick Lake Northeast Ref ID. 149

UTM

Easting	341752
Northing	6143788
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2) 9

Maximum Dimensions 18 x 5 km

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Tonalite to diorite

Host Rocks granodiorite-granite and migmatite

Deformation Cut by granitic dykes

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Pollock, G.D. 1964: Geology of the Duval Lake area; Manitoba Mines Br., Publication 61-6, inc. map 61-6.
Pollock, G.D. 1965: Geology of the Russick Lake area; Manitoba Mines Br., Publication 63-2, inc. map 63-2.

Name of Intrusion Duval Lake 2 Ref ID. 150

UTM

Easting	332319
Northing	6110716
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2) 20

Maximum Dimensions 8 x 2.5 km

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Diorite and pyroxenite intrusion

Host Rocks tonalite, migmatite and schist

Deformation Pyroxenite is pre- to syn-tectonic

PREVIOUS EXPLORATION

Mineral Occurrences

800X15 m of pyroxenite in diorite. Tr. diss cpy in pyroxenite.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Pollock, G.D. 1964: Geology of the Duval Lake area; Manitoba Mines Br., Publication 61-6, inc. map 61-6.
Davies, J.F. 1948: The origin of the Cree Lake intrusives and basic gneisses; M.Sc. thesis, University of Manitoba.

Name of Intrusion Duval Lake Metadiorite Ref ID. 151

UTM

Easting	325000
Northing	6107284
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2) 22.4

Maximum Dimensions 14 x 1.6 km

AGE DATA

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

Principal Rock Types Pyroxenite bodies, 10 pyroxenite bodies identified, ave. size 800X300 m.

Host Rocks diorite and migmatitic schist.

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Pollock, G.D. 1964: Geology of the Duval Lake area; Manitoba Mines Br., Publication 61-6, inc. map 61-6.
Davies, J.F. 1948: The origin of the Cree Lake intrusives and basic gneisses; M.Sc. thesis, University of Manitoba.

Name of Intrusion Krug Lake

Ref ID. 152

UTM

Easting	403452
Northing	6067789
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions ~15X~3.5 km

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro

Host Rocks mafic metavolcanics

PREVIOUS EXPLORATION

Mineral Occurrences

Sulphide-bearing shear zone cuts metagabbro E of Krug L.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Harrison, J.M. 1949: Geology and mineral deposits of the File-Tramping lakes area, Manitoba; Geological Survey of Canada. Memoir 250, inc. Map 906A.
Rousell, D.H. 1970: Geology of the Iskwasum Lake area (east half), Manitoba; Manitoba Mines Br., Publication 66-3.

Name of Intrusion Claw Lake Intrusion Ref ID. 154

UTM

Easting	387547
Northing	6075579
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Trans-Hudson Orogen - Flin Flon-Snow Lake Domain
Locality 2	Flin Flon Belt

SIZE

Area (km2)	5
Maximum Dimensions	4 km x 1.2 km

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic-Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro

Host Rocks Mafic metavolcanic rocks of the Elbow Lake area (Flin Flon Belt)

Layering Features Local modal layering

Synoptic Geology

See Syme (1992). Sudbivided into a layered series (gabbro, leucogabbro, anorthosite, pyroxenite) and a younger gabbro that contains locally abundant gabbroic pegamtite veins and pods. Ultramafic rocks (peridotite, pyroxenite) locally occur in the younger gabbro.

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Not reviewed

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping 1:20 000 scale (Syme and Whalen, 1992).

Sketch Map Figure# Yes

Regional Mapping 1:250,000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63K)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.0173 to 1.0184

Whole-rock Analyses Numbers 2.170 to 2.211

Geochemical Features and PGE Abundances

See Tables 1 and 2.

Selected Bibliography

McGlynn, J.C. 1959: Elbow-Heming lakes area, Manitoba; Geological Survey of Canada, Memoir 305.
Robertson, D.S. 1950: Elbow Lake, Manitoba; Geological Survey of Canada, Paper 50-1.
Stockwell, C.H. 1935: Gold deposits of Elbow-Morton area, northern Manitoba; Geological Survey of Canada, Memoir 186.
Syme, E.C., 1992: Elbow Lake project - Part A : supracrustal rocks; Manitoba Energy and Mines, Geological Services,

Report of activities 1992, p. 32-46.
Syme, E.C., Whalen, J.B. 1992: Geology Elbow Lake, Manitoba (part of NTS 63K/15); Manitoba Energy and Mines, Geological Survey of Canada, Preliminary Map 1992F-1.

Name of Intrusion Loonhead Lake (South Head) Ref ID. 155

UTM

Easting	404541
Northing	6088730
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2) 11.5

Maximum Dimensions 7.2 km X 1.6 km

AGE DATA

CLASSIFICATION

Intrusion Type Sill

General Classification Ultramafic

GEOLOGY

Principal Rock Types Pyroxenite

Host Rocks metavolcanics and gneiss

PREVIOUS EXPLORATION

Mineral Occurrences

Minor py

MAPPING

GEOCHEMISTRY

Selected Bibliography

Robertson, D.S. 1950: Elbow Lake, Manitoba; Geological Survey of Canada, Paper 50-1.
Bailes, A.H. 1980: Geology of the File Lake area; Manitoba Mines Br., Geological Report 79-1.

Name of Intrusion Josland Lake Sills Ref ID. 156

UTM

Easting	407092
Northing	6088120
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Trans-Hudson Orogen - Flin Flon-Snow Lake Domain
Locality 2	Flin Flon Belt

SIZE

Area (km2)	
Maximum Dimensions	Aprroximately 18 km x 0.7 km; discontinuous

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro,leucogabbro, ferrogabbro, ferrotonalite, granophyric felsic differentiates

Host Rocks tonalite to schist

Layering Features Local modal layering

Igneous Textures Roof melt zones

Other Igneous Features Differentiated mafic sill

Synoptic Geology

See Bailes (1980) for detailed descriptions. Conformable sill-like intrusions of gabbroic composition, emplaced into Amisk Group supracrustal sequences. Includes two ages of emplacement (Bailes, 1980). Locally these intrusions are differentiated from gabbro (base) to felsic granophyre (top) and display cm-scale rhythmic layering.

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Local, disseminated to massive po, py and minor cpy

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping 1:25,000 scale (Bailes, 1980)

Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Series, NTS 63J and 63K)

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.0427 to 1.0455

Whole-rock Analyses Numbers 2.283 to 2.297 and 2.298 to 2.326

Geochemical Features and PGE Abundances

See Tables 1 and 2 and Bailes (1980). Anomalously high and anomalously low PGE contents are present in samples collected by Bailes (1980) and re-analysed for this report.

Recommendations

The anomalously high and anomalously low background PGE contents obtained for samples collected by Bailes (1980) indicate a potential PGE concentrating mechanism has been operative during the emplacement and crystallization of the main Josland Lake intrusion.

Selected Bibliography

Bailes, A.H. 1980: Geology of the File Lake area; Manitoba Mines Br., Geological Report 79-1.
Shanks, R.J. Bailes, A.H. 1977: Missi Group rocks, Wekusko Lake area; Report of field activities 1977. Manitoba Min. Res. Div., p. 83-87.
Stockwell, C.H. 1935: Gold deposits of Elbow-Morton area, northern Manitoba; Geological Survey of Canada, Memoir 186.

Name of Intrusion Loonhead Lake Gabbro (east) Ref ID. 157

UTM

Easting	406082
Northing	6090924
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2) 1

Maximum Dimensions 2 km x 0.5 k m

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro

Host Rocks gneisses

Other Igneous Features Differentiated mafic rock

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Stockwell, C.H. 1935: Gold deposits of Elbow-Morton area, northern Manitoba; Geological Survey of Canada, Memoir 186.
Bailes, A.H. 1980: Geology of the File Lake area; Manitoba Mines Br., Geological Report 79-1.
Shanks, R.J. Bailes, A.H. 1977: "Missi Group" rocks, Wekusko Lake area; Report of field activities 1977. Manitoba Min. Res. Div., p. 83-87.

Name of Intrusion Woosey Lake (Island) Ref ID. 158

UTM

Easting	418051
Northing	6073993
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2) 1.35

Maximum Dimensions 4500 X 300 m

AGE DATA

Age Proterozoic

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro to qtz diorite

Host Rocks gneisses

Other Igneous Features weakly layered

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Bailes, A.H. 1980: Geology of the File Lake area; Manitoba Mines Br., Geological Report 79-1.
Shanks, R.J. Bailes, A.H. 1977: "Missi Group" rocks, Wekusko Lake area; Report of Field Activities 1977. Manitoba Min. Res. Div., p. 83-87.

Name of Intrusion Crowduck Bay Ref ID. 159

UTM

Easting	459401
Northing	6085486
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions 4500X500 m

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Tonalite

Host Rocks paragneiss

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Bailes, A.H. 1975: Geology of the Guay-Wimapedi lakes area; Manitoba Mines Br., Publication 75-2.

Name of Intrusion Mayo Lake East

Ref ID. 160

UTM

Easting	445659
Northing	6097688
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions 0.5 X 0.1 km

AGE DATA

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

Principal Rock Types Pyroxenite

Host Rocks Herblet Lake complex gneiss

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

McRitchie, W.D. 1975: Russell Lake south; Summary of geological fieldwork 1975. Manitoba Mines Br., Geological Paper 2/75, p. 19-22.
Pollock, G.D. 1965: Geology of the Russick Lake area; Manitoba Mines Br., Publication 63-2, inc. map 63-2.
Bailes, A.H. 1975: Geology of the Guay-Wimapedi lakes area; Manitoba Mines Br., Publication 75-2.

Name of Intrusion Wuskatasko River Body Ref ID. 161

UTM

Easting	459536
Northing	6100323
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2) 0.12

Maximum Dimensions 1.2 x 0.1 km

AGE DATA

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

Principal Rock Types Orthopyroxenite

Host Rocks Missi Gp. Paragneiss

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

McRitchie, W.D. 1975: Russell Lake south; Summary of geological fieldwork 1975. Manitoba Mines Br., Geological Paper 2/75, p. 19-22.
Hunt, G.H. 1970: Geology of the Iskwasum Lake area; Manitoba Mines Br., Publication 65-3.
Bailes, A.H. 1975: Geology of the Guay-Wimapedi lakes area; Manitoba Mines Br., Publication 75-2.

Name of Intrusion Partridge Breast Lake Ref ID. 162

UTM

Easting	575187
Northing	6358682
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions 4000X500 m

AGE DATA

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

Principal Rock Types UM in qtz diorite to gabbro

Host Rocks gneiss and QF porphyry

PREVIOUS EXPLORATION

Mineral Occurrences

UM is component of mafic body. Diss cpy.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.
Schledewitz, D.C.P. 1977: The Seal River area; Manitoba Mineral Res. Div., Open File report 77-3.
McRitchie, W.D. Peters J. 1978: Preliminary compilation of the Northern Indian Lake area (64H); Manitoba Min. Res. Div., preliminary map 1978M-1.
Lenton, P.G. Corkery, M.T. 1981: The lower Churchill River project; Manitoba Min. Res. Div., Open File Report OF 81-3, inc. map OF 81-3-1

Name of Intrusion Strong Lake

Ref ID. 163

UTM

Easting	583050
Northing	6212232
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Ultramafic

GEOLOGY

Principal Rock Types Peridotite

Host Rocks granitoid gneiss and schist

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.
Corkery, M.T. 1978: Preliminary compilation of the Split Lake area (64A); Manitoba Min. Res. Div., prelim. map 1978 M-2.
Milligan, R. 1955: Split Lake, Manitoba; Geological Survey of Canada, Map 10 (1956).

Name of Intrusion Rock Lake

Ref ID. 164

UTM

Easting	580834
Northing	6219612
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro

Host Rocks granitic gneiss

PREVIOUS EXPLORATION

Mineral Occurrences

Ms py, po in metasediments ~1 km S of Rock L.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.
Corkery, M.T. 1978: Preliminary compilation of the Split Lake area (64A); Manitoba Min. Res. Div., prelim. map 1978 M-2.
Milligan, R. 1955: Split Lake, Manitoba; Geological Survey of Canada, Map 10 (1956).
McRitchie, W.D. 1977: Hardy-Rock lakes region; Manitoba Min. Res. Div., Report of field activities 1977, Report GS-9.

Name of Intrusion Thorsteinson Lake Ref ID. 165

UTM

Easting	584399
Northing	6349582
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions 3X1 km

AGE DATA

CLASSIFICATION

General Classification Unknown

GEOLOGY

Principal Rock Types Granite (gabbro?)

Host Rocks granite-granodiorite

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Cranstone, J.R. 1972: Geology of the South Indian Lake area, northeastern portion; Manitoba Mines Br., Publication 71-2J.
Lenton, P.G. Corkery, M.T. 1981: The lower Churchill River project; Manitoba Min. Res. Div., Open File Report OF 81-3, inc. map OF 81-3-1.
McRitchie, W.D. 1977a: Reindeer Lake - Southern Indian Lake regional correlation; Manitoba Min. Res. Div., Report of field activities 1977, Report GS-2.

Name of Intrusion North Knife Lake Ref ID. 166

UTM

Easting	613551
Northing	6420831
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions ~5X1 km

AGE DATA

CLASSIFICATION

General Classification Unknown

GEOLOGY

Principal Rock Types Granite (gabbro?)

Host Rocks granite-granodiorite

PREVIOUS EXPLORATION

Exploration History

Originally iden. as gabbro within Chipewayan Batholith

MAPPING

GEOCHEMISTRY

Selected Bibliography

Lenton, P.G. Corkery, M.T. 1981: The lower Churchill River project; Manitoba Min. Res. Div., Open File Report OF 81-3, inc. map OF 81-3-1

Kretz, R. 1967: Granite and pegmatite studies at Northern Indian lake, Manitoba; Geological Survey of Canada, Bulletin 148.

Name of Intrusion Gouer Lake Gabbro Ref ID. 167

UTM

Easting	502030
Northing	6307898
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions 5000X500 m

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro to diorite

Host Rocks granite to tonalite

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Lenton, P.G. Corkery, M.T. 1981: The lower Churchill River project; Manitoba Min. Res. Div., Open File Report OF 81-3, inc. map OF 81-3-1

Haugh, I. 1969 Geology of the Split Lake area; Manitoba Mines Br., Publication 65-2.

Name of Intrusion Cockeram Lake

Ref ID. 168

UTM

Easting	391282
Northing	6303748
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Trans-Hudson Orogen - Lynn Lake Domain
Locality 2	Lynn Lake Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

Age Proterozoic

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro

Host Rocks volcanic-intrusive rocks

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.
Gilbert, H.P. 1977: Lynn Lake area; Report of field activities 1977. Manitoba Mnes Br., p. 37-46.
Keay, J.P. Zwanzig, H.V. 1977: Geology of the Eager Lake area; Report of field activities 1977. Manitoba Min. Res. Div., p. 26-30.

Name of Intrusion Snake Lake

Ref ID. 169

UTM

Easting	340451
Northing	6277527
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro

Host Rocks Volcanic and sedimentary rocks

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.
Cranstone, D.A. 1968: Geology of the Watt Lake area (east half); Manitoba Mines Br., Publication 61-5, p. 21.
Gilbert, H.P. 1977: Lynn Lake area; Report of field activities 1977. Manitoba Mnes Br., p. 37-46.

Name of Intrusion Black Trout Lake diorite Ref ID. 170

UTM

Easting	387242
Northing	6266733
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	Trans-Hudson Orogen - Lynn Lake Domain
Locality 2	Lynn Lake Greenstone Belt

SIZE

Area (km2)	50
Maximum Dimensions	10 km x 5 km

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

GEOLOGY

Principal Rock Types Diorite, gabbro

Host Rocks Tonalite, granodiorite

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Bailes, A.H. 1980: Geology of the File Lake area; Manitoba Mines Br., Geological Report 79-1.
Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evaluation of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.
McRitchie, W.D. 1974: The Sickle-Wasekwan debate; a review. Manitoba Mines Br., Geological Paper 1/74.

Name of Intrusion Wimapedi Lake

Ref ID. 171

UTM

Easting	484074
Northing	6113152
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro

Host Rocks paragneisses

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.
Baldwin, D.A. Frohlinger, T.G. and Kendrick, G. 1979: Geology of the Nelson House-Pukatawagan region (Burntwood project); Manitoba Min. Res. Div., Geology maps 87-3-1 to 78-3-22
Quinn, H.A. 1954: Nelson House, Manitoba; Geological Survey of Canada, perliminary map 54-12.
Frohlinger, T.G. 1971: Hall Lake - Wapisu Lake area; Summary of geological fieldwork 1971. Manitoba Mines Br., Geological Paper 6/71, p. 35-43.

Name of Intrusion Moody Lake

Ref ID. 172

UTM

Easting	393608
Northing	6105119
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro

Host Rocks paragneiss

PREVIOUS EXPLORATION

Mineral Occurrences

Two bodies ~1 km apart. Semims to ms po, py at contact? with paragneiss

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.
Bailes, A.H. 1975: Geology of the Guay-Wimapedi lakes area; Manitoba Mines Br., Publication 75-2.
Baldwin, D.A. Frohlinger, T.G. and Kendrick, G. 1979: Geology of the Nelson House-Pukatawagan region (Burntwood project); Manitoba Min. Res. Div., Geology maps 87-3-1 to 78-3-22
Harrison, J.M. 1949a: Kississing area, Manitoba; Geological Survey of Canada, Map 970A.
McRitchie, W.D. Frohlinger, T.G., Baldwin, D.A. and Zwanzig, H.V. 1973: Burntwood project; Summary of geological fieldwork 1973. Manitoba Mines Br., GP 2/73, p. 9-10.

Name of Intrusion Kississing River

Ref ID. 173

UTM

Easting	384190
Northing	6151746
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2) 202

Maximum Dimensions 45 x 7 km

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro

Host Rocks paragneiss and migmatite

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Bailes, A.H. 1975: Geology of the Guay-Wimapedi lakes area; Manitoba Mines Br., Publication 75-2.

Baldwin, D.A. Frohlinger, T.G. and Kendrick, G. 1979: Geology of the Nelson House-Pukatawagan region (Burntwood project); Manitoba Min. Res. Div., Geology maps 87-3-1 to 78-3-22

Harrison, J.M. 1949a: Kississing area, Manitoba; Geological Survey of Canada, Map 970A.

McRitchie, W.D. Frohlinger, T.G., Baldwin, D.A. and Zwanzig, H.V. 1973: Burntwood project; Summary of geological fieldwork 1973. Manitoba Mines Br., GP 2/73, p. 9-10.

Name of Intrusion Morin Lake

Ref ID. 174

UTM

Easting	366691
Northing	6165235
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2) 28

Maximum Dimensions 14 x 2 km

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro

Host Rocks paragneiss

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Bailes, A.H. 1975: Geology of the Guay-Wimapedi lakes area; Manitoba Mines Br., Publication 75-2.

Baldwin, D.A. Frohlinger, T.G. and Kendrick, G. 1979: Geology of the Nelson House-Pukatawagan region (Burntwood project); Manitoba Min. Res. Div., Geology maps 87-3-1 to 78-3-22

Harrison, J.M. 1949a: Kississing area, Manitoba; Geological Survey of Canada, Map 970A.

McRitchie, W.D. Frohlinger, T.G., Baldwin, D.A. and Zwanzig, H.V. 1973: Burntwood project; Summary of geological fieldwork 1973. Manitoba Mines Br., GP 2/73, p. 9-10.

Name of Intrusion Siers Lake

Ref ID. 175

UTM

Easting	326592
Northing	6161071
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions 13X3 km

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro

Host Rocks paragneiss-migmatite

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.
Bailes, A.H. 1975: Geology of the Guay-Wimapedi lakes area; Manitoba Mines Br., Publication 75-2.
Baldwin, D.A. Frohlinger, T.G. and Kendrick, G. 1979: Geology of the Nelson House-Pukatawagan region (Burntwood project); Manitoba Min. Res. Div., Geology maps 87-3-1 to 78-3-22
Harrison, J.M. 1949a: Kississing area, Manitoba; Geological Survey of Canada, Map 970A.
McRitchie, W.D. Frohlinger, T.G., Baldwin, D.A. and Zwanzig, H.V. 1973: Burntwood project; Summary of geological fieldwork 1973. Manitoba Mines Br., GP 2/73, p. 9-10.

Name of Intrusion Wright and Girouard Lakes Ref ID. 176

UTM

Easting	352673
Northing	6154547
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2) 28

Maximum Dimensions 14 x 2 km

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro

Host Rocks paragneiss-migmatite

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Bailes, A.H. 1975: Geology of the Guay-Wimapedi lakes area; Manitoba Mines Br., Publication 75-2.

Baldwin, D.A. Frohlinger, T.G. and Kendrick, G. 1979: Geology of the Nelson House-Pukatawagan region (Burntwood project); Manitoba Min. Res. Div., Geology maps 87-3-1 to 78-3-22

Harrison, J.M. 1949a: Kississing area, Manitoba; Geological Survey of Canada, Map 970A.

McRitchie, W.D. Frohlinger, T.G., Baldwin, D.A. and Zwanzig, H.V. 1973: Burntwood project; Summary of geological fieldwork 1973. Manitoba Mines Br., GP 2/73, p. 9-10.

Name of Intrusion Flatrock Lake

Ref ID. 177

UTM

Easting	371938
Northing	6165078
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2) 19

Maximum Dimensions 9.5 X 2 km

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro

Host Rocks paragneiss-migmatite

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Bailes, A.H. 1975: Geology of the Guay-Wimapedi lakes area; Manitoba Mines Br., Publication 75-2.

Baldwin, D.A. Frohlinger, T.G. and Kendrick, G. 1979: Geology of the Nelson House-Pukatawagan region (Burntwood project); Manitoba Min. Res. Div., Geology maps 87-3-1 to 78-3-22

Harrison, J.M. 1949a: Kississing area, Manitoba; Geological Survey of Canada, Map 970A.

McRitchie, W.D. Frohlinger, T.G., Baldwin, D.A. and Zwanzig, H.V. 1973: Burntwood project; Summary of geological fieldwork 1973. Manitoba Mines Br., GP 2/73, p. 9-10.

Name of Intrusion Pukatawagon Lake Ref ID. 178

UTM

Easting	365983
Northing	6176394
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2) 24

Maximum Dimensions 24 x 1 km

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro

Host Rocks paragneiss/schist

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Bailes, A.H. 1975: Geology of the Guay-Wimapedi lakes area; Manitoba Mines Br., Publication 75-2.

Baldwin, D.A. Frohlinger, T.G. and Kendrick, G. 1979: Geology of the Nelson House-Pukatawagan region (Burntwood project); Manitoba Min. Res. Div., Geology maps 87-3-1 to 78-3-22

Harrison, J.M. 1949a: Kississing area, Manitoba; Geological Survey of Canada, Map 970A.

McRitchie, W.D. Frohlinger, T.G., Baldwin, D.A. and Zwanzig, H.V. 1973: Burntwood project; Summary of geological fieldwork 1973. Manitoba Mines Br., GP 2/73, p. 9-10.

Name of Intrusion Barnett Lake

Ref ID. 179

UTM

Easting	334228
Northing	6168203
Zone	14

Location and Access

Locality 1	Trans-Hudson Orogen - Kisseynew Domain
Locality 2	

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

Age Proterozoic

CLASSIFICATION

General Classification Mafic

Other Classification Unknown

GEOLOGY

Principal Rock Types Gabbro

Host Rocks paragneiss

Synoptic Geology

See Baldwin et al. (1979(

PREVIOUS EXPLORATION

Assessment Files not reviewed

Mineral Occurrences

not reviewed

Exploration History

not reviewed

MAPPING

GEOCHEMISTRY

Selected Bibliography

Baldwin, D.A. Frohlinger, T.G. and Kendrick, G. 1979: Geology of the Nelson House-Pukatawagan region (Burntwood project); Manitoba Min. Res. Div., Geology maps 87-3-1 to 78-3-22

Harrison, J.M. 1949a: Kississing area, Manitoba; Geological Survey of Canada, Map 970A.

McRitchie, W.D. Frohlinger, T.G., Baldwin, D.A. and Zwanzig, H.V. 1973: Burntwood project; Summary of geological fieldwork 1973. Manitoba Mines Br., GP 2/73, p. 9-10.

Name of Intrusion Luci Lake

Ref ID. 180

UTM

Easting	347489
Northing	6063764
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions 5.5X1.5 km

AGE DATA

CLASSIFICATION

General Classification Mafic

GEOLOGY

Principal Rock Types Gabbro

Host Rocks mafic metavolcanic

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.area, Manitoba; Geological Survey of Canada, Map 970A.

Kalliokoski, J. 1949: Weldon Bay area Manitoba; Geological Survey of Canada, Paper 49-5.

Price, D. 1977: Flin Flon, Snow Lake geology, CIM field trip; Hudson Bay Mining and Smelting Co. Ltd., Flin Flon, Manitoba, 55 p.

Stockwell, C.H. 1960: Flin Flon-Mandy Lake area, Manitoba and Saskatchewan; Geological Survey of Canada, Map 1078A.

Name of Intrusion Highway Lake

Ref ID. 181

UTM

Easting	431739
Northing	6057998
Zone	14

Location and Access

Locality 1

Locality 2

SIZE

Area (km2)

Maximum Dimensions ~5.5X3 km

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Diorite to gabbro

Host Rocks dolostone?

Other Igneous Features Diabasic texture, roof pendants, contact breccia.

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Harrison, J.M. 1949: Geology and mineral deposits of the File-Tramping lakes area, Manitoba; Geological Survey of Canada. Memoir 250, inc. Map 906A.

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Name of Intrusion Grass River Intrusions (Saw Lake area) Ref ID. 182

UTM

Easting	470500
Northing	6081000
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Trans-Hudson Orogen - Flin Flon-Snow Lake Domain
Locality 2	Snow Lake Belt

SIZE

Area (km2)	
Maximum Dimensions	Up to 10 km long x 400 m wide

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic-Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Pyroxenite, peridotite and melagabbro in ultramafic sill; gabbro in mafic sill

Host Rocks Missi Group metavolcanic and metasedimentary rocks

Igneous Textures Orbicular gabbro in mafic intrusion

Deformation Folded

Synoptic Geology

See Bailes (1985). This occurrence includes both a mafic and an ultramafic sill-like intrusion occurring in the Saw Lake area of the Snow Lake part of the Flin Flon - Snow Lake Belt that are exposed along the Grass River (units 10 and 11 in Bailes, 1985). The intrusions occur along the contact between the metavolcanic rocks and meta-quartzite of the Missi Group (Bailes, 1985). These intrusions may be stratigraphically equivalent to the Josland Lake Sills (Bailes, 1985). The ultramafic sill is principally composed of orthopyroxenite.

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Not reviewed

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping 1:50 000 scale (Bailes, 1985)

Sketch Map Figure# No

Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63J)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Base Metal Assay and PGE Analyses

PGE Analyses Numbers 1.0415 to 1.0419

Geochemical Features and PGE Abundances

See Table 1

Selected Bibliography

Bailes, A.H., 1985: Geology of the Saw Lake area; Manitoba Energy and Mines, Geological Report 83-2, 47p. 1 map @ 1:50 000.

Harrison, J.M. 1949: Geology and mineral deposits of the File-Tramping lakes area, Manitoba; Geological Survey of Canada. Memoir 250, inc. Map 906A.
Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.

Name of Intrusion Wekusko Lake

Ref ID. 183

UTM

Easting	436784
Northing	6072764
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Trans-Hudson Orogen - Flin Flon-Snow Lake Domain
Locality 2	Snow Lake Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Peridotite

Host Rocks granitic to metasedimentary rocks

PREVIOUS EXPLORATION

Mineral Occurrences

Minor ms po, py stringers assoc. with U M

MAPPING

GEOCHEMISTRY

Selected Bibliography

Gale, G.H. Baldwin, D.A. and Koo, J. 1980: A geological evolution of Precambrian massive sulfide deposits potential in Manitoba; Manitoba Mines Br., Economic Geology Report ER 79-1, map ER 79-1-23.
Frarey, M.J. 1948: Crowduck Bay, Manitoba; Geological Survey of Canada, Paper 48-22.
Davidson, W.L. 1977: Wekusko Lake, Manitoba; Geological Survey of Canada, Map 1423A.
Shanks, R.J. Bailes, A.H. 1977: "Missi Group" rocks Wekusko Lake area; Report of field activities 1977, Manitoba Min. Res. Div., p. 83-87.

Name of Intrusion Cranberry Portage Ref ID. 184

UTM

Easting	363653
Northing	6065104
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Trans-Hudson Orogen - Flin Flon-Snow Lake Domain
Locality 2	

SIZE

Area (km2)	
Maximum Dimensions	6400X400 m

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Gabbro

Host Rocks metavolcanic and dioritic rocks

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Selected Bibliography

Podolsky, T. 1951: Preliminary map Cranberry Portage (east half), Manitoba; Geological Survey of Canada, Paper 51-17.
Podolsky, T. 1957: Cranberry Portage (west half); Geological Survey of Canada, map 26 (1957).

Name of Intrusion Bird River Sill (Euclid Lake) Ref ID. 186

UTM

Easting	753519
Northing	5610789
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Bird River Sill

SIZE

Area (km2)	0.072
Maximum Dimensions	1.75 km x 50 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Tholeiitic - Low Ti

General Classification Mafic-Ultramafic

Other Classification Rifted Archean basement

GEOLOGY

Principal Rock Types Peridotite, gabbro

PREVIOUS EXPLORATION

Assessment Files not yet reviewed

MAPPING

GEOCHEMISTRY

Name of Intrusion McLeod Narrows Gabbro Ref ID. 187

UTM

Easting	317050
Northing	6041400
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Max Lake Belt

SIZE

Area (km2)	75
Maximum Dimensions	1.5 km x 15 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Unknown

General Classification Mafic

Other Classification Ocean floor

GEOLOGY

Principal Rock Types Gabbro, subordinate melagabbro, amphibolite, pyroxenite

Host Rocks Basalt and tonalite-granodiorite

Layering Features Local modal layering

Igneous Textures Massive

Other Igneous Features Local basalt xenoliths. A magnetite-rich diorite layer at the north side of the sill is believed to have formed by assimilation of iron formation at the roof of the intrusion.

Metamorphic Grade Amphibolite facies

Deformation Predates two regional folding events.

Synoptic Geology

A massive gabbro sill with only minor amounts of ultramafic (pyroxenite) and feldspar-rich rock types. Appears to postdate an early folding event. Up to 1.5 km wide (true thickness not known) and open along strike beyond type area (Gilbert, 1999). Contains major enclaves of older mafic volcanic breccia and oxide facies iron formation.

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping Gilbert (1999)

Sketch Map Figure# Yes

Regional Mapping Hubregtse (1985)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Recommendations

Investigate the degree of chemical interaction between the enclave of oxide facies iron formation and the sill rocks.

Selected Bibliography

Gilbert, H.P., 1999. Southeast Max Lake Area. Manitoba Industry, Trade and Mines, Geological Survey, Report of Activities, p. 84-93 (detailed geology of the central part of the Max Lake Belt with petrological description of the sill); Hubregtse, J.J.M.W., 1985. Geology of the Oxford Lake-Carrot River area. Geological Report GR83-1a, 73p (regional geology at 1:50,000 scale).

Name of Intrusion Lavigne Lake Gabbro Ref ID. 188

UTM

Easting	315600
Northing	6042050
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Max Lake Belt

SIZE

Area (km2)	0.6
Maximum Dimensions	0.3 km x 2 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Tholeiitic - Low Ti

General Classification Mafic

Other Classification Ocean floor

GEOLOGY

Principal Rock Types Gabbro, subordinate melagabbro, amphibolite, pyroxenite

Host Rocks Basalt and tonalite-granodiorite

Layering Features Local modal layering

Other Igneous Features Cm-scale grain size layering in pyroxenite and local gabbro pegmatite intrusions occur at the northern margin of the sill

Metamorphic Grade Amphibolite facies

Deformation Predates two regional folding events.

Synoptic Geology

A gabbro sill with minor amounts of ultramafic (pyroxenite) and feldspar-rich rock types. Appears to postdate an early folding event. Up to 300 m wide (true thickness not known) and 2 km long (Gilbert, 1999). Emplaced into basalt sequence.

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping Gilbert (1999)

Sketch Map Figure# Yes

Regional Mapping Hubregtse (1985)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.0479 to 1.0481

Whole-rock Analyses Numbers 2.352 to 2.354

Geochemical Features and PGE Abundances

Low-Ti tholeiitic composition.

Recommendations

Investigate possible effects of assimilation of proximal oxide facies iron formations.

Selected Bibliography

Gilbert, H.P., 1999. Southeast Max Lake Area. Manitoba Industry, Trade and Mines, Geological Survey, Report of Activities, p. 84-93 (detailed geology of the central part of the Max Lake Belt with petrological description of the sill); Hubregtse, J.J.M.W., 1985. Geology of the Oxford Lake-Carrot River area. Geological Report GR83-1a, 73p (regional geology at 1:50,000 scale).

Name of Intrusion Munro Lake South

Ref ID. 189

UTM

Easting	359000
Northing	6055000
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Munro Lake Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	10.5m long in the drill core

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Peridotite

Host Rocks basalt (mafic subvolcanic ?) of Munro Lake greenstone belt (unnamed supracrustal rocks).

Layering Features Unknown

Metamorphic Grade Amphibolite facies

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM

Assessment Files 93683, 92171, 92172

Mineral Occurrences

Po, Py

Exploration History

also see Vivian Lake (Rifle Lake) record.
In 1977-1979, Manitoba Mineral Res. Ltd. (AF 93683, 92171, 92172) carried out a base metal exploration program in the area between Munro Lake, Colen Lake and Reekie Lake. The company completed an airborne EM survey in the area, a ground horizontal loop EM survey on 8 grid areas and 19 diamond drill holes. Drill core samples were assayed for Au and Ni.

Hole 164-12 is located about ¼ mile south of Munro Lake and 2 miles northeast of Rifle Lake, and it intersected fine-grained basalt from 23.0 to 124.4 feet interval and medium-grained peridotite from 124.4 to 159.0 feet interval. The basalt contains trace py and po generally with a 9.3 feet long suphides mineralized zone (5-10% po + py in bands and stringers) from 105.0-114.3 feet interval. The peridotite is slightly serpentinized, and contains trace, disseminated po and py.

MAPPING

Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987; 1:50,000 Munro Lake, 53L/11, Map GR83-1-11.

GEOCHEMISTRY

Name of Intrusion Island Lake (Linklater Island Ni Cu prospect) Ref ID. 192

UTM

Easting	383990
Northing	5977457
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Island Lake Domain
Locality 2	Island Lake Greenstone Belt

SIZE

Area (km2)	0.6
Maximum Dimensions	3 km x200m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Flow

Geochemical Classification Komatiitic

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Dunite, peridotite, pyroxenite

Host Rocks Mafic intrusive and extrusive rocks (Hayes River group)/ Conglomerates and sandstones (Island Lake group)

Layering Features Unknown

Igneous Textures Olivine ad and orthocumulates; peridotite; spinifex textures in places

Metamorphic Grade Greenschist facies

Synoptic Geology

A suite of komatiitic ultramafic rocks occur in a stratigraphic position between the Hayes River Group and the Island Lake "Series" of rocks. Spinifex textures have been observed in outcrops adjacent to Linklater Island. The Canadian Nickel Company

A detailed review of the exploration history is given in Mineral Inventory Card 53E/15 Ni1. This property was first staked in 1952 and optioned by the Canadian Nickel Company Limited who conducted an AEM survey over the area in 1957 as Airborne Permit 19 (A.F. 91624). Results of this survey led to the staking of a group of claims that were assigned to the International Nickel Company of Canada, Limited in 1958. Approximately 12 800 m of diamond drilling were completed from 1956 to 1960. In 1972, International Nickel Company of Canada Limited conducted an AEM survey under Airborne Permit 102 (A.F. 91694). In 1976 the status of an Explored Area Lease (E.A.L. 13) was granted for a group of claims and subsequently was converted into a Mineral Lease (M.L.-8) in 1995 (Fig. 7).

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM

Assessment Files 91624; 91694

Mineral Occurrences

"Low grade" Ni Cu mineralization. Tonnage and grade is confidential information.

Exploration History

A "low grade" Ni Cu mineralization (Quinn, 1960) located in sheared peridotite east of Linklater Island was drilled (12800 m) by the Canadian Nickel Company in the years 1956 until 1960. The company was granted an Explored Area Lease (E.A.L. 13) for this area that was converted into a Mineral Lease (M.L.-8) in 1995. Grades and tonnages of this mineralization are confidential company-held information.

MAPPING

Most Detailed Mapping Theyer, (1977)

Regional Mapping Neale, K.L. and Weber, W. (1981), Preliminary Map 1981 I-1, 1:20 000

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry (no REE)

PGE Analyses Numbers 1.0424 to 1.0426

Whole-rock Analyses Numbers 2.279 to 2.281

Geochemical Features and PGE Abundances

Komatiites

Recommendations

Analyses for PGE of selected rock samples

Selected Bibliography

Neale, K.L. and Weber, W. 1981: Island Lake - Cochrane Bay, Manitoba Department of Energy and Mines, Preliminary Map 1981 I-1, 1:20 000

Quinn, H.A. 1960: Island Lake, Manitoba - Ontario; Geological Survey of Canada, Map 26-1960 with descriptive notes.

Theyer, P. 1985: Ultramafic rocks of the Island Lake area; Manitoba Energy and Mines, Geological Services, Geological Paper 84-1, 29p.

Name of Intrusion Webber Lake (Sharpe Lake West) Ref ID. 193

UTM

Easting	442400
Northing	6028500
Zone	15

Location and Access

Accessibility	Winter road
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Sharpe Lake Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	Approx. 560 X 5600m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type	Unknown
Geochemical Classification	Unknown
General Classification	Ultramafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	serpentinized dunite and clinopyroxene-peridotite
Host Rocks	andesitic tuff, andesite of Hayes River Group.
Layering Features	Unknown
Metamorphic Grade	Greenschist facies
Deformation	shearing zone

PREVIOUS EXPLORATION

Geophysical Surveys	Airborne magnetic/EM and ground magnetic/EM
Assessment Files	91806

Mineral Occurrences

Pyrite rarely occurs in the talc-carbonate veinlet.
Drill core samples of the ultramafic rocks from DDH 3 contain 2-16 ppm Cu, 12-300 ppm Zn and 0.13-0.26% Ni.

Exploration History

In 1936, the region was mapped the GSC (Downie, 1938).

In 1971 to 1972, Freeport Canadian Exploration Co. (AF 91806) carried out an exploration program in the area between Webber Lake and Sharpe Lake.
- Conducted airborne magnetic and EM surveys in the area and discovered a very strong magnetic anomaly with good conductors located west of the Sharpe Lake area.
- Completed ground magnetic and EM surveys on C, C2-6 grids located west of the Sharpe Lake. These surveys confirmed the airborne magnetic/EM anomalies. The ground magnetic and EM conductive anomalies are likely caused by the ultramafic body and serpentinization of the rock, respectively.
- Four drill holes (DDH 3, 4, 5 and 6) intersected serpentinized ultramafic rocks on grid C2 west of Sharpe Lake. Pyrite rarely occurs in the talc-carbonate veinlet. Drill core samples of the ultramafic rocks from DDH 3 contain 2-16 ppm Cu, 12-300 ppm Zn and 0.13-0.26% Ni.
- Completed a detailed petrography study (F.J. Wicks, 1972). The primary ultramafic rocks were dunites and clinopyroxene-peridotites which were composed of the primary minerals:olivine, clinopyroxene and chromite. The rocks have been subjected to primary and secondary stage serpentinization.

MAPPING

GEOCHEMISTRY

Selected Bibliography

Southard, G.G., 1977: Exploration history, compilation and review, including exploration data from cancelled assessment files, for the Gods, Knee and Oxford Lake areas, Manitoba; Manitoba Department of Mines, Resources and Environmental Management, Mineral Resources Division, Open File Report 77/5, p. 36 and Map Sheet 53K/5NE.

Name of Intrusion Knee Lake West Ref ID. 194

UTM

Easting	366400
Northing	6082500
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Oxford Lake - Knee Lake Greenstone Belt

SIZE

Area (km2)	7
Maximum Dimensions	1 X 7 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type	Sill
Geochemical Classification	Unknown
General Classification	Mafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	gabbro
Host Rocks	Mafic or felsic metavolcanics of Hayes River Group and metamorphosed tuff and lapilli-tuff rocks of Oxford Lake Group
Layering Features	Unknown
Metamorphic Grade	Amphibolite facies
Deformation	strongly deformated.

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping	1:50,000 Oxford House, 53L/14, Map GR83-1-6.
Regional Mapping	1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987.

GEOCHEMISTRY

PGE Analyses Numbers	1.0470 to 1.0475
Whole-rock Analyses Numbers	2.342 to 2.347

Selected Bibliography

Gilbert, H.P., 1985: Geology of the Knee Lake-Gods Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 83-1B, p. 9.

Name of Intrusion Knee Lake East Ref ID. 195

UTM

Easting	388600
Northing	6091800
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Oxford Lake - Knee Lake Greenstone Belt

SIZE

Area (km2)	6.5
Maximum Dimensions	1.1 X 6.4km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown

Geochemical Classification Unknown

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Hornblende gabbro

Host Rocks Massive basalt, minor andesite and tuff of Hayes River Group

Layering Features Unknown

Metamorphic Grade Amphibolite facies

Synoptic Geology

Barry (1959) described "An elongated intrusion body of hornblende gabbro ---, trends north ---. Textural and compositional variations occur throughout the intrusion. Essentially it is a medium- to coarse-grained, mottled, medium grey rock, composed of 30 to 60 percent plagioclase and 40 to 70 percent hornblende. Outcrops of amphibolite consisting of 70 percent or more hornblende are common.
Thin section sample from a large gabbro body located west of Opischikona Narrows (Gibert, 1985), shows that the amphibole is commonly twinned and poikiloblastic and contains sporadically clinopyroxene relicts and/or brown biotite.

PREVIOUS EXPLORATION

Mineral Occurrences

sulphides

MAPPING

Most Detailed Mapping 1:50,000 Knee Lake, 53L/15, Map GR83-1-7.

Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987.

GEOCHEMISTRY

PGE Analyses Numbers 1.0470 to 1.0475

Whole-rock Analyses Numbers 2.342 to 2.347

Selected Bibliography

Barry, G.S., 1959: Geology of the Oxford House-Knee Lake area; Manitoba Mines and Natural Resources, Mines Branch, Publication 58-3, p. 26.
Gilbert, H.P., 1985: Geology of the Knee Lake-Gods Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 83-1B, p. 9.

Name of Intrusion Cinder Lake Gabbro Ref ID. 196

UTM

Easting	381800
Northing	6097700
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Oxford Lake - Knee Lake Greenstone Belt

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types gabbro

Host Rocks It is in contact with basalt, andesite and basic tuff of Hayes River Group in northwest, and felsic to intermediate volcanic rocks of Hayes River Group to the south side.

Layering Features Modally graded/weakly differentiated

Igneous Textures Plagioclase megacrysts

Synoptic Geology

Small gabbroic bodies hosted by Hayes River Group metabasalt, including plagioclase megacrystic and glomerocrystic mafic flows. The gabbroic bodies are exposed in outcrops along the south shore of Cinder Lake. The gabbroic rocks display similar compositions to the enclosing basalts and the two rock suites are believed to be coeval and cogenetic. The gabbros also locally contain megacrysts of plagioclase. Diffuse modal grading is developed in some of the plagioclase-phyric gabbro bodies.

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Not reviewed

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping 1:50 000 scale (Gilbert, 1985)

Sketch Map Figure# No

Regional Mapping 1:250,000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 53L)

Type Section Figure# No

GEOCHEMISTRY

Selected Bibliography

Gilbert, H.P., 1985: Geology of the Knee Lake-Gods Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 83-1B, 76p.

Syme, E.C., Corkery, M.T., Lin, S., Skulski, T., Jiang, D., 1998: Geological investigations in the Knee Lake area, northern Superior Province (parts of NTS 53L/15 and 53M/2); Manitoba Energy and Mines, Geological Services, Report of activities 1998, p. 88-95.

Name of Intrusion Elk Island (Gods Lake) Ref ID. 197

UTM

Easting	426800
Northing	6069400
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Gods Lake Greenstone Belt

SIZE

Area (km2)	6
Maximum Dimensions	approx. 500m x 13km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Unknown

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Hornblendite to dioritic rocks

Host Rocks Pillowed basalt and andesite of Hayes River Group.

Layering Features Unknown

Metamorphic Grade Amphibolite facies

Deformation shear zone

Synoptic Geology

The gabbro sill immediately north of Margaret Lake (on Elk Island)
Dix (1951) described:
On Elk Island several intrusive bodies have been traced for considerable distance. They conform in strike to the surrounding volcanics, and may be sills. The sill running through No. 1 and No. 2 shafts varies from a hornblendite with less than 20 percent plagioclase through a diabasic rock with 30-40 percent feldspar in lath-like crystals to a dioritic rock with as much as 60 percent feldspar. At places a shear zone, several feet in width, may be seen along the diorite-greenstone contact and may be confused with intruded tuff beds. A zoning, visible only on weathered surfaces, was noted at several points along this diorite sill -- light- and dark-colored bands several inches in width, somewhat crumpled, run parallel to the general strike. It has been suggested by M.B. Baker (Canadian Institute of Mining and Metallurgy Transactions 1935) that this zoning is due to magmatic differentiation. Epidote in stringers and blebs is also characteristic of the diorite.

The Large sill 3 km north of Elk Island
Dix (1951) described:
A large body of diorite cutting through the narrow part of the northeastern arm of Elk Island has a porphyritic zone paralleling the southern contact, becoming less porphyritic toward the north, and finally appearing to grade into pillowed basalt. The porphyritic nature is due to a development of feldspar phenocrysts as much as one and one half inches in length. The phenocrysts, where most abundant, comprise approximately 80 percent of the rock. The south contact is associated with magnetiferous slaty tuff and chert beds.

Gilbert (1985) described:
The gabbro is gradational northwards into pillow basalt; the southern margin of the sill is in contact with iron formation... Disseminated or strata-bound plagioclase phenocrysts (0.0-3cm) occur in the intrusion; these locally constitute up to 80 percent of anorthositic gabbro layers up to 75 cm thick.

PREVIOUS EXPLORATION

Mineral Occurrences

The northern tuff is host to the sulphide-gold ore formerly mined by Gods Lake Gold Mines Limited (Baker 1935).

MAPPING

Most Detailed Mapping 1:31,680 Gods Lake Area, Map 47-4, 1948.

Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987.

GEOCHEMISTRY

Selected Bibliography

Dix, W.F., 1951: Geology of the Gods Lake area, Gods Lake division, Manitoba; Manitoba Mines and Natural Resources, Mines Branch, Preliminary Report, Publication 47-4, p. 5.
Gilbert, H.P., 1985: Geology of the Knee Lake-Gods Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 83-1B, p. 9.

Name of Intrusion Chataway Lake

Ref ID. 198

UTM

Easting	420000
Northing	6047900
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Gods Lake Greenstone Belt

SIZE

Area (km2)	5
Maximum Dimensions	1 km x 5 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro

Host Rocks Basalt, minor andesite, related sills, minor basic tuff of Hayes River Group.

Layering Features Unknown

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping 1:50,000 Gods Lake, 53L/9, Map GR83-1-13.

Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987.

GEOCHEMISTRY

Selected Bibliography

Gilbert, H.P., 1985: Geology of the Knee Lake-Gods Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 83-1B.

Name of Intrusion Knife Lake

Ref ID. 199

UTM

Easting	421900
Northing	6046500
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Gods Lake Greenstone Belt

SIZE

Area (km2)	4
Maximum Dimensions	approx. 550m x 1.3 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro

Host Rocks Metamorphosed porphyritic rhyolite and dacite, minor related intrusions, pyroclastic rocks and minor mafic flows of Hayes River Group.

Synoptic Geology

Dix (1951) decribed:
Intrusive diorite outcrops in a long narrow zone on the west side of Knife Lake. The rock here is finer in grain size and contains a uniform percentage of feldspar, as much as 60 percent.
Intrusive diorite, conforming closely to the strike and dip of the basic flows, is difficult to distinguish from amphibolite. The amphibolites seem to represent the coarse-grained centres of the basalt and andesitic volcanics.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM

Assessment Files 92076, 93660

Mineral Occurrences

A well-developed zone of pyritized acid lava parallels the diorite for a distance of 1,500 feet along the west side of Knife Lake (Dix, 1951).
Po and py occur in mafic-felsic metavolcanics near north end of gabbro body (Gilbert, 1985).

Exploration History

In 1976-1978, Manitoba Mineral Resources Ltd. (AF 92076) drilled 33 hole in the area with little encouragement and hole 134-32 intersected 50 feet of gabbro.
In 1986-1987, Noranda Exploration Co. Ltd. (AF 93660) mapped and prospected in the area.

MAPPING

Most Detailed Mapping 1:50,000 Gods Lake, 53L/9, Map GR83-1-13.

Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987.

GEOCHEMISTRY

Selected Bibliography

Dix, W.F., 1951: Geology of the Gods Lake area, Gods Lake division, Manitoba; Manitoba Mines and Natural Resources, Mines Branch, Preliminary Report, Publication 47-4, p. 5.
Gilbert, H.P., 1985: Geology of the Knee Lake-Gods Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 83-1B, p. 9.

Name of Intrusion Jackson Bay (Oxford Lake Southeast) Ref ID. 200

UTM

Easting	347700
Northing	6076500
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Oxford Lake - Knee Lake Greenstone Belt

SIZE

Area (km2)	0.2
Maximum Dimensions	approx. 400 X 500m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown

Geochemical Classification Unknown

General Classification Mafic

GEOLOGY

Principal Rock Types Metagabbro

Host Rocks Amphibole-biotite gneiss, feldspathic metagreywacke of Oxford Lake Group

Metamorphic Grade Amphibolite facies

Synoptic Geology

The gabbro intrusion is associated with the late orogenic event that occurred at Oxford Lake (post-Oxford Lake Group gabbro).
The intrusive relationships with Oxford Lake Group metasediments have been observed about 1.5 km west of the Laidlaw Creek outlet (Hubregtse, 1985). Metagreywacke xenoliths were found in the margin of the locally chilled metagabbro. Contact metamorphism of the Oxford Lake Group sediments was noticed in the area where a 5cm wide zone with random growth of amphibole in the metagreywacke borders the gabbro interface.
The petrography of the gabbro in the Oxford Lake-Carrot River region has been described by Hubregtse (1985), it appears that all primary minerals have been completely replaced under the microscope. Brown pleochroic hornblende, (probably pseudomorphous after clinopyroxene), is rimmed by colourless to light green amphibole, which also makes up most of the groundmass, with chlorite and minor quartz. Plagioclase phenocrysts are almost completely replaced by clinozoisite. Ilmenite-magnetite skeletons are surrounded by masses of leucoxene.

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping 1:50,000 Oxford House, 53L/14, Map GR83-1-6.

Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987.

GEOCHEMISTRY

Selected Bibliography

Barry, G.S., 1959: Geology of Oxford House-Knee Lake Area; Manitoba Mines and Natural Resources, Mines Branch, Publication 58-3, p. 26.
Hubregtse, J.J.M.W., 1985: Geology of the Oxford Lake-Carrot River area; Manitoba Energy and Mines, Geological Report 83-1A, p.56.

Name of Intrusion Carghill Island South Ref ID. 201

UTM

Easting	330800
Northing	6078600
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Oxford Lake - Knee Lake Greenstone Belt

SIZE

Area (km2)	0.2
Maximum Dimensions	250 X 1000m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Dyke

Geochemical Classification Unknown

General Classification Mafic

Other Classification Unknown

GEOLOGY

Principal Rock Types Metagabbro

Host Rocks Metasediments and metavolcanics of Oxford Lake Group

Layering Features Unknown

Metamorphic Grade Amphibolite facies

Deformation strongly sheared

Synoptic Geology

The gabbro intrusion is probably associated with the late orogenic event that occurred at Oxford Lake (Gilbert and McShane, 1987). This intrusive relationships with Oxford Lake Group metasediments have been observed on southeast Carghill Island (Hubregtse, 1985).

The metagabbro is generally medium- to coarse-grained and medium to dark greenish grey on both the weathered and fresh surfaces (Barry, 1960). It is composed of approximately equal amounts of hornblende and plagioclase showing-ophitic texture; some phases with well-developed lath-shaped plagioclase have an ophitic texture. The gabbro is cut by very fine-grained probably consanguineous diorite dykes and calcite veinlets.

The petrography of the gabbro in the Oxford Lake-Carrot River region has been described by Hubregtse (1985), it appears that all primary minerals have been completely replaced under the microscope. Brown pleochroic hornblende, (probably pseudomorphous after clinopyroxene), is rimmed by colourless to light green amphibole, which also makes up most of the groundmass, with chlorite and minor quartz. Plagioclase phenocrysts are almost completely replaced by clinozoisite. Ilmenite-magnetite skeletons are surrounded by masses of leucoxene.

PREVIOUS EXPLORATION

Mineral Occurrences

Minor disseminated pyrrhotite and chalcopyrite were observed (Barry, 1960)

MAPPING

Most Detailed Mapping 1:50,000 Carghill Island, 53L/13, Map GR83-1-5.

Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987.

GEOCHEMISTRY

Selected Bibliography

Barry, G.S., 1960: Geology of the western Oxford Lake-Carghill Island area; Manitoba Mines and Natural Resources, Mines Branch, Publication 59-2, p. 17.

Hubregtse, J.J.M.W., 1985: Geology of the Oxford Lake-Carrot River area; Manitoba Energy and Mines, Geological Report 83-1A, p. 56.

Name of Intrusion Carghill Channel (Oxford Lake West) Ref ID. 202

UTM

Easting	324000
Northing	6081200
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Oxford Lake - Knee Lake Greenstone Belt

SIZE

Area (km2)	20
Maximum Dimensions	approx. 1 X 20km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Unknown

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Equigranular gabbro

Host Rocks Metamorphosed basalts, andesites and tuffs of Hayes River Group.

Layering Features Unknown

Metamorphic Grade Amphibolite facies

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping 1:50,000 Carghill Island, 53L/13, Map GR83-1-5.

Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987.

GEOCHEMISTRY

Selected Bibliography

Hubregtse, J.J.M.W., 1985: Geology of the Oxford Lake-Carrot River area; Manitoba Energy and Mines, Geological Report 83-1A, p.14-15.

Name of Intrusion Island Lake "Linkex" Area Ref ID. 203

UTM

Easting	380563
Northing	5978296
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Island Lake Domain
Locality 2	Island Lake Greenstone Belt

SIZE

Area (km2)	0.2
Maximum Dimensions	100m x 200m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown

Geochemical Classification Komatiitic

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types dunite, peridotite

Host Rocks Hayes River group/ Island Lake series

Layering Features Massive/modally uniform

Igneous Textures unknown

Metamorphic Grade Greenschist facies

Deformation sheared

Synoptic Geology

Massive komatiitic dunite and peridotite in badly-exposed contact with detrital sediments of the Island Lake series, gabbro and mafic to intermediate volcanic rocks.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM

Assessment Files 91502, 92061

Mineral Occurrences

Disseminated and blebs of pyrite and chalcopyrite in drill core.

Exploration History

The Canadian Nickel Company Limited conducted an airborne EM survey over the Island Lake area in 1957 under Airborne Permit 19 (A.F. 91624). International Nickel Company of Canada Limited conducted an airborne EM survey over the area in 1972 under Airborne Permit 102 (A.F. 91694). Canadian Occidental Petroleum Limited Minerals Division, staked an area west of Linklater Island and conducted geological mapping (1:4800 scale) and a rock geochemical survey in 1974, (A.F. 91502). International Nickel Company of Canada Limited had identified the area as partially underlain by a sulphide-bearing ultramafic complex. The geological and geochemical surveys were followed by an EM and MAG survey in 1975 and by a three-hole (502 m) drilling program in 1976 (A.F. 92061).

MAPPING

Most Detailed Mapping Canadian Occidental Petroleum: AF 91502

Regional Mapping Neale, K.L. and Weber, W.
(1981), Preliminary Map 1981 I-1, 1:20 000

GEOCHEMISTRY

Geochemistry Base Metal Assay

Whole-rock Analyses Numbers 2.282

Geochemical Features and PGE Abundances

Komatiites

Recommendations

Analyses for PGE of selected rock samples

Selected Bibliography

Neale, K.L. and Weber, W. 1981: Island Lake - Cochrane Bay, Manitoba Department of Energy and Mines, Preliminary Map 1981 I-1, 1:20 000

Quinn, H.A. 1960: Island Lake, Manitoba - Ontario; Geological Survey of Canada, Map 26-1960 with descriptive notes.

Theyer, P. 1985:Ultramafic rocks of the Island Lake area; Manitoba Energy and Mines, Geological Services, Geological Paper 84-1, 29p.

Theyer, P. (in prep.) Mineral deposits and occurrences in the Island Lake area; Manitoba Industry,Trade and Mines, Geological Services, Mineral Deposit series, Report 32.

Name of Intrusion Gods Lake East Ref ID. 204

UTM

Easting	452700
Northing	6065500
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Gods Lake Greenstone Belt

SIZE

Area (km2)	2.5
Maximum Dimensions	1.5 X 4 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Equigranular gabbro

Host Rocks Metamorphosed basalts, andesites and tuffs of Hayes River Group, and metamorphosed granodiorite, granite and tonalite of Bayly Lake Complex.

Layering Features Unknown

Metamorphic Grade Amphibolite facies

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping 1:50,000 Pesanapisko Lake, 53k/12, Map GR83-1-14; 1:50,000 Yellowback Island, 53k/13, Map GR83-1-9.

Regional Mapping 1:50,000 Pesanapisko Lake, 53k/12, Map GR83-1-14; 1:50,000 Yellowback Island, 53k/13, Map GR83-1-9.

GEOCHEMISTRY

PGE Analyses Numbers 1.0392 to 1.0397

Whole-rock Analyses Numbers 2.273 to 2.275

Selected Bibliography

Gilbert, H.P., 1985: Geology of the Knee Lake-Gods Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 83-1B, p. 20.

Name of Intrusion Gods Lake Northeast (Yellowback Island North) Ref ID. 205

UTM

Easting	444700
Northing	6086400
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Cross Lake Greenstone Belt

SIZE

Area (km2)	1.7
Maximum Dimensions	900 X 2700 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type	Sill
Geochemical Classification	Unknown
General Classification	Mafic
Other Classification	Unknown

GEOLOGY

Principal Rock Types Equigranular gabbro, porphyritic gabbro.

Host Rocks Amphibolite and amphibolite schist of Hayes River Group, and gneissoid tonalite of Bayly Lake Complex.

Synoptic Geology

Plagioclase megacrysts and aggregates up to 15 cm in diameter occur in one sill close to the northwest end of Yellowback Island (2.6 km south from the north shore of Gods Lake).

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping 1:50,000 Yellowback Island, 53k/13, Map GR83-1-9.

Regional Mapping 1:50,000 Yellowback Island, 53k/13, Map GR83-1-9.

GEOCHEMISTRY

PGE Analyses Numbers	1.0392 to 1.0397
Whole-rock Analyses Numbers	2.273 to 2.275

Selected Bibliography

Gilbert, H.P., 1985: Geology of the Knee Lake-Gods Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 83-1B, p. 20.

Name of Intrusion Johnson Bay (Gods Lake North) Ref ID. 206

UTM

Easting	423600
Northing	6089500
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Gods Lake Greenstone Belt

SIZE

Area (km2)	0.5
Maximum Dimensions	400 X 2000m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Unknown

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Equigranular gabbro

Host Rocks mafic to felsic metasedments and mafic to intermediate metavolcanics of Hayes River Group.

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping 1:50,000 McIvor Lake, 53L/16, Map GR83-1-9.

Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987.

GEOCHEMISTRY

Selected Bibliography

Gilbert, H.P., 1985: Geology of the Knee Lake-Gods Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 83-1B, p. 20.

Name of Intrusion Island Lake (Henderson Island) Ref ID. 207

UTM

Easting	400629
Northing	5958974
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Island Lake Domain
Locality 2	Island Lake Greenstone Belt

SIZE

Area (km2)	0.4
Maximum Dimensions	2 km X 200m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic-Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Megacrystic dunite; gabbro

Host Rocks Mafic volcanic rocks

Layering Features Local modal layering

Igneous Textures Ovoid to subhedral olivine pseudomorphs up to 3 cm in diameter, vaguely size-sorted; might be metamorphic olivines

Metamorphic Grade Greenschist facies

Synoptic Geology

An elongate body of olivine megacrystic dunite occurs as a sill between basalt and gabbro. In petrograhic sections an approximately 15 % of anomalous chlorite may possibly be after plagioclase with the result that this rock may have been originally melagabbro.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM

Assessment Files A.F.91624; 91684; 91694; 92336

Mineral Occurrences

Ministik gold mine, also located on Henderson Island, but fracture-bound in younger tonalite.

Exploration History

Sherritt Gordon Mines Limited conducted an airborne EM and MAG survey over the area in 1970 under Airborne Permit 91 (A.F. 91684). International Nickel Company of Canada Limited conducted an AEM survey over the area in 1972 under Airborne Permit 102 (A.F. 91694). Barringer Research Limited conducted a combined MAG and EM survey over part of the occurrence on behalf of Canadian Occidental Petroleum Limited in 1974 (A.F. 92244). The property was restaked, trenched and sampled in 1978 (A.F. 92336), geologically investigated in 1979 (Theyer, 1979) and geologically mapped in 1983 (Gilbert and Weber, 1983). In 1984, the Midway Lake Minerals one

MAPPING

Most Detailed Mapping Gilbert, H.P and Weber, W. 1983.

Regional Mapping Gilbert, H.P and Weber, W. 1983

GEOCHEMISTRY

Geochemistry none

PGE Analyses Numbers 1.0420 to 1.0421

Whole-rock Analyses Numbers 2.279 to 2.281

Recommendations

No indications of sulphides and/or chromite within the mafic and ultramafic rock sequence. Poor prospect for PGE exploration.

Selected Bibliography

Gilbert, H.P and Weber, W. 1983: Island Lake project (parts of 53E/15, and 16); in Manitoba Department of Energy and Mines, Mineral Resources Division, Report of Field Activities 1983.

Name of Intrusion Island Lake (Trinity shoals) Ref ID. 208

UTM

Easting	383800
Northing	5973500
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Island Lake Domain
Locality 2	Island Lake Greenstone Belt

SIZE

Area (km2)	0.3
Maximum Dimensions	1500 m x 20 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Peridotite

Host Rocks Gabbro

Layering Features Unknown

Metamorphic Grade Greenschist facies

Synoptic Geology

Serpentinized peridotite outcropping on islands and reefs adjacent to gabbro but separated from it by a few tens of metres water.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM

Assessment Files 91624; 91694

Mineral Occurrences

none known

Exploration History

Canadian Nickel Company Limited conducted an AEM survey over the Island Lake area in 1957 under Airborne Permit 19 (A.F. 91624). International Nickel Company of Canada Limited conducted an AEM survey over the area in 1972 under Airborne Permit 102 (A.F. 91694)

MAPPING

Most Detailed Mapping Gilbert, H.P and Weber, W. 1983.

Sketch Map Figure# No

Regional Mapping Gilbert, H.P and Weber, W. 1983.

Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Whole-rock Analyses Numbers 2.282

Recommendations

No indications of sulphides and/or chromite within the mafic and ultramafic rock sequence. Poor prospect for PGE exploration.

Selected Bibliography

Gilbert, H.P and Weber, W. 1983: Island Lake project (parts of 53E/15, and 16); in Manitoba Department of Energy and Mines, Mineral Resources Division, Report of Field Activities 1983.

Name of Intrusion Island Lake (Pipestone Quarry) Ref ID. 209

UTM

Easting	392579
Northing	5967934
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Island Lake Domain
Locality 2	Island Lake Greenstone Belt

SIZE

Area (km2)	0.01
Maximum Dimensions	10 m x 100 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill
Geochemical Classification Unknown
General Classification Mafic-Ultramafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types serpentinized peridotite; talc schist; gabbro
Host Rocks gabbro
Layering Features Other
Metamorphic Grade Greenschist facies
Deformation shearfolding

Synoptic Geology

up to 10 m thick layer of serpentinized peridotite with a sheared contact to adjacent gabbro.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM
Assessment Files 91624

Mineral Occurrences

none known

Exploration History

none on record

MAPPING

Most Detailed Mapping Weber et al. (1982) Preliminary map 1982 I-4.
Sketch Map Figure# No
Regional Mapping Weber et al. (1982) Preliminary map 1982 I-4.
Type Section Figure# No

GEOCHEMISTRY

Geochemistry none
Whole-rock Analyses Numbers 2.279 to 2.281

Recommendations

not a target for the exploration of PGE

Selected Bibliography

Weber, W., Gilbert, H.P., Neale, K.L. and McGregor, C.R. 1982: Island Lake Project; in Manitoba Mineral Resources Division, Report of Field Activities, 1982, p. 34-43.

Name of Intrusion Island Lake (Jubilee Island) Ref ID. 210

UTM

Easting	391228
Northing	5964198
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Island Lake Domain
Locality 2	Island Lake Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

Age Archean

CLASSIFICATION

GEOLOGY

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM

Assessment Files 91624

MAPPING

GEOCHEMISTRY

Name of Intrusion Island Lake (Loonfoot Island) Ref ID. 211

UTM

Easting	426644
Northing	5965183
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Island Lake Domain
Locality 2	Island Lake Greenstone Belt

SIZE

Area (km2)	4
Maximum Dimensions	4km x 1 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Unknown

General Classification Mafic-Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types peridotite

Host Rocks Polymictic conglomerate of the Island Lake "Series". Most of the occurrence covered by water.

Layering Features Unknown

Metamorphic Grade Greenschist facies

Synoptic Geology

DDH Rita 1 intersected dark coloured, graphitic, mafic volcanic rocks and 96 m of ultramafic rocks. DDH Rita 2 intersected mafic volcanic rocks and 46 m of ultramafic rocks (A.F. 92288). DDH 6 intersected graphitic tuff and quartzite (A.F. 91402).

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM

Assessment Files 91624; 91144; 91402

Mineral Occurrences

In places concentrations of up to 3% disseminated pyrite and pyrrhotite within peridotite.

Exploration History

Canadian Nickel Company Limited conducted an AEM survey over the Island Lake area in 1957 under Airborne Permit 19 (A.F. 91624). Canadian Aero Mineral Surveys Limited carried out an airborne EM and MAG survey over the area on behalf of Kerr Addison Mines Limited in 1965 (A.F. 91144). Kerr Addison Mines Limited drilled a hole (20.5 m) to test an EM and MAG anomaly (A.F. 91402) The Rita group of claims was first staked in 1970 and assigned to Cominco Limited. Sherritt Gordon Mines Limited conducted an airborne EM and MAG survey over the area in 1970 under Airborne Permit 91 (A.F. 91684). International Nickel Company of Canada Limited conducted an AEM survey over the area in 1972 under Airborne Permit 102 (A.F. 91694). Cominco Limited conducted a VLF-EM and MAG survey in the area in 1972 (A.F. 92324); and drilled two holes (338 m) in 1974 (A.F. 92288).

MAPPING

GEOCHEMISTRY

Whole-rock Analyses Numbers 2.282

Recommendations

Analyze existing rock samples for PGE.

Selected Bibliography

Gilbert, H.P. 1985: Loonfoot Island; Manitoba Energy and Mines, Preliminary Map 1985 I-3, 1:20 000 scale.
Theyer, P. 1980: Ultramafic rocks, nickel occurrences and interpreted stratigraphic relationships; Manitoba Energy and Mines,

Mineral Resources Division, Map ER79-2-1 to ER79-2-13, Scale 1:50 000.
Theyer, P. 1985: Ultramafic rocks of the Island Lake area; Manitoba Energy and Mines, Geological Services, Geological Paper 84-1, 29p.

Name of Intrusion Island Lake (Sandy Bar Narrows) Ref ID. 212

UTM

Easting	429530
Northing	59557537
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Island Lake Domain
Locality 2	Island Lake Greenstone Belt

SIZE

Area (km2)	2.1
Maximum Dimensions	7 km x 0.3 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Unknown

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types peridotite; pyroxenite; melagabbro

Host Rocks mafic to felsic extrusive and intrusive derivatives/ epiclastic sedimentary rocks/ argillite and chert

Layering Features Modally graded/weakly differentiated

Igneous Textures Tectonically disturbed suite of gabbro, melagabbro, pyroxenite peridotite, dunite.

Other Igneous Features 2 to 3 cm thick chromite layer located between gabbro and pyroxenite. Indistinct acicular lamellae in one outcrop tentatively interpreted as spinifex textures.

Metamorphic Grade Greenschist facies

Deformation shear folding

Synoptic Geology

Several rock lenses varying from olivine cumulate to peridotite, pyroxenite and melagabbro are included in this cluster. The occurrence of chromite as disseminations and as a layer between melagabbro and pyroxenite indicates modal stratification.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM

Assessment Files 91624; (91652 report, 91144 map)

Mineral Occurrences

Chromite, disseminated pyrite, pyrrhotite

Exploration History

Canadian Nickel Company Limited conducted an AEM survey over the Island Lake area in 1957 under Airborne Permit 19 (A.F. 91624). Godard (1963b) reported on the prospecting activities in this area. Canadian Aero Mineral Surveys Limited carried out an airborne EM and MAG survey over the area on behalf of Kerr Addison Mines Limited in 1965 (A.F. 91652 report; A.F. 91144 map). Kerr Addison Mines Limited conducted an airborne EM and MAG survey over the area in 1965 (A.F. 91144). International Nickel Company of Canada Limited conducted an AEM survey over the area in 1972 under Airborne Permit 102 (A.F. 91694).

MAPPING

Most Detailed Mapping Theyer, 1985

Regional Mapping Theyer, 1985

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry (no REE)

Whole-rock Analyses Numbers 2.279 to 2.281

Recommendations

Disseminated chromite and chromite layers plus disseminated pyrite and pyrrhotite indicate that this area merits further investigation for PGE

Selected Bibliography

Theyer, P. 1985: Ultramafic rocks of the Island Lake area; Manitoba Energy and Mines, Geological Services, Geological Paper 84-1, 29p.

Name of Intrusion Island Lake (Sagawitchewan Bay - Spinifex Island) Ref ID. 213

UTM

Easting	444380
Northing	5954000
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Island Lake Domain
Locality 2	Island Lake Greenstone Belt

SIZE

Area (km2)	0.9
Maximum Dimensions	180 m x 50 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Flow

Geochemical Classification Komatiitic

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Ultramafic to mafic sill and flows including melagabbro, peridotite, olivine cumulate, spinifex textured flow top breccia

Host Rocks Island wholly underlain by rock types enumerated above

Layering Features Other

Igneous Textures spinifex textured flow top breccia and rubble

Other Igneous Features Two discrete flows including massive cumulate, spinifex textured and flow top breccia were distinguished.

Metamorphic Grade Greenschist facies

Deformation none apparent

Synoptic Geology

Island underlain by melagabbro, subhedral megacrystic olivine cumulate capped by spinifex textured flow rocks and spectacular outcrops of flow top breccia. A noticeable increase in the length of spinifex lamellae to the south is interpreted to mean that stratigraphic tops are to the north. The occurrence of pyroxene and olivine spinifex suggests that two separate ultramafic flows are present.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM

Assessment Files 91624

Mineral Occurrences

none known

Exploration History

none

MAPPING

Most Detailed Mapping Theyer (1985)

Regional Mapping Godard (1963)

GEOCHEMISTRY

Geochemistry none

Whole-rock Analyses Numbers 2.282

Recommendations

No indication of sulphides or chromite. Poor exploration target for PGE.

Selected Bibliography

Godard, J.D. 1963: Geology of the Sagawitchewan Bay area; Manitoba Mines Branch, Publication 60-2.
Theyer, P. 1985: Ultramafic rocks of the Island Lake area; Manitoba Energy and Mines, Geological Services, Geological Paper 84-1, 29p.

Name of Intrusion Island Lake (Whiteway Island area) Ref ID. 214

UTM

Easting	421250
Northing	5959500
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Island Lake Domain
Locality 2	Island Lake Greenstone Belt

SIZE

Area (km2)	28
Maximum Dimensions	2 km x 14 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types gabbro; melagabbro; leucogabbro; granophyric gabbro

Host Rocks basalt (Hayes River group)

Layering Features Local modal layering

Metamorphic Grade Greenschist facies

Synoptic Geology

Massive, large multiphase gabbro body containing enclaves of basalt, greywacke, conglomerate and chert interpreted as roof pendants (Gilbert, 1985).

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM

Assessment Files 91624

Mineral Occurrences

Sporadic occurrences of disseminated pyrite.

Exploration History

none

MAPPING

Most Detailed Mapping Gilbert (1985)

Regional Mapping Gilbert (1985)

GEOCHEMISTRY

PGE Analyses Numbers 1.1407

Whole-rock Analyses Numbers 2.279 to 2.281

Recommendations

Detailed prospecting for sulphides and /or chromite. Geological investigations to detemine the main lithologies and magmatic history of the gabbroic intrusion.

Selected Bibliography

Gilbert, H.P. 1985a: Geological investigations in the Island Lake-Stevenson Lake area; in Manitoba Energy and Mines, Geological Services, Mines Branch, Mineral Resources Division, Report of Field Activities, 1985, p. 187-199.
Gilbert, H.P. 1985b: Loonfoot Island; Manitoba Energy and Mines, Preliminary Map 1985 I-3, 1:20 000 scale.

Name of Intrusion Island Lake, (Jubilee Island) Ref ID. 215

UTM

Easting	397333
Northing	5961408
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Island Lake Domain
Locality 2	Island Lake Greenstone Belt

SIZE

Area (km2)	14
Maximum Dimensions	14 km x 1 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro; hornblendite; minor quartz diorite; very minor peridotite.

Host Rocks Mafic volcanic rocks

Layering Features Local modal layering

Igneous Textures In places acicular to plumose hornblende (after pyroxene) akin to harrisitic textures.

Metamorphic Grade Greenschist facies

Synoptic Geology

Extensive gabbroic sill with ultramafic and intermediate enclaves. Scarce sulphides observed.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM

Assessment Files 91624

Mineral Occurrences

none known

Exploration History

none

MAPPING

Most Detailed Mapping Gilbert and Weber (1983)

Regional Mapping Gilbert and Weber (1983)

GEOCHEMISTRY

Geochemistry none

Whole-rock Analyses Numbers 2.279 to 2.281

Recommendations

This gabbroic sill has seen only superficial investigations of its mineral potential. The scarcity of sulphides and or chromite appear to suggest that it is an explooration target of low priority.

Selected Bibliography

Gilbert, H.P and Weber, W. 1983: Island Lake project (parts of 53E/15, and 16); in Manitoba Department of Energy and Mines, Mineral Resources Division, Report of Field Activities 1983.

Name of Intrusion Island Lake (Norrie Island) Ref ID. 216

UTM

Easting	424427
Northing	5963947
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Island Lake Domain
Locality 2	Island Lake Greenstone Belt

SIZE

Area (km2)	0.3
Maximum Dimensions	1.2 km x 0.25 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Olivine cumulate (dunite); peridotite

Host Rocks Basalt

Layering Features Other

Other Igneous Features Abundant ilmenite

Metamorphic Grade Greenschist facies

Deformation Shear zones

Synoptic Geology

Norrie Island ultramafic is a homogeneous, serpentinized olivine cumulate and peridotite characterized by zones with abundant ilmenite and hematite and surrounded by intensely carbonatized host rocks.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM

Assessment Files 91624

Mineral Occurrences

none

Exploration History

none specific to this body

MAPPING

Most Detailed Mapping Gilbert (1984)

Regional Mapping Gilbert (1984)

GEOCHEMISTRY

Geochemistry none

Whole-rock Analyses Numbers 2.282

Recommendations

Absence of sulphides and/or chromite makes this a target of low priority for PGE exploration.

Selected Bibliography

Gilbert, H.P. 1984: Island Lake project; in Manitoba Energy and Mines, Mineral Resources Division, Report of Field Activities, 1984, p. 120-125.

Gilbert, H.P. 1984: Loonfoot Island, Manitoba Department of Energy and Mines, Preliminary Map 1984 I-1, 1:20 000.

Theyer, P. 1980: Stratigraphic setting of selected ultramafic bodies in the Superior and Churchill provinces and certain aspects of nickel-copper deposits in the Thompson Nickel Belt; Manitoba Energy and Mines, Mineral Resources Division, Economic

Geology Report ER79-2, 71p.
Theyer, P. 1985: Ultramafic rocks of the Island Lake area; Manitoba Energy and Mines, Geological Paper 84-1, 29p.

Name of Intrusion Magill Lake West

Ref ID. 217

UTM

Easting 363200

Northing 6071900

Zone 15

Location and Access

Accessibility Fixed-wing

Locality 1 Superior Province - Gods Lake Domain

Locality 2 Oxford Lake - Knee Lake Greenstone Belt

SIZE

Area (km2) 7

Maximum Dimensions approx. 1 x 7 km (or 0.9 x 22 km long)

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro (diabase)

Host Rocks south in contact with pillowed porphyritic andesite and basalt of Hayes River Group, north in contact with metasediments of Oxford lake Group.

Layering Features Massive/modally uniform

Metamorphic Grade Amphibolite facies

Synoptic Geology

The gabbro is a dark greenish grey, mottled and massive rock with fine- to coarse-grained textures. It has sill-like body which is interbanded with sediments (Barry, 1959). Hornblende and plagioclase generally occur in more or less equidimonsional grains, but distinctive ophitic textures are characteristic of the coarse-grained plagioclase phases. Microscopically, plagioclase laths occur in a groundmass of interstitial hornblende.
Several outcrops show typical streaky or lenticular differentiated bands, which may be easily mistaken for volcanic flow structures but on closer examination may identified as irregular horizons of alteration in an otherwise homogeneous hornblende gabbro.
Gilbert (1985) considered the rock in the south of Mickikanes Lake, is massive and foliated porphyritic diabase.

PREVIOUS EXPLORATION

MAPPING

Most Detailed Mapping 1:50,000 Oxford House, 53L/14, Map GR83-1-6.

Regional Mapping 1:250,000 Bedrock Geology Compilation Map Series, Oxford House, NST 53L, 1987.

GEOCHEMISTRY

Selected Bibliography

Barry, G.S., 1959: Geology of the Oxford House-Knee Lake area; Manitoba Mines and Natural Resources, Mines Branch, Publication 58-3, p. 26-27.
Gilbert, H.P., 1985: Geology of the Knee Lake-Gods Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 83-1B, p. 48-51.

Name of Intrusion Island Lake ("Nickel Claims" east of Henderson Island) Ref ID. 218

UTM

Easting	403029
Northing	5958352
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Island Lake Domain
Locality 2	Island Lake Greenstone Belt

SIZE

Area (km2)	0.5
Maximum Dimensions	1 km x 0.5 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types peridotite

Host Rocks granite gneiss, diorite, hornblende schist

Layering Features Unknown

Igneous Textures not known

Other Igneous Features not known

Metamorphic Grade Greenschist facies

Synoptic Geology

Drill hole intersections of narrow (tens of centimetres) layers of serpentinized peridotite interlayered with granitic gneiss, dioritic gneiss and hornblende schist.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM

Assessment Files 91624; 91684; 91156;

Mineral Occurrences

Up to 7% pyrrhotite and pyrite occur adjacent to the serpentinized peridotite in amphibolite and hornblende schist.

Exploration History

A complete review of the exploration history is given in Mineral Inventory Card 53E/16 Ni2. First staking of this property was by A.E. Storey in 1935; the claims were cancelled in 1936. Canadian Nickel Company Limited conducted an AEM survey in 1957 (A.F. 91624). Trenching and pitting were undertaken from 1959 to 1965 (Mineral Inventory Card 53E/16 Ni2). Phelps Dodge Corporation of Canada Limited optioned the property and conducted a 7-hole (197 m) drilling program in 1960 (A.F. 91156). Sherritt Gordon Mines Limited conducted an airborne EM and MAG survey over the area in 1970 under Airborne Permit 91 (A.F. 91684). International Nickel Company of Canada Limited conducted an AEM survey over the area in 1972 under Airborne Permit 102 (A.F. 91694). Barringer Research Limited conducted an HLEM and MAG survey in 1974.

MAPPING

Most Detailed Mapping Theyer (in press)

Sketch Map Figure# No

Regional Mapping Gilbert, (1985)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Base Metal Assay

Whole-rock Analyses Numbers 2.282

Recommendations

none

Selected Bibliography

Gilbert, H.P. 1985: Meegeesiwaseeson Island; Manitoba Energy and Mines, Preliminary Map 1985 I-4, 1:20 000.
Theyer, P. (in press): Mineral deposits and occurrences in the Island Lake area; Mineral Deposit Series Report 32, Manitoba Industry, Trade and Mines, Geological Services.

Name of Intrusion Tadoule Lake (Tadoule Lake Chalcopyrite) Ref ID. 219

UTM

Easting	538582
Northing	6497350
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	Trans-Hudson Orogen - Seal River Domain
Locality 2	

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Altered leucogabbro

PREVIOUS EXPLORATION

Mineral Occurrences

Cu, Ni, disseminated sulphides in the altered leuco gabbro

MAPPING

Regional Mapping Map 64J, Tadoule Lake (topo), SC. 1:250 000; Surv. & Map. Br., Ottawa. Map 30-1962, Tadoule Lake (Geol), sc. 1:253 440 - accomp. marginal notes by Davison (1962); Geol. Surv. Can.

GEOCHEMISTRY

Selected Bibliography

Jenness, S.E., 1962, Field Work, 1961; Geological Survey of Canada., Information. Circular No. 5, P. 43.

Name of Intrusion Weir River (Track 12) Ref ID. 220

UTM

Easting	432129
Northing	6296871
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Trans-Hudson Orogen - Leaf Rapids Domain
Locality 2	Leaf Rapids Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type	Unknown
Geochemical Classification	Unknown
General Classification	Ultramafic
Other Classification	Unknown

GEOLOGY

Principal Rock Types	Serpentinized peridotite and proxenite
Host Rocks	Precambrian gneiss, gabbro, diorite and granite
Layering Features	Unknown
Metamorphic Grade	Not defined

PREVIOUS EXPLORATION

Geophysical Surveys	None
Assessment Files	91702, 91737

Mineral Occurrences

The peridotite and pyroxenite have lower nickel contents from trace amount to 0.05% in the drill core samples. The gabbro contains 0.01-0.03% Cu in the drill core samples.
Po, Pent, Cpy for 90% of core between 807.5' and 808.3' in the DDH #6. elsewhere the peridotite contains trace amounts to few percent of sulphides in other parts of the drill core.

Exploration History

In 1961-1964, Kennco Exploration, (Canada) Ltd. completed airborne magnetic, ground gravity and magnetic surveys, and 17 drill holes in the area.

MAPPING

Sketch Map Figure#	No
Regional Mapping	1:250,000 Scale, Kettle Rapids, NTS 54D; Man. Energy and Mines, Geol. Services, Bedrock Geology Compilation Map, Map 54D.
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry none

Name of Intrusion Split Lake Anorthosite Complex Ref ID. 221

UTM

Easting	673050
Northing	6235120
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Superior Boundary Zone and Pikwitonei Domain
Locality 2	Thompson Nickel Belt

SIZE

Area (km2)	22.5
Maximum Dimensions	approx. 3 x 10 km

AGE DATA

Age Archean

CLASSIFICATION

Geochemical Classification	Unknown
General Classification	Mafic-Ultramafic
Other Classification	Unknown

GEOLOGY

Principal Rock Types	Anorthosite, anorthositic gabbro and olivine peridotite
Host Rocks	Amphibolite of Sickel Metamorphic Suite, Archean migmatite, hornblende and hornblende-biotite gneiss and Proterozoic and/or Archean migmatite, migmatitic Gneiss.
Layering Features	Local modal layering
Igneous Textures	Non-foliated phases contain well preserved pseudomorphs of original plagioclase megacrysts.
Other Igneous Features	Most the rocks in the complex were recrystallized during regional metamorphic events.
Metamorphic Grade	Granulite facies
Deformation	Weakly foliated and bent twin lamellae in the plagioclase.

Synoptic Geology

Corkery (1985) concluded:
The anorthosite complex forms a north-northeast-trending body along the northwest shore of Split Lake within Indian Reserve 171. The main body is a dome with an anorthosite core surrounded by layered gabbroic anorthosite and anorthositic gabbro. Gabbro, and ultramafic inclusions and layers, were also observed in the border facies. In the southwestern portion of the complex, clotted tonalite to granodiorite dykes and apophyses units cut the anorthositic rocks. Locally the tonalite becomes abundant enough to produce agmatites of the anorthosite. Diabase dykes and irregular granitic dykes form late intrusions. The south end of the complex is truncated by a northeast-trending migmatite belt containing anorthosite inclusions. The inclusions range in size from a few centimetres to tens of metres and decrease in abundance to the northeast. Two several hundred metre exposures of anorthosite were mapped in the Clark Lake area.
Most rocks in the complex were recrystallized during regional metamorphic events. Anorthosite in the core of the complex is massive to weakly foliated. Non-foliated phases contain well-preserved pseudomorphs of original plagioclase megacrysts. As the margins are approached a weak foliation and vague lamination becomes apparent and this grades into layered gabbroic anorthosite and anorthositic gabbro. This layering is parallel to the margin of the complex. At the contact with the surrounding gneiss, dips are approximately 90°. Towards the massive core of anorthosite the dip becomes increasingly shallow (to about 45°) and within the anorthosite the foliation is very shallow indicating a domal configuration for the complex.
The anorthositic rocks contain plagioclase, amphibole, garnet, chlorite, epidote and rare biotite, calcite and paragonite. They are highly recrystallized and only a few pseudomorphs of the original plagioclase phenocrysts, generally about 1 by 4 cm, are preserved. Numerous ragged crystals of plagioclase with An85-95 comprise the main portion of the rock and may represent original igneous minerals. Twinning is poorly defined, these crystals are fogged due to alteration to sericite, and included needles of amphibole are present. The plagioclase also shows numerous deformation features, the most common being bent twin lamellae and deformation-induced twinning. Late plagioclase of An40 forms small rounded crystals generally associated with fractures.
Amphibole exists in two forms: pseudomorphs after pyroxene, and as small disc-shaped radiating bundles in the metamorphic fabric. Pseudomorphs after clinopyroxene comprise felted masses of pale green amphibole with minor biotite and numerous quartz inclusions.
Epidote grains up to 2 mm are a common alteration product throughout the anorthosite as well as white mica (paragonite), chlorite and fine green amphibole.
Some amphibolites occur as layers within the anorthositic gabbro, also a layered amphibolite occurs on the southeast margin of the complex. These amphibolites are interpreted as an associated metagabbro, but no direct evidence to indicate an intrusive gabbro relationship is lacking; therefore, these rock are referred to as amphibolite in the map.

PREVIOUS EXPLORATION

Geophysical Surveys Ground EM

Assessment Files AF 90925

Mineral Occurrences

In John Fleet Ni, Cu showing area (Ted claims):
Massive and Disseminated sulphides, mainly pyrrhotite in a Precambrian gabbro dyke with 1.32% Ni, 0.53% Cu over 8 feet.

Exploration History

In John Fleet Ni. Cu showing area (Ted claims):
In 1960-1961, Prosectors Airways Company, Ltd. (AF) conducted an EM survey in the area, and the survey report mentions an assay of 1.32% Ni and 0.53% Cu over 8 feet from John Feet Ni, Cu showing on northwest side of Ted 17, northern shore of Split Lake.
In 1965, a field party of Manitoba Mines Branch, could not locate the showing in the area (Haugh, 1969, p.67).
In Pit claims area:
Magnetic anomaly thought to be caused by a body of olivine peridotite and it is exposed in extreme southwest corner of the claim group (Haugh, 1969; Corkery, 1985).

MAPPING

Most Detailed Mapping 1:50,000 Scale, Split Lake, Map GR 82-1-1.

Sketch Map Figure# No

Regional Mapping 1:250,000 scale, Split Lake area, NTS 64A; Man. Energy and Mines, Geol. Services, Bedrock Geology Compilation Map, Map 64A; 1:250,000 Scale, Kettle Rapids, NTS 54D; Man. Energy and Mines, Geol. Services, Bedrock Geology Compilation Map, Map 54D.

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry (no REE)

Selected Bibliography

Haugh, I., 1969: Geology of the Split Lake area; Manitoba Mines and Natural Resources, Mines Branch, Publication 65-2, p. 67.
Corkery, M.T., 1985: Geology of the lower Nelson River project area; Manitoba Energy and Mines, Geological Services, Geological Report 82-1, p. 12-15 , 56, 59.

Name of Intrusion Island Lake ("Asbestos Claims" northwest of Jubilee Island) Ref ID. 222

UTM

Easting	381229
Northing	5971768
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Island Lake Domain
Locality 2	Island Lake Greenstone Belt

SIZE

Area (km2)	0.75
Maximum Dimensions	75 m x 10 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown

Geochemical Classification Unknown

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types peridotite, talc schist

Host Rocks iron formation, slate

Layering Features Unknown

Synoptic Geology

Drill hole intersections up to 300 m long described in logs as peridotite and/or talc schist. There are no outcrops or core to inspect and verify.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM

Assessment Files 91152

Mineral Occurrences

"Sulphide streaks" in hosting sedimentary rocks.

Exploration History

Canico drilled three drill holes in 1956 to intersect the ultramafic rocks. Hostrocks were described as iron formation and slate.

MAPPING

Most Detailed Mapping none

Sketch Map Figure# No

Regional Mapping Weber, W., Gilbert, H.P., Neale, K.L. and McGregor, C.R. (1982)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Whole-rock Analyses Numbers 2.282

Geochemical Features and PGE Abundances

none

Recommendations

none

Selected Bibliography

Theyer, P. 1980: Ultramafic rocks, nickel occurrences and interpreted stratigraphic relationships; Manitoba Energy and Mines, Mineral Resources Division, Map ER79-2-1 to ER79-2-13, 1:50 000.
Theyer, P. 1985: Ultramafic rocks of the Island Lake area; Manitoba Energy and Mines, Geological Paper 84-1, 29p.

Weber, W., Gilbert, H.P., Neale, K.L. and McGregor, C.R. 1982: Island Lake Project; in Manitoba Mineral Resources Division, Report of Field Activities, 1982, p. 34-43.

Name of Intrusion Island Lake ("Lin Claims" northwest of Jubilee Island) Ref ID. 223

UTM

Easting	383955
Northing	5969663
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Island Lake Domain
Locality 2	Island Lake Greenstone Belt

SIZE

Area (km2)	0.1
Maximum Dimensions	100 m x 10 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown

Geochemical Classification Unknown

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types peridotite

Host Rocks siliceous siltstone and argillite

Layering Features Unknown

Synoptic Geology

A peridotite layer hosted in a sequence of metasedimentary rocks was intersected in this area. No outcrops or drill core are available.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM

Assessment Files 91153

Mineral Occurrences

none reported

Exploration History

Canico drilled one hole in 1960

MAPPING

Most Detailed Mapping Weber et al. (1982) Preliminary map 1982 I-4.

Sketch Map Figure# No

Regional Mapping Weber et al. (1982) Preliminary map 1982 I-4.

Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Whole-rock Analyses Numbers 2.282

Geochemical Features and PGE Abundances

none

Recommendations

not a target for PGE exploration

Selected Bibliography

Theyer, P. 1980: Ultramafic rocks, nickel occurrences and interpreted stratigraphic relationships; Manitoba Energy and Mines, Mineral Resources Division, Map ER79-2-1 to ER79-2-13, 1:50 000.
Theyer, P. 1985: Ultramafic rocks of the Island Lake area; Manitoba Energy and Mines, Geological Paper 84-1, 29p.
Weber, W., Gilbert, H.P., Neale, K.L. and McGregor, C.R. 1982: Island Lake Project; in Manitoba Energy and Mines, Mineral

Resources Division, Report of Field Activities, 1982, p. 34-43.

Name of Intrusion Island Lake (Megeesi Bay and surroundings) Ref ID. 224

UTM

Easting	398338
Northing	5964241
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Island Lake Domain
Locality 2	Island Lake Greenstone Belt

SIZE

Area (km2)	0.1
Maximum Dimensions	0.1 km x 1 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types peridotite, dunite

Host Rocks Igneous and sedimentary rocks of the Hayes River group

Layering Features Local modal layering

Other Igneous Features stratabound layer of ultramafic rocks at least partially extrusive

Metamorphic Grade Greenschist facies

Synoptic Geology

These occurrences of mainly olivine adcumulate are part of a series of stratabound ultramafic rocks suggested (Theyer 1985) to be in places extrusive.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM

Assessment Files 91152

Mineral Occurrences

none reported

Exploration History

none

MAPPING

Most Detailed Mapping Gilbert and Weber (1983)

Sketch Map Figure# No

Regional Mapping Gilbert and Weber (1983)

Type Section Figure# No

GEOCHEMISTRY

Whole-rock Analyses Numbers 2.282

Selected Bibliography

Gilbert, H.P and Weber, W. 1983: Island Lake project (parts of 53E/15, and 16); in Manitoba Department of Energy and Mines, Mineral Resources Division, Report of Field Activities 1983.

Theyer, P. 1980: Ultramafic rocks, nickel occurrences and interpreted stratigraphic relationships; Manitoba Energy and Mines, Mineral Resources Division, Map ER79-2-1 to ER79-2-13, 1:50 000.

Theyer, P. 1985: Ultramafic rocks of the Island Lake area; Manitoba Energy and Mines, Geological Paper 84-1, 29p.

Name of Intrusion Island Lake ("Asbestos Claims" north of Jubilee Island) Ref ID. 225

UTM

Easting	386490
Northing	5970811
Zone	15

Location and Access

Accessibility	Scheduled aircraft and boat
Locality 1	Superior Province - Island Lake Domain
Locality 2	Island Lake Greenstone Belt

SIZE

Area (km2)	0.4
Maximum Dimensions	200 m x 20 m

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Unknown

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types peridotite

Host Rocks Chlorite talc schist; mafic metavolcanic rocks

Layering Features Unknown

Metamorphic Grade Greenschist facies

Synoptic Geology

Approximately 150 m thick layer of peridotite. Other rocks intersected were greenstones, quartzite, carbonaceous rocks and talc-chlorite schist

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM

Assessment Files 91153

Mineral Occurrences

none reported

Exploration History

Canico drilled one hole in this area in 1960

MAPPING

Most Detailed Mapping Weber et al. (1982) Preliminary map 1982 I-4.

Sketch Map Figure# No

Regional Mapping Weber et al. (1982) Preliminary map 1982 I-4.

Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Whole-rock Analyses Numbers 2.282

Name of Intrusion Moose Lake Trend Ref ID. 226

UTM

Easting	754000
Northing	5462070
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Superior Province - southeastern Manitoba
Locality 2	

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

Age not known

CLASSIFICATION

Intrusion Type	Unknown
Geochemical Classification	Unknown
General Classification	Ultramafic
Other Classification	Unknown

GEOLOGY

Principal Rock Types	Ultramafic rocks intersected by drilling
Host Rocks	not well characterized; presumed to be the western extension of the Wabigoon Subprovince
Layering Features	Unknown

Synoptic Geology

Ultramafic rocks intersected by drilling (Hole SEM-95-5; Indicator Explorations Ltd.). There is a north-trending series of circular to elliptical airborne magnetic anomalies extending northward into southeastern Manitoba (Moose Lake trend - Indicator Explorations Ltd.) that could be the continuation of a north-trending belt of largley drift-covered mafic-ultramafic intrusions occurring in northern Minnesota, referred to as the Warroad trend by Indicator Explorations Ltd. No bedrock exposure has been identified to date. The area is characterized by 30 to 60 m of Quaternary cover.

PREVIOUS EXPLORATION

Geophysical Surveys	Airborne magnetic/EM and ground magnetic/EM
Assessment Files	not yet reviewed

Exploration History

Several industry EM/magnetic anomalies have been recognized along this trend (not drill tested). Ground magnetic surveys and follow-up drilling by Indicator Explorations Ltd. (1995) on one bullseye magnetic target (drill hole SEM-95-5; Indicatro Explorations Ltd.). Anomalous Ni-Cu values were obtained from bedrock and basal till from nearby Manitoba Government rotasonic drilling.

MAPPING

Most Detailed Mapping	Not exposed
Sketch Map Figure#	No
Regional Mapping	McGregor et al. (1987)
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry (no REE)

Geochemical Features and PGE Abundances

Contact Indicator Explorations Ltd. for whole-rock analyses of drill cuttings from ultramafic rocks intersected in SEM-95-2.

Recommendations

Additional interpretation of airborne magnetic anomalies and follow up drilling is required to determine the size and composition of the ultramafic (mafic?) bodies that are known to be assoicated with the Moose Lake trend.

Selected Bibliography

Beakhouse, G.P., Stott, G.M, Blackburn, C.E., Breaks, F.W., Ayer, J., Stone, D., Farrow, C., Corfu, F. 1996: Western Superior Province; Geological Association of Canada, Mineralogical Association of Canada, Geological Association of Canada; Mineralogical Association of Canada; annual meeting, Winnipeg, MB, Field Trip Guidebook A5 and B6, 107p.

Klassen, R.W., Wyder, J.E., Bannatyne, B.B. 1970: Bedrock topography and geology of southern Manitoba; Geological Survey of Canada, Map 25-1970, Scale 1:500 000.

McGregor, C.R., Kowerchuk, D., Weber, W. 1987: Kenora, NTS 52E; Manitoba Energy and Mines, Minerals Division, Bedrock Geology Compilation Map, Preliminary Edition, Map 52E, Scale 1:250 000.

Name of Intrusion Stevenson Lake Ref ID. 227

UTM

Easting	317205
Northing	5977623
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Gabbro-diorite

Host Rocks Occurrence near contact between sediments of Hayes River Group and mixed gneisses; Ni and Cu are probably found in gabbro and diorite which may separate the sediments from the gneisses

PREVIOUS EXPLORATION

Geophysical Surveys Ground EM

Mineral Occurrences

Ni, Cu

MAPPING

Most Detailed Mapping Map 4084G, Stevenson Lake East (Aeromag), Sc. 1:63 360, Man. Mines Br. and GSC.

Regional Mapping 1:250 000 scale (Quinn, 1960)

GEOCHEMISTRY

Name of Intrusion DUCK Ref ID. 228

UTM

Easting	330654
Northing	5579295
Zone	15

Location and Access

Locality 1	Superior Province - southeastern Manitoba
Locality 2	

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Gabbro and Metagabbro

PREVIOUS EXPLORATION

Geophysical Surveys Ground magnetic and EM

Assessment Files not yet reviewed

Mineral Occurrences

Cu, Ni.
Gabbro has heavy mineralization in some sections. Location is in an area of heavy mineralization that includes pyrite, pyrrhotite, chalcopyrite and pentlandite.

Exploration History

6 trenches, 6 pits and 7 ddh's. Holes drilled on 60,800 and 61,000 gamma mag. Highs.on map 1194 g. Holes drilled in gabbro and through to pink microcline granite.

MAPPING

Most Detailed Mapping 1:31 680 scale (Trueman, 1972)

Regional Mapping 1:250 000 scale (Bedrock Geology Compilation Map Series, Pointe du Bois, NTS 52L, 1987)

GEOCHEMISTRY

Selected Bibliography

Trueman, D.L., 1972: Geological compilation map of the Bird River area; Manitoba Mines Branch, Preliminary Map 1972. F-1, scale 1:31 680.

Name of Intrusion English Lake East (English Lake magmatic complex) Ref ID. 229

UTM

Easting	703940
Northing	5674506
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Superior Province - Uchi Domain
Locality 2	Rice Lake Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown

General Classification Mafic-Ultramafic

Other Classification Unknown

GEOLOGY

Principal Rock Types Pyroxenite, gabbro, leucogabbro, melagabbro, anorthosite

Host Rocks Gneiss

Layering Features Other

Igneous Textures Intrusive breccia and pegmatitic gabbro veins

Synoptic Geology

See Weber (1990), Young and Theyer (1991) and Russell (1949). Complex brecciation of a mafic-ultramafic intrusion (English Lake magmatic complex). Broken by younger (?) tonalitic rocks.

PREVIOUS EXPLORATION

Geophysical Surveys Ground magnetic and EM

Assessment Files Not reviewed

Mineral Occurrences

Ni 0.86% max, Cu 1.26% max; cpy and pn, po noted as diss in pyroxenite. Intrusion outcrops for 200-300 ' along lake shore. Violarite and bravoite have been identified.
Showing consists of Cu-Ni outcropping on the se shore of English lake about 1000 m NE of mouth of harding CK.

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping Russell, G.A. 1949: Geology of the English Brook Area

Sketch Map Figure# No

Regional Mapping Russell, G.A. 1949: Geology of the English Brook Area

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.0229 to 1.0251

Whole-rock Analyses Numbers 2.245 to 2.244

Geochemical Features and PGE Abundances

See Tables 1 and 2

Recommendations

The potential for deuteric/breccia-hosted (Lac des Iles - type) PGE mineralization should be investigated.

Selected Bibliography

Russell, G.A. 1949: Geology of the English Brook Area: Manitoba Department of Mines and Natural Resources, Preliminary Report and Map 48-3, Winnipeg, 1949.
Kowerchuk, D., Weber, W., 1987: Pointe du Bois, NTS 52L; Manitoba Energy and Mines, Minerals Division, Bedrock Geology Compilation Map, Map 52L, Scale 1:250 000.
Young, J., Theyer, P., 1990: Geology of mafic-ultramafic intrusive rocks in the English Lake area (NTS 62P/1); Manitoba Energy and Mines, Minerals Division, Report of Activities 1990, p. 111-113.

Weber, W., 1990: Geological investigations in the English Brook area, southeastern Manitoba (NTS 62P/1); Manitoba Energy and Mines, Minerals Division, Report of Activities 1990, p. 98-99.

Name of Intrusion RESERVE 1-18 Ref ID. 230

UTM

Easting	694869
Northing	5673319
Zone	14

Location and Access

Locality 1	Superior Province - Uchi Domain
Locality 2	

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Serpentinized Ultramafic Rocks

PREVIOUS EXPLORATION

Geophysical Surveys Ground EM

Assessment Files 91226, 91227, 91228.

Mineral Occurrences

Ni 1.44% Max. Au up to 34.97 g/t, Ag 6.86 g/t; Talc-serpentine rock with asbestos fibres. Ni in both millerite and garnierite. Free gold and moly. present. Average Ni value is 0.19%. Some surprisingly high gold values.

MAPPING

Most Detailed Mapping 1:31 680 scale (Russell, 1949)

Regional Mapping 1:250 000 scale (Bedrock Geology Compilation Map Series, 1987)

GEOCHEMISTRY

Name of Intrusion PIN

Ref ID. 231

UTM

Easting	324957
Northing	5664194
Zone	15

Location and Access

Locality 1	Superior Province - Uchi Domain
Locality 2	

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM

Mineral Occurrences

Mineralized shear zones in countryrock contain py, pn, po and cp in places. Small discontinuous sulphide zones in the mafic intrusion range from centimetres to 1 m width; generally pinching out within a few metres.
The most concentrated mineralization occurs on claim Pin 10.

MAPPING

Most Detailed Mapping 1:31 680 scale (Davies, 1950)

Regional Mapping 1:250 000 (Bedrock Geology Compilation Map Series, 1987)

GEOCHEMISTRY

Name of Intrusion Pool Lake

Ref ID. 233

UTM

Easting	364839
Northing	6287812
Zone	14

Location and Access

Locality 1	Trans-Hudson Orogen - Lynn Lake Domain
Locality 2	Lynn Lake Greenstone Belt

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Name of Intrusion Tulune Lake Ref ID. 234

UTM

Easting	399548
Northing	6314182
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	Trans-Hudson Orogen - Lynn Lake Domain
Locality 2	Lynn Lake Greenstone Belt

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Drill hole intersections encountered metapyroxenite, hornblendite, anorthosite and gabbro.

Host Rocks Wasekawan metavolcanics and metasediments.

Synoptic Geology

Pre-sickle gabbros that intrude the Wasekawan metavolcanics and metasediments.
Fault striking in a N-S direction cuts gabbro body into two parts. West of fault gabbro is highly altered but less altered east of the fault.

PREVIOUS EXPLORATION

Geophysical Surveys Ground magnetic and EM

Mineral Occurrences

Cu, Ni, Pt, Pd, Ti;
Cu 0.42-0.92%, Ni 0.03%, Pt 0.06-0.31 g/t over 7 feet;
Disseminated (over 1-3 feet) to massive (occasionally) sulphides (po, cp and py) in mafic to ultramafic intrusion, also massive pyrrhotite (minor Cu) bands in metasediments and metavolcanics. Magnetite is a common associate. DDH Ho. 10 on CB 2084 assayed 0.06-0.31 g/tonne Pd and 0.09 Pt from 231-238'. Up to 0.40% Ti and 0.06 % V_2O_5.
Tonnage on massive sulphide samples over 0.5 feet.

MAPPING

GEOCHEMISTRY

Name of Intrusion MacBen Lake Ref ID. 235

UTM

Easting	453360
Northing	6318230
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	Trans-Hudson Orogen - Lynn Lake Domain
Locality 2	Lynn Lake Greenstone Belt

SIZE

Area (km2)	18
Maximum Dimensions	approx. 3 x 6 km

AGE DATA

CLASSIFICATION

Intrusion Type	Plug
Geochemical Classification	Unknown
General Classification	Mafic-Ultramafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	Gabbro, pyroxenite
Layering Features	Unknown

Synoptic Geology

Geology and alteration (uralitization). Similar to Lynn Lake intrusion. Ultramafic rocks make up 10% of surface expression of intrusion. Gabbro is intruded by approx. 2.5 m wide pyroxenite dyke. Intrusion is pod shaped, max. dimensions approx. 3 x 6 km. Sulphides most abundant on shore of bay at western end of lake where they comprise up to 5% of pyroxenite host. Drilling cut occasional sulphides on RAT claims.

PREVIOUS EXPLORATION

Mineral Occurrences

Minor disseminated chalopyrite, pyrrhotite and pyrite scattered throughout the plug.

MAPPING

GEOCHEMISTRY

Name of Intrusion Namew Lake Sill Ref ID. 238

UTM

Easting	319760
Northing	6013670
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Trans-Hudson Orogen - Flin Flon-Snow Lake Domain
Locality 2	

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

Age Proterozoic

Geochronological Data 1847+/-6 Ma (Cumming and Krstic (1991)

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Komatiitic

General Classification Ultramafic

GEOLOGY

Host Rocks Namew Gneiss Complex.

Layering Features Local modal layering

Igneous Textures Coarse-grained cumulate textures are predominant.

Metamorphic Grade Amphibolite facies

Synoptic Geology

See Menard et al. (1996).

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM

Assessment Files 91707, 92080, 92471, 92473, 92755

Mineral Occurrences

Past-producer (Ni-Cu)

Exploration History

Deposit discovered in 1984 by Hudson Bay Exploration and Development. Mine was operated by Hudson Bay Mining and Smelting. Mine opened in 1988 and closed in 1993. Mine produced 2.57 million tons grading 1.79% Ni, 0.63% Cu (Menard et al., 1996). Ore also estimated to contain 0.6 g/t Pt, 0.5 g/t Pd and 0.1 g/t Au (Menard et al., 1996).

MAPPING

Most Detailed Mapping Not exposed

Sketch Map Figure# No

Regional Mapping Lucas (1993)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE

Geochemical Features and PGE Abundances

See detailed study by Menard et al. (1996).

Selected Bibliography

Cumming, G.L. and Krstic, D., 1991. Geochronology at the Namew Lake Ni-Cu deposit, Flin Flon area, Manitoba, Canada: Thermal history of a metamorphic terrane. Canadian Journal of Earth Sciences, v. 28, p. 309-325.
Lucas, S.B., NATMAP Shield Margin Project Working Group 1993: Geology of the Cormorant Lake sheet (NTS 63K),

Manitoba and Saskatchewan; Geological Survey of Canada, Manitoba Energy and Mines, Geological Services, Open File 2581, Bedrock Geology Compilation Map, Map 63K, 3 map. Scale 1:250 000.

Menard, T., Lesher, C.M., Stowell, H.H., Price, D.P., Pickell, J.R., Onstott, T.C., Hulbert, L. 1996: Geology, genesis, and metamorphic history of the Namew Lake Ni-Cu deposit, Manitoba; Economic Geology, v. 91, p. 1395-1414.
Manitoba Industry, Trade and Mines, Mines Branch, Mineral Inventory File Number 1003. 63K/4 NW NI 1.

Name of Intrusion KIDD 2 Ref ID. 239

UTM

Easting	328152
Northing	6094133
Zone	14

Location and Access

Locality 1	Trans-Hudson Orogen - Kisseynew Domain
Locality 2	

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Unknown

Geochemical Classification Unknown

General Classification Ultramafic

Other Classification Unknown

GEOLOGY

Principal Rock Types Pyroxenite

Host Rocks Kisseynew Gneisses

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM

Assessment Files 90393, 92423

Mineral Occurrences

Disseminated pyrhhotite and chalcopyrite in pyroxenite and norite

MAPPING

Sketch Map Figure# No

Type Section Figure# No

GEOCHEMISTRY

Name of Intrusion BIX

Ref ID. 240

UTM

Easting 608768

Northing 6148287

Zone 14

Location and Access

Locality 1 Superior Boundary Zone and Pikwitonei Domain

Locality 2

SIZE

Area (km2)

Maximum Dimensions

AGE DATA

CLASSIFICATION

GEOLOGY

Principal Rock Types Gabbro, peridotite

Host Rocks Pikwitonei Domain gneisses

Layering Features Unknown

Metamorphic Grade Not defined

PREVIOUS EXPLORATION

Mineral Occurrences

Disseminated sulphides in gabbro and altered peridotite hosted by felsic gneiss.

MAPPING

Sketch Map Figure# No

Regional Mapping 1:250 000. Sipiwesk. NTS 63P. Manitoba Bedrock Geology Map Series.

Type Section Figure# No

GEOCHEMISTRY

Geochemistry none

Name of Intrusion Cartwright Lake Gabbro Ref ID. 243

UTM

Easting	391600
Northing	6299500
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Trans-Hudson Orogen - Lynn Lake Domain
Locality 2	Lynn Lake Greenstone Belt

SIZE

Area (km2)	4
Maximum Dimensions	1 x 4 km

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

Other Classification Arc

GEOLOGY

Host Rocks Basalt of the Wasekwan Group

Metamorphic Grade Greenschist facies

Deformation Large scale folding

Synoptic Geology

Regional geology described in Gilbert et al. (1980). Geology and mineralization associated with the Lynn Lake Mafic-Ultramafic Intrusions described by Pinsent (1980).

PREVIOUS EXPLORATION

MAPPING

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.0151 to 1.0160

Selected Bibliography

Gilbert, H.P., Syme, E.C., Zwanzig, H.V. 1980: Geology of the metavolcanic and volcaniclastic metasedimentary rocks in the Lynn Lake area; Manitoba Energy and Mines, Mineral Resources Division, Geological Paper 80-1, 118p.
Pinsent, R.H. 1980: Nickel-copper mineralization in the Lynn Lake gabbro; Manitoba Energy and Mines, Mineral Resources Division, Economic Geology Report 79-3, 138p.

Name of Intrusion Falcon Lake Intrusive Complex Ref ID. 244

UTM

Easting	340000
Northing	5504000
Zone	15

Location and Access

Accessibility	All-weather road
Locality 1	Superior Province - southeastern Manitoba
Locality 2	Falcon Lake - West Hawk Lake area

SIZE

Area (km2)	9
Maximum Dimensions	5 x 2.5 km

AGE DATA

Age not known

CLASSIFICATION

Intrusion Type	Cone sheet
Geochemical Classification	Alkaline
General Classification	Intermediate-mafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	pyroxenite, gabbro, diorite, granodiorite, quartz monzonite
Host Rocks	Metavolcanic and metasedimentary rocks of the Lake of the woods greenstone belt (Wabigoon Subprovince)
Layering Features	Local modal layering
Igneous Textures	Variable grain size, pyroxene cumulates
Other Igneous Features	Rhythmic modal layering, graded layering, disrupted layering, breccia pipes, cognate inclusions and inclusions of country rock
Metamorphic Grade	Sub-greenschist facies
Deformation	Not deformed

Synoptic Geology

Detailed geological descriptions of the Falcon Lake intrusive complex (FLIC) are given by Tirschmann (1992), Mandziuk (1989) and Mandziuk et al. (1989). The regional geology is described by Davies (1954). The (FLIC) is a well-preserved concentrically-zoned intrusion having many features in common with Alaskan-type intrusions, including ovoidal shape (plan view), concentric-zoning of major subunits and a tholeiitic to alkaline geochemical composition. Emplaced into metavolcanic and metasedimentary rocks that represent the western extension of the Lake of the Woods greenstone belt in northwestern Ontario, the FLIC is an exceptionally well-preserved late- to post-tectonic intrusion dominated by gabbroic and dioritic rock types. The complex is subdivided into 4 gabbro units, a diorite-granodiorite unit and a quartz monzonite unit.

PREVIOUS EXPLORATION

Assessment Files not yet reviewed

Mineral Occurrences

Two breccia pipes occurring in the central part of the FLIC, the Sunbeam-Kirkland and Moonbeam pipes, are known to contain gold mineralization in assoication with sulphides developed in concentric fracture systems. Elsewhere in the FLIC, sulphide mineralization appears to be rare.

Exploration History

Restricted to sporadic gold exploration of the Sunbeam-Kirkland and Moonbeam breccia pipes. See Fingler (1991) for details.

MAPPING

Most Detailed Mapping	Mandziuk (1989) and Tirschmann (1992)
Sketch Map Figure#	Yes
Regional Mapping	Davies (1954)

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.0252 to 1.0272

Whole-rock Analyses Numbers 2.251 to 2.271

Geochemical Features and PGE Abundances

The trace element geochemistry of all of the rocks in the FLIC is characterized by strong light rare-earth element enrichment relative to mantle.

Selected Bibliography

Davies, J.F., 1954. Geology of the West Hawk Lake - Falcon Lake area. Manitoba Department of Mines and Natural Resources, Publication 53-4, 28 p.

Fingler, J. 1991: Precious metal mineralization related to the Falcon Lake intrusive complex, southeastern Manitoba; M.Sc. thesis, University of Manitoba, Winnipeg, Manitoba.

Mandziuk, W.S., 1989. Primary structures of the Falcon Lake intrusive complex, southeastern Manitoba. Unpublished M.Sc. Thesis, University of Manitoba, Winnipeg, Manitoba, 103 p.

Mandziuk, W.S., Brisbin, W.C., Scoates, R.F.J. 1989: Igneous structures in the Falcon Lake intrusive complex, southeastern Manitoba; Canadian Mineralogist, v. 27, p. 81-92.

Tirschmann, P.A., 1992. Geochemistry and fractional crystallization history of the Falcon Lake intrusive complex. Unpublished M.Sc. Thesis, University of Manitoba, Winnipeg, Manitoba, 191 p.

Name of Intrusion Lake Winnipegosis Komatiites Ref ID. 245

UTM

Easting	434000
Northing	5844000
Zone	14

Location and Access

Accessibility	Winter road
Locality 1	Superior Boundary Zone and Pikwitonei Domain
Locality 2	Winnipegosis Komatiite Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

Age Proterozoic

CLASSIFICATION

GEOLOGY

Principal Rock Types Peridotite, pyroxenite, gabbro

Host Rocks Metavolcanic and metasedimentary rocks of the Winnipegosis Belt

Layering Features Local modal layering

Igneous Textures Predominantly olivine and pyroxene cumulates

Metamorphic Grade Sub-greenschist facies

Deformation largely undeformed

Synoptic Geology

See record for the Thompson Nickel Belt intrusions (this report) and Theyer (1997). Not exposed at surface. All of the information obtained for these intrusions has been derived from detailed examination of Cominco Ltd. drill core for the Cedar Lake part of the belt.

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Not reviewed

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping Theyer (1997)

Sketch Map Figure# No

Type Section Figure# No

GEOCHEMISTRY

Recommendations

See record for the Thompson Nickel Belt (this report)

Selected Bibliography

Theyer, P., 1997: Stratigraphy and lithologies of selected drill core from the Lake Winnipegosis komatiite belt (parts of NTS 63B, 63C and 63G); Manitoba Energy and Mines, Geological Services, Report of Activities 1997, p. 109-111.

Name of Intrusion Fox River Belt - Lower Intrusions Ref ID. 248

UTM

Easting	815000
Northing	6190800
Zone	14

Location and Access

Accessibility	Helicopter
Locality 1	Superior Boundary Zone and Pikwitonei Domain
Locality 2	Fox River Belt

SIZE

Area (km2)	
Maximum Dimensions	0.75 x 20 km

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic-Ultramafic

Other Classification Marginal rift basin

GEOLOGY

Principal Rock Types Peridotite, pyroxenite, gabbro, anorthosite

Host Rocks Lower sedimentary formation, Fox River Belt

Layering Features Megacyclic Units

Igneous Textures Mainly medium- to coarse-grained olivine, pyroxene and plagioclase cumulates.

Metamorphic Grade Greenschist facies

Deformation Relatively undeformed

Synoptic Geology

See Scoates (1990). The lower intrusions (lower differentiated intrusions in Scoates, 1990) of the Fox River Belt have not been observed in outcrop. All data for these bodies has been obtained from Inco Limited drill core (Scoates, 1990). The intrusions range in length from <2 km to >20 km, and are typically 300 to 500 m thick. The intrusions are emplaced into the upper part of the Lower sedimentary formation of the Fox River Belt. They have sill-like morphologies in cross section and information gained from the few drill holes intersections of these intrusions suggests that they are strongly differentiated from predominantly ultramafic rocks at their base (south) to plagioclase-rich mafic rocks at their top (north). Detailed documentation of drill core intersecting the lower intrusions is given by Scoates (1990). They also appear to have a similar range of rock compositions to the Marginal Zone of the Fox River Sill (Scoates, 1990), which was shown by Peck et al. (1999) to be propsective for PGE-rich magmatic sulphide mineralization (see sample 98-99-202-1a, Tables 1 and 2).

PREVIOUS EXPLORATION

Mineral Occurrences

See Scoates (1990)

Exploration History

See Scoates (1990). The lower intrusions have received very little attention in comparison to the overlying Fox River Sill. These intrusions are highly prospective for both Ni-Cu and PGE-Cu-Ni mineralization.

MAPPING

Most Detailed Mapping 1:50 000 scale (Scoates, 1990)

Sketch Map Figure# Yes

Regional Mapping 1:50 000 scale (Scoates, 1990)

Type Section Figure# Yes

GEOCHEMISTRY

Geochemical Features and PGE Abundances

See Scoates (1990).

Recommendations

These intrusions are highly prospective for both Ni-Ci and PGE-Cu-Ni mineralization. Drilling by Falconbridge Limited (2000) has provided new drill core that will provide additional information on the geology and mineral potential of the lower intrusions.

Selected Bibliography

Peck, D.C., Huminicki, M., Wegleitner, C., Theyer, P., Olshefsky, K., Potter, L., Hulbert, L., Scoates, R.F.J. 1999: Lithostratigraphic framwork for Platinum-group element-copper-nickel sulphide mineralization in the marginal zone of the Fox River sill (Parts of NTS 53M/16 and 53N/13); Manitoba Industry, Trade and Mines, Geological Services, Report of activities 1999, p. 46-50.

Scoates, R.F.J. 1981: Volcanic rocks of the Fox River Belt, northwestern Manitoba; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 81-1, 109p. 1 map @ 1:50 000.

Scoates, R.F.J. 1990: The Fox River sill, northeastern Manitoba - a major stratiform intrusion; Manitoba Energy and Mines, Geological Services, Geological Report 82-3, 192p. 1 map @ 1:50 000.

Name of Intrusion Thompson Nickel Belt Intrusions Ref ID. 249

UTM

Easting	531000
Northing	6096000
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Superior Boundary Zone and Pikwitonei Domain
Locality 2	Thompson Nickel Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

Age Proterozoic

Geochronological Data 1.88 Ga (L. Hulbert, GSC , written communication, 1999)

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Komatiitic

General Classification Ultramafic

Other Classification Marginal rift basin

GEOLOGY

Principal Rock Types Dunite, peridotite, orthopyroxenite; locally (rare) mafic components

Host Rocks Generally occur within the Pipe Fromation of the Ospwagan Group

Layering Features Local modal layering

Igneous Textures Principally olivine cumulates

Metamorphic Grade Not uniform

Deformation Generally highly deformed and commonly boudinaged and/or sheared

Synoptic Geology

See Bleeker (1990). This record relates to all ultramafic and mafic rocks in the Thompson Nickel Belt (TNB) and related mafic rocks (Peck et al., 1998). It also includes mafic-ultramafic intrusions occurring in the Winnipegosis Komatiite Belt, which occurs adjacent (east side of) the sub-Paleozoic, southward extension of the exposed parts of the TNB (Theyer, 1997), between the north end of Lake Winnipegosis and the William Lake area. A thorough study of the geology, metallogeny and petrogenesis of the TNB mafic and ultramafic intrusions commenced in 1997 (Canadian Mining Industry Research Organization Project (CAMIRO) 97E-02) and will be completed in 2001. The intrusions in the exposed parts of the TNB appear to have been emplaced as conformable sills within Fe- and, locally, S-rich metasedimentary rocks of the Pipe Formation within the regionally important Ospwagan Group supracrustal sequence. The original size and composition of these predominantly ultramafic intrusions remains unknown.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM

Assessment Files Not reviewed

Mineral Occurrences

Numerous Ni sulphide deposits and occurrences throughout the TNB, including many operating and post-producing mines (e.g., Thompson Mine, Birchtree Mine, Manibridge Mine).

Exploration History

Extensively explored by Inco Limited, Falconbridge Ltd., HBED Ltd., Cominco Ltd., Sherritt Gordon Ltd. and others, between 1950 to present.

MAPPING

Most Detailed Mapping See Bleeker (1990) and related references

Sketch Map Figure# No

Regional Mapping Coats et al. (1972)

Type Section Figure# No

GEOCHEMISTRY

Geochemical Features and PGE Abundances

A compilation of pre-existing and newly acquired geochemical data is being prepared as part of the CAMIRO TNB project.

Recommendations

It remains uncertain whether or not any of the mafic and ultramafic rocks in the TNB are prospective for PGE (principal metals) mineralization. Local PGE-rich Ni sulphide ores are present in the numerous mines and deposits in the TNB (Bleeker, 1990), but there appears to have been little systematic analysis of unmineralized (low S tenor) intrusions, especially the many small gabbroic sills that occur in the northern TNB and the mafic-ultramafic intrusions occurring in the Winnipegosis Belt and the sub-Paleozoic parts of the TNB. Given their komatiitic affinities (Bleeker, 1990), the TNB ultramafic bodies, particularly the more differentiated bodies and the mafic intrusions, could have been derived from PGE-rich parental magmas and the potential that some of these intrusions developed PGE mineralization should not be discounted. In addition, it is likely that the majority of TNB intrusions are coeval with the Cuthbert Lake suite of the Molson dyke swarm (1.883 Ga - Heaman et al., 1986). Given the recent discovery of Cu-PGE-rich sulphide mineralization at Cuthbert Lake and the presence of similar styles of sulphide mineralization in the northern part of Wintering Lake (see relevant records, this report), the area immediately to the east of the exposed parts of the TNB (e.g., Wintering Lake, Cuthbert Lake, Partridge Crop Lake) that contains numerous mafic-ultramafic dykes and intrusions of unknown primary morphology should be explored for both magmatic Ni-Cu sulphides and PGE-Cu-rich mineralization. It is possible that this area preserves incipient rift structures and associated (variably deformed) Proterozoic mafic-ultramafic intrusions and rift-basin sedimentary rocks (e.g., paragneiss exposed at Cuthbert Lake and Wintering Lake) that were contemporaneous with the main rifting and magmatism in the TNB.

Selected Bibliography

Bleeker, W., 1990: Evolution of the Thompson Nickel Belt and its nickel deposits, Manitoba, Canada; Ph.D. thesis, University of New Brunswick, 444p.

Coats, C.J.A., Quirke, T.T.Jr., Bell, C.K., Cranstone, D.A., Campbell, F.H.A. 1972: Geology and mineral deposits of the Flin Flon, Lynn Lake and Thompson areas, Manitoba and the Churchill-Superior front of the western Precambrian Shield; International Geological Congress, 24th, Guidebook, Field Excursion, p. A31-C31.

Heaman, L.M., Machado, N., Krogh, T.E., Weber, W., 1986: Precise U-Pb zircon ages for the Molson dyke swarm and the Fox River sill; constraints for early Proterozoic crustal evolution in northeastern Manitoba, Canada; Contributions to Mineralogy and Petrology, v. 94, no. 1, p. 82-89.

Peck, D.C., Layton-Matthews, D., Chandler, C., Freund, C.C., Heaman, L.M., 1998: Petrogenetic and metallogenic significance of mafic-ultramafic dykes and volcanic sequences in the Thompson Nickel Belt : preliminary results (parts of NTS 63J, 63O, and 63P); Manitoba Energy and Mines, Geological Services, Report of activities 1998, p. 49-55.

Theyer, P., 1997: Stratigraphy and lithologies of selected drill core from the Lake Winnipegosis komatiite belt (parts of NTS 63B, 63C and 63G); Manitoba Energy and Mines, Geological Services, Report of Activities 1997, p. 109-111.

Name of Intrusion Bear Head Lake

Ref ID. 251

UTM

Easting 680800
Northing 6159000
Zone 14

Location and Access

Accessibility Fixed-wing
Locality 1 Superior Boundary Zone and Pikwitonei Domain
Locality 2

SIZE

Area (km2)
Maximum Dimensions Approximately 8 x 0.5 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown
Geochemical Classification Tholeiitic - Low Ti
General Classification Mafic
Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro, anorthosite
Host Rocks Basalt (amphibolite)
Layering Features Unknown
Metamorphic Grade Amphibolite facies
Deformation Massive to foliated

Synoptic Geology

See Peck et al. (1996). Principally anorthositic rocks underlain by amphibolite derived from basalt.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic
Assessment Files Not reviewed

Mineral Occurrences

No sulphide occurrences were recognized by Peck et al. (1996).

Exploration History

Unknown

MAPPING

Most Detailed Mapping 1:50 000 (Weber, 1976)
Sketch Map Figure# Yes
Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63P)
Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers 1.0000 to 1.0001
Whole-rock Analyses Numbers 2.021 to 2.026

Geochemical Features and PGE Abundances

See Tables 1 and 2. Samples collected by Peck et al. (1996). Similar major and trace element geochemistry to anorthositic rocks at Cauchon Lake (Ref ID. #255).

Selected Bibliography

Peck, D.C., Cameron, H.D.M., Layton-Matthews, D., Bishop, A., 1996: Geological investigations of Anorthosite, gabbro and pyroxenite occurrences in the Pikwitonei granulite domain and the Cross Lake region (parts of NTS 63I/6, 63J/7, 63J/8, 63P/5, 63P/6, 63P/7, 63P/8, 63P/9, 63P/11 and 63P/12); in Report of activities, Manitoba Energy and Mines, Geological Services, Report of activities 1996, p. 85-90.

Weber, W., 1976: Bear Head Lake (south half); Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Preliminary Map 1976U-3, Scale 1:50 000.

Name of Intrusion Cuthbert Lake Dyke (Molson Dyke Swarm) Ref ID. 252

UTM

Easting	601700
Northing	6156800
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Boundary Zone and Pikwitonei Domain
Locality 2	

SIZE

Area (km2)	
Maximum Dimensions	160 km long x 60 m to >500 m wide

AGE DATA

Age	Proterozoic
Geochronological Data	1883 +/- 2 Ma (Heaman et al., 1986)

CLASSIFICATION

Intrusion Type	Dyke
Geochemical Classification	Tholeiitic - Low Ti
General Classification	Mafic-Ultramafic
Other Classification	Rifted Archean basement

GEOLOGY

Principal Rock Types	Peridotite, pyroxenite, gabbro, leucogabbro
Host Rocks	Pikwitonei Domain orthogneiss and paragneiss and retrogressed equivalents
Layering Features	Local modal layering
Igneous Textures	Predominantly equigranular cumulate textures involving olivine and orthopyroxene.
Other Igneous Features	Local pegmatitic gabbro veins and pods.
Metamorphic Grade	Not uniform
Deformation	Undeformed central portion of the dyke. Deformed, locally gneissic textured apophyses.

Synoptic Geology

The Cuthbert Lake dyke is one of the largest known intrusions belonging to the 1.883 Ga Molson dyke swarm (Scoates and Macek, 1978). Detailed description of the Cuthbert Lake dyke are provided by Scoates and Macek (1978), Paktunc (1983) and Paktunc (1989). Recent unpublished mapping by the Manitoba Geological Survey along the western shoreline of Cuthbert Lake confirmed the observations made by Paktunc (1983) that the Cuthbert Lake dyke is an intrusive complex that was originally fed by multiple, discrete injections of geochemically similar Mg-rich magma. The tectonic association of the Cuthbert Lake dyke appears to be similar to the main group of 1.883 Ga mafic-ultramafic Molson dykes that occur throughout the northwestern part of the Superior Province, e.g., the dykes were emplaced into extensional faults developed in Archean basement. The extent to which these faults may have evolved into rift basins warrants additional investigation, particularly given that some of the dykes, including the Cuthbert Lake dyke, intrude sulphide-facies iron formation (paragneiss) of unknown age. In summers where water levels on Cuthbert Lake are lower than normal (e.g., 1999), abundant outcrop can be observed on the western shoreline of Cuthbert Lake which reveal that the western margin of the dyke is made up of numerous, interconnected apophyses likely emanating from the core of the dyke (exposed on islands in the central part of the lake). Locally, these apophyses display planar modal layering, commonly cm-scale and rhythmic in nature. Similar features are recognized in other Molson dykes (Scoates and Macek, 1978), including the Nelson River dyke, which was briefly examined by Manitoba Geological Survey staff in 1999 . The small apophyses of the Cuthbert Lake dyke that are exposed along the western shoreline of the lake vary from a few metres to tens of metres in width and, like the main dyke, strike north-northeasterly, although they show local variations in strike. These apohpyses show variable degrees of minor folding, foliation (metamorphic) development and recrystallization (locally at the amphibolite facies) so that the Cuthbert Lake dyke was emplaced prior to at least one phase of Proterozoic deformation and high grade metamorphism. This observation has significance to exploration for Ni-Cu-PGE mineralization in the adjacent Wintering Lake and Partridge Crop Lake areas, where deformed gabbroic to pyroxenitic rocks of unknown age are emplaced into both orthogneiss and paragneiss of presumed (but not known) Archean age. In order to determine the age of both the mafic-ultramafic rocks and the host rocks, a detailed U-Pb geochronological study of the Superior Boundary Zone between Paint Lake and Cuthbert Lake and including Wintering and Partidge Crop lakes is needed.

PREVIOUS EXPLORATION

Geophysical Surveys	Airborne magnetic and EM
Assessment Files	Not reviewed. See related records for Cuthbert Lake area.

Mineral Occurrences

Historical trenches along the western shoreline of Cuthbert Lake expose disseminated Cu-Ni sulphide mineralization hosted by gabbroic to pyroxenitic rocks that are emplaced into both garnet-sulphide-bearing paragneiss and tonalitic orthogneiss. Sulphide mineralization includes disseminations of pyrrhotite and chalcopyrite, locally reaching abundances of up to 10%, in pyroxenite and gabbroic phases of the Cuthbert Lake dyke. Similar styles of Cu-PGE mineralization are reported from garnetiferous meta-pyroxenite exposed in historical trenches on the eastern shoreline Murray Island in the northern part of Wintering Lake (Ref ID #253, this report). In both areas, the host rocks are garnet and sulphide-rich paragneiss possibly representing metamorphosed sulphide facies iron formation.

Exploration History

Historical trenching (age not known) completed along the shoreline of Cuthbert Lake. Inco Limited conducted geophysical surveys and follow-up drilling of the Cuthbert Lake dyke as part of their regional Ni-Cu sulphide exploration program in the Superior Boundary Zone. Mr. E. Chaboyer (Thompson, Manitoba) completed surface prospecting of the Cuthbert Lake dyke in 1998 and 1999.

MAPPING

Most Detailed Mapping	Paktunc (1983)
Sketch Map Figure#	Yes
Regional Mapping	1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63P)
Type Section Figure#	Yes

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.0186 to 1.0201
Whole-rock Analyses Numbers	2.212 to 2.218

Geochemical Features and PGE Abundances

A detailed analysis of the geochemistry and metallogeny of the Cuthbert Lake dyke will be included in an ongoing investigation of the Molson dyke swarm (collaborative project involving the University of Alberta and the Manitoba Geological Survey). Previous data from mineral chemistry and whole-rock geochemistry studies of the dyke are discussed in Paktunc (1983, 1989) and Scoates and Macek (1978). Anomalously high PGE and Cu-Ni contents, including up to 3.38 g/t combined Pd+Pt+Au, including up to 1.67 g/t of Pd, and up to 1.4% Cu and 0.46% Ni (see Table 1) were obtained from surface samples collected by E. Chaboyer (Thompson, Manitoba) and D. Peck (Manitoba Geological Survey) from the western shoreline of Cuthbert Lake, in the vicinity of historical trenches along the western margin of the dyke. The data are reported here with the permission of Mr. E. Chaboyer. Additional PGE data were obtained for samples of the main part of the dyke during a reconnaissance lithogeochemical survey of the Cuthbert Lake area by Peck et al. (1996; see Table 1 in the current report). The latter data are principally from samples of a peridotite body that is exposed in a series of islands that relate to the central, ultramafic part of the Cuthbert Lake dyke. These data reflect a wide range of bakcground PGE contents, from anomalously low (<1 ppb Pd) to trelatively high background values of approximately 50 ppb combined Pd + Pt (Table 1). Whole-rock geochemical data for some of the samples listed in Table 1 are given in Table 2. The dyke appears to have been fed by Mg-rich, low-Ti tholeiitic (or fractionated komatiitic?) magma having trace element compositions similar to that of a depleted primitive mantle source.

Recommendations

Given the recently discovered (E. Chaboyer, Thompson, Manitoba) Cu-PGE mineralization along the western margin of the dyke (in association with garnet-sulphide paragneiss) and its potential genetic relationship with ultramafic magmatism in the Thompson Nickel Belt (e.g., Peck et al., 1998), additional exploration of the Cuthbert Lake dyke for PGE-Cu-Ni mineralization is recommended. In addition, the age of the host rocks to the Cuthbert Lake dyke is not known, and the possibility that the paragneiss is Proterozoic in age and analgous to sulphide-rich iron formation of the Ospwagan Group in the Thompson Nickel Belt should be investigated. Additional detailed mapping, surface exploration, drilling and metamorphic petrology studies will be needed to resolve the mineral potential, petrogenesis and tectonic setting of the Cuthbert Lake dyke. This work will also shed light on the regional implications for PGE-Cu-Ni mineralization in other, large Molson dykes.

Selected Bibliography

Heaman, L.M., Machado, N., Krogh, T.E., Weber, W., 1986: Precise U-Pb zircon ages for the Molson dyke swarm and the Fox River sill; constraints for early Proterozoic crustal evolution in northeastern Manitoba, Canada; Contributions to Mineralogy and Petrology, v. 94, p. 82-89.

Paktunc, A.D., 1983: Petrology and geochemistry of some ultramafic rocks of the Thompson Nickel Belt and the Cuthbert Lake dikes of the Pikwitonei region, northern Manitoba; Ph.D. thesis, University of Ottawa.

Paktunc, A.D., 1987: Differentiation of the Cuthbert Lake ultramafic dikes and related mafic dikes; Contributions to

Mineralogy and Petrology, v. 97, p. 405-416.
Peck, D.C., Layton-Matthews, D., Chandler, C., Freund, C.C., Heaman, L.M., 1998: Petrogenetic and metallogenic significance of mafic-ultramafic dykes and volcanic sequences in the Thompson Nickel Belt : preliminary results (parts of NTS 63J, 63O, and 63P); Manitoba Energy and Mines, Geological Services, Report of activities 1998, p. 49-55.
Peck, D.C., Halden, N.M., Heaman, L.M., Corkery, M.T., Cameron, H.D.M., Toope, K., 1999: Field, geochemical and geochronological studies of Paleoroterozic mafic and ultramafic dykes in the northwestern Superior Province, (Parts of NTS 63I, 63J, 63P); Manitoba Industry, Trade and Mines, Geological Services, Report of activities 1999, p. 97-101.
Scoates, R.F.J., Macek, J.J., 1978: Molson dyke swarm; Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Geological Paper 78-1, 53p.

Name of Intrusion Wintering Lake Mafic-Ultramafic Intrusions Ref ID. 253

UTM

Easting	584100
Northing	6142800
Zone	14

Location and Access

Accessibility	Winter road
Locality 1	Superior Boundary Zone and Pikwitonei Domain
Locality 2	

SIZE

Area (km2)	
Maximum Dimensions	Unknown

AGE DATA

Age not known

Geochronological Data Not available

CLASSIFICATION

Intrusion Type Unknown

Geochemical Classification Unknown

General Classification Mafic-Ultramafic

Other Classification Unknown

GEOLOGY

Principal Rock Types Pyroxenite, gabbro and metamorphosed equivalents, including garnet-bearing pyroxenite and gabbro

Host Rocks Pikwitonei Domain orthogneiss and paragneiss and retrogressed equivalents

Layering Features Local modal layering

Igneous Textures Principally metamorphic textures, including annealed, granoblastic textures and gneissic textures

Other Igneous Features Local pods and veins of pegmatitic gabbro and diorite

Metamorphic Grade Amphibolite facies

Deformation Affected by at least one major folding event

Synoptic Geology

The geology of the Wintering Lake area is described by Hubregtse (1978). The mineral occurrences of the Wintering Lake area, including descriptions of historical Cu mineralization in trenches developed in the northern part of the lake, are described in Dawson (1952) and Peck et al. (1996). A brief account of the geology of the mafic and ultramafic rocks exposed in the northern part of Wintering Lake is given in Peck et al. (1996).

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic and EM

Assessment Files Not reviewed

Mineral Occurrences

Three historical copper showings are exposed in trenches in the northenr part of Wintering Lake and are described by Dawson (1952) and Peck et al. (1996). These include (from south to north) the Murray Island, Nikko and Walter Johnson Cu occurrences. All of these occurrences appear to relate to local disseminated to semi-massive Fe-Cu-Ni sulphide mineralization developed in gabbroic and pyroxenite at the contact with older garnetiferous paragneiss and/or intermediate orthogneiss. See Dawson (1952) and Peck et al. (1996) for additional information.

Exploration History

The Wintering Lake area has been intermittently explored for Ni-Cu sulphide mineralization from prior to 1950 to present, including recent exploration (1990s) by Cominco Limited. Historical trenches associated with copper showings are present in low, shoreline outcrops or buried outcrops in the northern part of Wintering Lake (Dawson, 1952).

MAPPING

Most Detailed Mapping 1:50 000 scale (Hubregtse et al., 1978)

Sketch Map Figure# No

Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63P)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.1408 to 1.1409
Whole-rock Analyses Numbers	2.802 to 2.810

Geochemical Features and PGE Abundances

One sample of semi-massive pyrrhotite and chalcopyrite obtained by Peck et al. (1996) from the Murray Island Cu-Ni occurrence returned 1.3 g/t Pd (see Table 1). New whole-rock geochemical data for samples collected by peck et al. (1996) indicate that the least-altered mafic and ultramafic (pyroxenite) rocks exposed in the northern part of Wintering Lake (e.g., samples 98-99-323 and 98-99-337, Table 2) have similar major and trace element abundances to the Cuthbert Lake dyke (e.g., slightly-depleted in light rare-earth elements, low-Ti, wide range in MgO contents). These results indicate the importance of establishing the age of the mafic and ultramafic rocks in the Wintering Lake area, which are presumed to be Archean (e.g., Hubregtse et al., 1978).

Recommendations

The similarities between the mafic-ultramafic intrusions, their host rocks and their mineral occurrences at Wintering Lake and Cuthbert Lake indicates that the Wintering Lake intrusive gabbro-pyroxenite units could represent more deformed and thoroughly recrystallized equivalents of the Cuthbert Lake dyke. If this proves to be true, then additional mapping and exploration should be undertaken in northern Wintering Lake to determine whether or not additional PGE-rich Cu-Ni sulphides are present in the area and if the original mafic-ultramafic intrusions were dyke-like or sill-like. High precision U-Pb zircon geochronology should be undertaken to determine the age of the mafic and ultramafic intrusive rocks at Wintering Lake.

Selected Bibliography

Dawson, A.S., 1952: Geology of the Partridge Crop Lake area; Manitoba Mines and Natural Resources, Mines Branch, Publication 41-1, 26p. , 1 map @ 1:126 720.

Hubregtse, J.J.M.W., 1978: Sipiwesk Lake-Landing Lake-Wintering Lake area; Manitoba Department of Mines, Resources and Environmental Management, Mineral Resources Division, Report of Field Activities 1978, p. 54-62.

Hubregtse, J.J.M.W., Charbonneau, R., Culshaw, N.G., 1978: Wintering Lake; Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Preliminary Map 1978N-3, Scale 1:50 000.

Peck, D.C., Cameron, H.D.M., Layton-Matthews, D., Bishop, A., 1996: Geological investigations of Anorthosite, gabbro and pyroxenite occurrences in the Pikwitonei granulite domain and the Cross Lake region (parts of NTS 63I/6, 63J/7, 63J/8, 63P/5, 63P/6, 63P/7, 63P/8, 63P/9, 63P/11 and 63P/12); in Report of activities, Manitoba Energy and Mines, Geological Services, Report of activities 1996, p. 85-90.

Name of Intrusion Landing Lake Mafic Intrusions Ref ID. 254

UTM

Easting	622000
Northing	6131700
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Boundary Zone and Pikwitonei Domain
Locality 2	

SIZE

Area (km2)	
Maximum Dimensions	Unknown

AGE DATA

Age Archean

Geochronological Data Not available

CLASSIFICATION

Intrusion Type Unknown

Geochemical Classification Tholeiitic - Low Ti

General Classification Mafic

Other Classification Unknown

GEOLOGY

Principal Rock Types Anorthosite, gabbro and pyroxenite and high-grade metamorphosed equivalents

Host Rocks Intermediate orthogneiss and derived migmatite

Layering Features Unknown

Metamorphic Grade Granulite facies

Deformation Complex polyphase folding and local development of shear zones

Synoptic Geology

The geology of the Landing Lake area is described by Hubregtse (1978). A brief description of mafic rocks occurring in the eastern part of Landing Lake is given by Peck et al. (1996). Scoates et al. (1978) describe Molson dykes occurring in the western part of the Lake. Most of the lake is poorly exposed but appears to be underlain by amphibolite facies and granulite facies orthogneiss and migmatite of Archean age. Anorthositic rocks of presumed Archean age were investigated by Peck et al. (1996) based on descriptions provided by Hubregtse (1978).

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

See Peck et al. (1996) and Hubregtse (1978).

Exploration History

Limited surface prospecting for Cu-Ni owing to low abundance of outcrop.

MAPPING

Most Detailed Mapping 1:50 000 scale (Hubregtse and Charbonneau, 1978)

Sketch Map Figure# No

Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63P)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.0476 to 1.0478

Whole-rock Analyses Numbers 2.348 to 2.351

Geochemical Features and PGE Abundances

See Tables 1 and 2.

Recommendations

Additional surface prosepcting of mafic and ultramafic intrusive rocks is required to determine the extent of these rock types in the area and if the rocks are prospective for PGE. This work should be undertaken in a year in which water levels on Landing Lake are significantly below normal levels.

Selected Bibliography

Hubregtse, J.J.M.W., 1978: Sipiwesk Lake-Landing Lake-Wintering Lake area; Manitoba Department of Mines, Resources and Environmental Management, Mineral Resources Division, Report of Field Activities 1978, p. 54-62.

Hubregtse, J.J.M.W. and Charbonneau, R., 1978: Landing Lake; Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Preliminary Map 1978N-4, Scale 1:50 000.

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Scoates, R.F.J., Macek, J.J., 1978: Molson dyke swarm; Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Geological Paper 78-1, 53p.

Name of Intrusion Cauchon Lake anorthosite complex Ref ID. 255

UTM

Easting	660500
Northing	6152400
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Boundary Zone and Pikwitonei Domain
Locality 2	

SIZE

Area (km2)	
Maximum Dimensions	25 km x approximately 1 km

AGE DATA

Age Archean

Geochronological Data See Heaman et al. (1986)

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Tholeiitic - Low Ti

General Classification Mafic

Other Classification Rifted Archean basement

GEOLOGY

Principal Rock Types Anorthosite and migmatized/deformed/metamorphosed equivalents. Local minor gabbro and pyroxenite layers.

Host Rocks Orthogneiss and derived migmatite of the Pikwitonei Domain

Layering Features Local modal layering

Igneous Textures Obscured by metamorphism and deformation

Metamorphic Grade Granulite facies

Deformation The entire anorthosite complex is affected by a northeast-trending set of high strain zones. Significant boudinage and minor folding. Local migmatization.

Synoptic Geology

See Weber (1976a) and Peck et al. (1996). Abundant reworking of original textures in numerous northeasterly-trending high strain zones in the northwestern part of Cauchon Lake has obscured primary layering and textures in the anorthosite complex. The anorthosite complex is affected by granulite and/or upper amphibolite facies metamorphism.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic

Assessment Files Not reviewed

Mineral Occurrences

Local disseminated pyrhhotite in gabbroic layers.

MAPPING

Most Detailed Mapping 1:50 000 scale (Weber, 1976b, c)

Sketch Map Figure# Yes

Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63P)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.0161 to 1.0171

Whole-rock Analyses Numbers 2.158 to 2.168

Geochemical Features and PGE Abundances

Light-rare-earth enrichment in comparison to primitive mantle. Very aluminous compositions (locally in excess of 30% Al2O3; see Table 2) reflecting accumulation of calcic plagioclase.

Recommendations

Additional surface prosepcting of anorthositic rocks is required to determine the extent of these rock types in the area and if the rocks are prospective for PGE. This work should be undertaken in a year in which water levels on Cauchon Lake are significantly below normal levels. Given the recent recognition of contact-type PGE mineralization in anorthositic layered intrusions of both Archean (e.g., Mayville intrusion, Manitoba; Peck et al., 1999) and Proterozoic age (Peck et al., 1993), all underexplored, large bodies of Archean megacrystic anorthosite such as the Cauchon Lake body warrant additional exploration for PGE.

Selected Bibliography

Heaman, L.M., Machado, N., Krogh, T.E., Weber, W., 1986: Preliminary U-Pb zircon results from the Pikwitonei granulite terrain, Manitoba; Geological Association of Canada, Mineralogical Association of Canada, Canadian Geophysical Union, 1986 Joint Annual Meeting, Program with Abstracts, v. 11, p. 79.

Peck, D.C., Cameron, H.D.M., Layton-Matthews, D., Bishop, A., 1996: Geological investigations of Anorthosite, gabbro and pyroxenite occurrences in the Pikwitonei granulite domain and the Cross Lake region (parts of NTS 63I/6, 63J/7, 63J/8, 63P/5, 63P/6, 63P/7, 63P/8, 63P/9, 63P/11 and 63P/12); in Report of activities, Manitoba Energy and Mines, Geological Services, Report of activities 1996, p. 85-90.

Peck, D.C., James, R.S. and Chubb, P.T., 1993. Geological environments for PGE-Cu-Ni mineralization in the East Bull Lake intrusion, Ontario. Exploration and Mining Geology, v.2, p. 85-104.

Peck, D.C., Theyer, P., Bailes, A.H., Chornoby, J., 1999: Field and lithogeochemical investigations of mafic and ultramafic rocks and associated Cu-Ni-PGE mineralization in the Bird River Greenstone belt (Parts of NTS 52L); Manitoba Industry, Trade and Mines, Geological Services, Report of activities 1999, p. 106-110.

Weber, W., 1976a: Cauchon, Partridge Crop and Apussigamasi lakes area; Manitoba Department of Mines, Resources and Environmental Management, Mineral Resources Division, Geological Survey, Report of Field Activities 1976, p. 54-57.

Weber, W., 1976b: Prud'homme Lake; Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Preliminary Map 1976U-1, Scale 1:50 000.

Weber, W., 1976c: Goulet Lake; Manitoba Mines, Resources and Environmental Management, Mineral Resources Division, Preliminary Map 1976U-2, Scale 1:50 000.

Name of Intrusion Mayville intrusion Ref ID. 256

UTM

Easting	739500
Northing	5614500
Zone	14

Location and Access

Accessibility	All-weather road
Locality 1	Superior Province - southeastern Manitoba
Locality 2	

SIZE

Area (km2)	
Maximum Dimensions	> 10 km x > 1 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type	Lopolith
Geochemical Classification	Tholeiitic - Low Ti
General Classification	Mafic-Ultramafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	Anorthosite, leucogabbro, gabbro, pyroxenite
Host Rocks	Basalt
Layering Features	Modally graded/weakly differentiated
Igneous Textures	Abundant megacrystic anorthosite, spectacular heterolithic magmatic breccia unit developed along the inferred base of the intrusion
Other Igneous Features	Varitextured and dendritic gabbro veins and pods
Metamorphic Grade	Amphibolite facies
Deformation	Relatively undeformed; local foliation development near lower contact with underlying basalt (shearing)

Synoptic Geology

See Peck et al. (1999) for a detailed description of the geology and mineral occurrences of the Mayville intrusion. The Mayville intrusion is principally composed of coarse-grained leucogabbro that grades to anorthosite and gabbro. Rare younging criteria such as modal and size graded layering, indicate that the intrusion is consistently north-facing. Planar, centimetre- and metre-scale modal layering is rarely developed. In the lowermost, exposed 150 m - 200 m of the southern part of the intrusion, irregular, inclusion-rich pyroxenite and melagabbro zones are developed (see below). The major lithostratigraphic units identified are (from base to top, with estimated true thickness shown in parenthesis - based on the type section for the central part of the Mayville intrusion, Peck et al., 1999, Fig. GS-27-2):
(1) Heterolithic Breccia zone (>120 m; based not exposed), comprises irregular pods, veins and layers, <1 to 100 m thick, of melagabbro and pyroxenite that have intruded, eroded and entrained fragments of pre-existing, semi-consolidated poikilitic and plagioclase megaphyric leucogabbro. The breccia unit also contains veins of fine-grained gabbro and pods and veins of varitextured, medium-grained to pegmatitic gabbro and quartz diorite. Basalt xenoliths are rarely observed. Sulphide mineralization is erratically developed throughout the breccia zone (see below);
(2) Lower Megacrystic zone (320 m), comprises alternating, decametre-thick, very-coarse-grained poikilitic and megacrystic leucogabbro subunits;
(3) Central Layered zone (220 m), comprises centimetre- and metre-scale modal and grain size layering in megacrystic anorthosite and leucogabbro, coarse-grained, poikilitic gabbro and massive, medium- to coarse-grained leucogabbro;
(4) Upper Megacrystic zone (110 m), similar to the Lower Megacrystic zone, but contains minor, centimetre-size partially digested, epidotized, granitic xenoliths;
(5) Upper Massive zone (350 m), including a lower, coarse-grained poikilitic leucogabbro that grades upward into massive, medium-grained leucogabbro with increasing proportions of granitic xenoliths;
(6) Gabbro zone (>20 m; top not exposed), comprises medium-grained gabbro with up to 15% centimetre- to metre-size granitic xenoliths and derived, interstitial granophyre (xenomelt).
The arrangement of rock types within the intrusion is typical of megacrystic anorthosite bodies that are described from other Archean granite-greenstone belts and to the basal, anorthositic parts of younger, ca. 2.48 Ga layered mafic intrusions in central Ontario (e.g., Peck et al., 1993). The geology of the intrusion can be explained by one or more pulses of Al-rich (hyperfeldspathic) basaltic magma that initially crystallized only plagioclase. Plagioclase crystallization led to enrichment of Mg and Fe in residual, interstitial magma that became denser than both the parental magma and the early-formed plagioclase crystals (primocrysts). The concentration of mafic rocks in the base of the intrusion and the presence of leucogabbro clasts in both pyroxenite and melagabbro in the Heterolithic Breccia zone may reflect ponding of dense, residual mafic liquid at the base of the intrusion.

PREVIOUS EXPLORATION

Geophysical Surveys Airborne magnetic/EM and ground magnetic/EM

Assessment Files Not reviewed

Mineral Occurrences

The Mayville intrusion hosts disseminated to semi-massive Cu-rich sulphide mineralization ("contact-type" mineralization) near its base. Maximum PGE abundances of 3 ppm were obtained by Peck et al. (1999) from the lower part of the mineralized zone, and values up to approx. 8 g/t combined Pd + Pt have been reported by Exploratus Limited. The rock types and sulphide mineralization in the Mayville intrusion have a striking resemblancer to those developed in the lower parts of ca. 2.48 Ga anorthositic intrusions in central Ontario (East Bull Lake intrusive suite; Peck et al., 1993). Several of the East Bull Lake suite of intrusions contain broad zones of contact-type, PGE-rich sulphide mineralization that became a focus for significant PGE exploration programs in 1998. Field observations suggest that the Mayville intrusion represents a dynamic magma chamber in which large-scale convection promoted the migration of dense components (immiscible magmatic sulphides and residual Mg- and Fe-rich magma) toward the base of the chamber. The development of large convection cells is believed to be a critical stage in the formation of PGE-rich "contact-type" sulphide mineralization in anorthositic intrusions. The intrusion hosts and known copper-rich sulphide deposit (Mayville deposit) and several Cu-Ni-PGE occurrences (e.g., Hititrite showing; Theyer, 1986).

Exploration History

Intermittently explored for magmatic sulphide mineralization. Historical trenches in the eastern part of the intrusion. Drilling by several companies, including Gods Lake Gold Mines, Falconbridge and Exploratus. Ground magnetic and EM surveys. Trenches established in 1999 by Exploratus. Extensive lithogeochemical database (see Tables 1 and 2).

MAPPING

Most Detailed Mapping 1:10 000 (Macek, 1985)

Sketch Map Figure# Yes

Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 52L)

Type Section Figure# Yes

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.0702 to 1.1002

Whole-rock Analyses Numbers 2.359 to 2.509

Geochemical Features and PGE Abundances

See Tables 1 and 2. In general, a significant correlation exists between Cu and PGE contents . The hosts rocks range from anorthosite to pyroxenite, and are characterized by low-Ti contents and primitive-mantle-like trace element contents.

Recommendations

In the opinion of the authors, the best known Archean analogue of contact-type PGE-Cu-Ni mineralization present in the Paleoproterozoic East Bull Lake suite of intrusions in Central Ontario.

Selected Bibliography

Macek, J.J., 1985: Cat Creek; Manitoba Energy and Mines, Geological Services, Preliminary Map 1985C-1, Scale 1:10 000.
Peck, D.C., James, R.S. and Chubb, P.T., 1993. Geological environments for PGE-Cu-Ni mineralization in the East Bull Lake intrusion, Ontario. Exploration and Mining Geology, v.2, p. 85-104.
Peck, D.C., Theyer, P., Bailes, A.H., Chornoby, J., 1999: Field and lithogeochemical investigations of mafic and ultramafic rocks and associated Cu-Ni-PGE mineralization in the Bird River Greenstone belt Parts of NTS 52L); Manitoba Industry, Trade and Mines, Geological Services, Report of activities 1999, p. 106-110.
Theyer, P. 1986: Platinum group elements in southeastern Manitoba; Manitoba Energy and Mines, Geological Services Branch, Report of Field Activities 1986, p.125-130.

Name of Intrusion Benn Lake Intrusion Ref ID. 258

UTM

Easting	327760
Northing	6075005
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Trans-Hudson Orogen - Flin Flon-Snow Lake Domain
Locality 2	Flin Flon Belt

SIZE

Area (km2)	20
Maximum Dimensions	> 10 km x 1.7 km

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Unknown

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbronorite, gabbro

Host Rocks Metavolcanic rocks of the Flin Flon greenstone belt

Layering Features Unknown

Igneous Textures Poikilitic gabbro

Metamorphic Grade Greenschist facies

Synoptic Geology

See Bailes and Syme (1989) for details. The Benn Lake intrusion appears to be coeval and possibly comagmatic with the adjacent Mikanagan Lake sill, but appears to be more massive and does not appear to contain the evolved ferrodiorite/tonalite suite of rocks that occur in the upper parts of the Mikanagan Lake sill.

PREVIOUS EXPLORATION

Assessment Files not reviewed

Mineral Occurrences

not reviewed

Exploration History

not reviewed

MAPPING

Most Detailed Mapping 1:20 000 scale (Bailes and Syme (1989)

Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63K)

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.0002 to 1.0003

Whole-rock Analyses Numbers 2.027 to 2.029

Geochemical Features and PGE Abundances

see Tables 1 and 2

Selected Bibliography

Bailes, A.H., Syme, E.C., 1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 87-1, 313p.

Name of Intrusion Butterfly Lake Intrusion Ref ID. 259

UTM

Easting	608500
Northing	6032000
Zone	14

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Cross Lake Greenstone Belt

SIZE

Area (km2)	20
Maximum Dimensions	8 km x > 1 km

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

Geochemical Classification Tholeiitic - Low Ti

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Leucogabbro, anorthosite, gabbro

Host Rocks Metavolcanic rocks of the Cross Lake greenstone belt

Layering Features Unknown

Igneous Textures Megacrystic anorthosite

Metamorphic Grade Amphibolite facies

Synoptic Geology

See Peck et al. (1996) for details. The anorthositic intrusion that occurs between Butterfly and Hairy Lakes within the southern part of the Cross Lake greenstone belt (NTS 63I) appears to be relatively massive in comparison to similar anorthositic bodies in the Cross Lake Belt (Peck et al., 1996). Abundant megacrystic anorthosite is the predominant lithology seen in outcrops of this intrusion, but this likely reflects the fact that more mafic rock types in the intrusion are less resistant to weathering and hence are poorly exposed (this is the case in the Pipestone Lake anorthosite complex).

PREVIOUS EXPLORATION

Assessment Files not reviewed

Mineral Occurrences

not reviewed

Exploration History

not reviewed - a strongnorth-trending linear (airborne) magnetic anomaly is associated with the intrusion

MAPPING

Most Detailed Mapping 1:20 000 scale (Corkery, 1996)

Sketch Map Figure# No

Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63I)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.0116 to 1.0136

Whole-rock Analyses Numbers 2.145 to 2.151

Geochemical Features and PGE Abundances

see Tables 1 and 2

Recommendations

As is the case with all megacrystic anorthosite bodies in the Province of Manitoba, it is recommended that prospecting for contact-type (basal magmatic sulphide accumulations) PGE-Cu-Ni deposits be carried.

Selected Bibliography

Corkery, M.T., 1986: Butterfly Lake area; Manitoba Energy and Mines, Minerals Division, Preliminary Map 1986N-1, Scale 1:20 000.

Peck, D.C., Cameron, H.D.M., Layton-Matthews, D., Bishop, A., 1996: Geological investigations of Anorthosite, gabbro and pyroxenite occurrences in the Pikwitonei granulite domain and the Cross Lake region (parts of NTS 63I/6, 63J/7, 63J/8, 63P/5, 63P/6, 63P/7, 63P/8, 63P/9, 63P/11 and 63P/12); in Report of activities, Manitoba Energy and Mines, Geological Services, Report of activities 1996, p. 85-90.

Name of Intrusion West Pipestone Lake ultramafic intrusion Ref ID. 260

UTM

Easting	582750
Northing	6042450
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Cross Lake Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	Approximately 1 km x >100 metres

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Sill

General Classification Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Peridotite, pyroxenite

Host Rocks Basalt of the Pipestone Lake Group

Layering Features Local modal layering

Igneous Textures Cumulates (olivine cumulates)

Other Igneous Features Local chromite-rich schlieren

Metamorphic Grade Amphibolite facies

Synoptic Geology

See Rousell (1965). Little is known about the geology of this small ultramafic intrusion. It may be coeval with the host basalt units and/or the Pipestone Lake anorthosite complex, which occurs immediately to the south of this ultramafic body. It appears to be layered on a cm-scale, and is made up of peridotite with variable olivine:pyroxene ratios and chromite content.

PREVIOUS EXPLORATION

Assessment Files not reviewed

Mineral Occurrences

not reviewed - likely the source of the "pipestone" (serpentinite and/or talc-carboante altered ultramafic rocks sourced on Pipestone Lake from which the lake derives its name)

Exploration History

not reviewed

MAPPING

Most Detailed Mapping 1:20 000 scale (Corkery and Cameron, 1985)

Sketch Map Figure# No

Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63I)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.1399 to 1.1406

Whole-rock Analyses Numbers 2.793 to 2.801

Geochemical Features and PGE Abundances

see Tables 1 and 2

Recommendations

Given the anomalously low PGE values in the adjacent Pipestone Lake anorthosite complex (PLAC; Table 1), it is recommended that the West Pipestone Lake ultramafic intrusion be explored for PGE-Cu-Ni mineralization, given the possibility that it may be related to a missing, ultramafic component of the PLAC.

Selected Bibliography

Corkery, M.T., Cameron, H.D.M., 1985: Pipestone Lake; Manitoba Energy and Mines, Geological Services, Preliminary Map 1985N-2.

Rousell, D.H. 1965: The petrology of Archean and Proterozoic rocks at Cross Lake, Manitoba, and the effects of the Hudsonian orogeny; Ph.D. thesis, University of Manitoba, 178p.

Name of Intrusion Kiskitto Lake Intrusion (West Channel Anorthosite Complex) Ref ID. 261

UTM

Easting	551000
Northing	6037000
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Superior Boundary Zone and Pikwitonei Domain
Locality 2	Cross Lake Greenstone Belt

SIZE

Area (km2)	1000
Maximum Dimensions	> 60 km long x > 20 km wide x >0.5 km thick

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type	Unknown
Geochemical Classification	Tholeiitic - Low Ti
General Classification	Mafic
Other Classification	Greenstone belt

GEOLOGY

Principal Rock Types	Leucogabbro, gabbro, anorthosite, melagabbro, massive magnetite-ilmenite layers, oxide-rich gabbro
Host Rocks	Orthogneiss of the Pikitonei Domain and supracrustal rocks of the Cross Lake greenstone belt
Layering Features	Local modal layering
Metamorphic Grade	Not uniform
Deformation	Affected by regional-scale complex large-scale folding, producing complex dome and basin pattern involving the intrusion and basement gneiss and (younger?) granitic rocks

Synoptic Geology

The Kiskitto Lake intrusion is generally poorly exposed but a few areas of abundant outcrop are present to the north of the east end of Kiskitto Lake. The intrusion is also exposed on a few shoreline outcrops (north shore of the lake) and on isolated outcrop areas present in a vast string bog that extends north of the north shoreline of Kiskitto Lake. The regional geology is described by Bell (1978). The geology of the intrusion is described by McRitchie (1986) and Peck et al. (1996). Recent drill core studies (Peck, unpublished) based on core provided by Gossan Resources Ltd. show that the Kiskitto Lake intrusion is a complexly folded sill-like (?) body covering an area of approximately 10,000 km2. It is also referred to as being part of the West Channel anorthosite complex and the Nelson River anorthosite complex (see McRitchie, 1986 and Bell, 1978). The maximum thickness of the intrusion is not known, but drilling by Gossan Resources Limited indicates that locally, the intrusion is at least 500 metres thick. The intrusion is well-layered (cm- to decametre-scale) and likely contains megacyclic units similar to those described for the Pipestone Lake anorthosite complex (PLAC; see Peck et al., 1994). The orthopyroxene-in isograd that defines the eastern boundary of the Pikwitonei Domain crosses the eastern part of the intrusion. For the most part, the rocks of the intrusion are recrystallized but preserve their megascopic primary textures. The central parts of the intrusion appear to have been metamorphosed at the granulite facies, whereas the western and eastern ends of the body appear to have been metamorphosed (retrogressed?) at lower temperatures (amphibolite facies). Megacrystic anorthosite and deformed equivalents (including "schollen" anorthosite gneiss and "enderbite" derived from anorthosite and leucogabbro) are the predominant rock type seen in the surface outcrops of the intrusion. However, Gossan Resources Ltd.'s drill core indicates that there is roughly and equal amounts of gabbroic and anorthositic rocks (interlayered) in the Kiskitto Lake intrusion, as is the case for the PLAC.

PREVIOUS EXPLORATION

Geophysical Surveys	Airborne magnetic and ground magnetic
Assessment Files	not reviewed

Mineral Occurrences

Massive and semi-massive magnetite-ilmenite mineralization hosted by layered gabbroic to anorthositic rocks intersected in drill holes completed by Gossan Resources Ltd. (1995/96).

Exploration History

Explored for magmatic Fe-Ti-V oxide mineralization by Gossan Resources Ltd. (1995/96). Airborne magnetic survey and follow-up diamond drilling.

MAPPING

Most Detailed Mapping	1:50 000 scale (Lenton et al., 1986)
Sketch Map Figure#	No
Regional Mapping	1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63J)
Type Section Figure#	No

GEOCHEMISTRY

Geochemistry	Whole-rock Geochemistry, including REE and PGE Analyses
PGE Analyses Numbers	1.0456 to 1.0469
Whole-rock Analyses Numbers	2.327 to 2.341

Geochemical Features and PGE Abundances

See Tables 1 and 2. Despite its apparently coeval and presumed comagmatic relationship to the adjacent Pipestone Lake anorthosite complex (PLAC), the Kiskitto Lake intrusion is characterized by extreme enrichment in light-rare-earth elements in comparison to primitive mantle, giving it an arc-like trace element geochemical signature distinct from the mantle-like signature of the PLAC. Oxide mineralization appears to be stratiform/magmatic, and is concentrated in melagabbroic layers.

Recommendations

The Kiskitto Lake intrusion appears to represent the largest anorthositic intrusion in Manitoba. Deformation associated with the collisional orogeny involving the Superior Boundary Zone and the Trans-Hudson Orogen has produced a complex fold pattern in the Kiskitto Lake area, making it very difficult to determine the original size and shape of the intrusion. Nevertheless, given that it can be generally classified as an Archean megacrystic anorthosite body, and given the presence of contact-type PGE-Cu-Ni mineralization in both the Mayville intrusion and Bird River Sill (Peck et al., 1999) in southeastern Manitoba (both having megacrystic anorthosite components), it is recommended that exploration for PGE-Cu-Ni mineralization in the Kiskitto Lake intrusion is warranted.

Selected Bibliography

Bell, C.K., 1978: Geology, Wekusko Lake map area, Manitoba; Geological Survey of Canada, Memoir 384, 84p.
Lenton, P.G., McRitchie, W.D., Corkery, M.T., Cameron, H.D.M., 1986: Kiskitto, Kiskittogisu, Playgreen lakes; Manitoba Energy and Mines, Minerals Division, Preliminary Map 1986N-2.
McRitchie, W.D., 1986: Nelson River anorthosite studies; Manitoba Energy and Mines, Minerals Division, Report of Field Activities 1986, p. 152-166.
Peck, D.C., Cameron, H.D.M., Layton-Matthews, D., Bishop, A., 1996: Geological investigations of Anorthosite, gabbro and pyroxenite occurrences in the Pikwitonei granulite domain and the Cross Lake region (parts of NTS 63I/6, 63J/7, 63J/8, 63P/5, 63P/6, 63P/7, 63P/8, 63P/9, 63P/11 and 63P/12); in Report of activities, Manitoba Energy and Mines, Geological Services, Report of activities 1996, p. 85-90.
Peck, D.C., Messing, C., Halden, N.M., Chandler, C., 1998: New insights into the petrogenesis of the Pipestone Lake anorthosite complex and its Ti-V-Fe oxide deposits (parts of NTS 63I/5 and I/12); Manitoba Energy and Mines, Geological Services, Report of activities 1998, p. 127-134.

Name of Intrusion Edmund Lake Gabbroic Intrusions Ref ID. 262

UTM

Easting	876900
Northing	6075000
Zone	15

Location and Access

Accessibility	Fixed-wing
Locality 1	Superior Province - Gods Lake Domain
Locality 2	Edmund - Stull Greenstone Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

Age Archean

CLASSIFICATION

Intrusion Type Unknown

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbroic rocks, layered

Host Rocks Supracrustal rocks of the Edmund-Margaret Lakes Belt

Layering Features Local modal layering

Synoptic Geology

Several occurrences of layered gabbroic rocks are described by Corkery (1996a). Most of these intrusions are thin (< 100 m) sills or dykes composed of fine- to medium-grained gabbro, emplaced into basalt sequences.

PREVIOUS EXPLORATION

Assessment Files not reviewed

Mineral Occurrences

not reviewed

Exploration History

not reviewed

MAPPING

Most Detailed Mapping 1:20 000 scale (Corkery, 1996b)

Sketch Map Figure# No

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.0219 to 1.0222

Whole-rock Analyses Numbers 2.233 to 2.236

Geochemical Features and PGE Abundances

See Tables 1 and 2.

Selected Bibliography

Corkery, M.T., 1996a: Geology of the Edmund Lake area (53K/11NE); in Report of activities, Manitoba Energy and Mines, Geological Services, Report of activities 1996, p. 11-13.
Corkery, M.T., 1996b: Edmund Lake; Manitoba Energy and Mines, Preliminary Map 1996S-1.

Name of Intrusion Elbow Lake Gabbro (South Elbow Gabbro) Ref ID. 263

UTM

Easting	380300
Northing	6074600
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Trans-Hudson Orogen - Flin Flon-Snow Lake Domain
Locality 2	Flin Flon Belt

SIZE

Area (km2)	5
Maximum Dimensions	5.3 km x 1.3 km

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic-Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabro, subordinate dunite, peridotite and pyroxenite

Host Rocks Claw Lake basalts

Layering Features Local modal layering

Igneous Textures Local gabbro pegmatite pods, some large, layered mafic pegmatite bodies occur in the intrusion

Deformation Locally cut by major shear zones

Synoptic Geology

See Syme (1991). Similar to Limestone Narrows complex and other subvolcanic mafic-ultramafic intrusions in the Flin Flon belt. Possibly part of a larger layered intrusion (see Syme, 1991).

PREVIOUS EXPLORATION

Assessment Files not reviewed

Mineral Occurrences

not reviewed

Exploration History

not reviewed

MAPPING

Most Detailed Mapping 1:20 000 scale (Syme and Whalen, 1991)

Sketch Map Figure# No

Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63K)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.0223 to 1.0225

Whole-rock Analyses Numbers 2.237 to 2.240

Geochemical Features and PGE Abundances

See Tables 1 and 2.

Selected Bibliography

Syme, E.C., 1991: Elbow Lake project - Part A : supracrustal rocks and structural setting; Manitoba Energy and Mines, Minerals Division, Report of activities 1991, p. 14-27.
Syme, E.C., Whalen, J.B., 1991: Elbow Lake (part of NTS 63K/15W); Manitoba Energy and Mines, Geological Survey of

Canada, Preliminary Map 1991F-3.

Name of Intrusion Fraser Lake Intrusion Ref ID. 264

UTM

Easting	371800
Northing	6295600
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Trans-Hudson Orogen - Lynn Lake Domain
Locality 2	Lynn Lake Greenstone Belt

SIZE

Area (km2)	10
Maximum Dimensions	5 km x >2 km

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Unknown

General Classification Mafic-Ultramafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbro, pyroxenite, peridotite

Host Rocks Wasekwan Group supracrustal rocks

Other Igneous Features See Hulbert (1978)

Metamorphic Grade Greenschist facies

Synoptic Geology

Part of the Lynn Lake suite of mafic-ultramafic sills and plugs (Pre-Sickle suite - Gilbert et al., 19994). See Hulbert (1978) for detailed description of the body and its Ni-Cu mineralization. Regional geology described in Milligan (1960) and Gilbert et al. (1980).

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Not reviewed. See Hulbert (1978) and Pinsent (1980).

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping 1:50 000 scale (Gilbert et al., 1980)

Sketch Map Figure# Yes

Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 64C)

Type Section Figure# Yes

GEOCHEMISTRY

Geochemistry Base Metal Assay and PGE Analyses

PGE Analyses Numbers 1.0363 to 1.0391

Selected Bibliography

Gilbert, H.P., Syme, E.C., Zwanzig, H.V., 1980: Geology of the metavolcanic and volcaniclastic metasedimentary rocks in the Lynn Lake area; Manitoba Energy and Mines, Mineral Resources Division, Geological Paper 80-1, 118p.
Hulbert, L.J., 1978: Geology of the Fraser Lake gabbro complex, Manitoba; M.Sc. thesis, University of Regina.
Milligan, G.C., 1960: Geology of the Lynn Lake district; Manitoba Mines and Natural Resources, Mines Branch, Publication 57-1, 317p.
Pinsent, R.H., 1980: Nickel-copper mineralization in the Lynn Lake gabbro; Manitoba Energy and Mines, Mineral Resources

Division, Economic Geology Report 79-3.

Name of Intrusion Hook Lake Intrusion Ref ID. 265

UTM

Easting	319780
Northing	6064360
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Trans-Hudson Orogen - Flin Flon-Snow Lake Domain
Locality 2	Flin Flon Belt

SIZE

Area (km2)	
Maximum Dimensions	

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Sill

General Classification Mafic

Other Classification Greenstone belt

GEOLOGY

Principal Rock Types Gabbronorite, ferrogabbro, leucotonalite

Host Rocks Basaltic sequences of the Flin Flon Belt

Synoptic Geology

Differentiated, Y-shaped gabbroic intrusion with a similar range of rock types to the Mikanagan Lake Sill (Bailes and Syme, 1989), i.e., gabbronorite, ferrogabbro and leucotonalite.

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Not reviewed

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping 1:20 000 scale (Bailes and Syme, 1989)

Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63K)

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.0422 to 1.0423

Whole-rock Analyses Numbers 2.276 to 2.278

Selected Bibliography

Bailes, A.H., Syme, E.C., 1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 87-1, 313p.

Name of Intrusion Wonderland Gabbro Ref ID. 267

UTM

Easting	323487
Northing	6067849
Zone	14

Location and Access

Accessibility	Boat
Locality 1	Trans-Hudson Orogen - Flin Flon-Snow Lake Domain
Locality 2	Flin Flon Belt

SIZE

Area (km2)	
Maximum Dimensions	Approx. 1.5 km x 1 km

AGE DATA

Age Proterozoic

CLASSIFICATION

Intrusion Type Unknown

General Classification Mafic-Ultramafic

GEOLOGY

Principal Rock Types Gabbro, pyroxenite

Synoptic Geology

See Bailes and Syme (1989)

PREVIOUS EXPLORATION

Assessment Files Not reviewed

Mineral Occurrences

Not reviewed

Exploration History

Not reviewed

MAPPING

Most Detailed Mapping 1:20 000 scale (Bailes and Syme, 1989)

Sketch Map Figure# No

Regional Mapping 1:250 000 scale (Bedrock Geology of Manitoba Compilation Map Series, NTS 63K)

Type Section Figure# No

GEOCHEMISTRY

Geochemistry Whole-rock Geochemistry, including REE and PGE Analyses

PGE Analyses Numbers 1.1410 and 1.1411

Whole-rock Analyses Numbers 2.811 to 2.814

Geochemical Features and PGE Abundances

See Tables 1 and 2

Selected Bibliography

Bailes, A.H., Syme, E.C., 1989: Geology of the Flin Flon-White Lake area; Manitoba Energy and Mines, Geological Services, Geological Report 87-1, 313p.