Manitoba
Energy and Mines
Geological Services
Geological Compilation Map Series
Oxford House, NTS 53L
1:250 000

MARGINAL NOTES

The Oxford House map area (NTS 53L) is in the northwestern Superior Province and is part of the Cross Lake subprovince (Stockwell, 1961) or the Sachigo subprovince (Ermanovics and Froese, 1978). The north-central part of the area lies within the Gods Lake domain and the southern part of the Oxford House area comprises part of the Molson Lake domain.

The **Gods Lake domain**[1] contains three supracrustal belts which comprise the western part of a terrane that extends laterally for 500 km to Big Trout Lake (Ontario) in the east. The belts are surrounded by granitoid plutons and related gneisses which intrude the margins of the supracrustal belts. These are (from north to south):

(1) Oxford Lake-Knee Lake-Gods Lake belt
(2) Munro Lake belt
(3) Aswapiswanan Lake-Beaver Hill Lake-Goose Lake belt

Relative ages between the greenstone belts are unknown and the stratigraphy cannot be correlated directly between the belts.

The Oxford Lake-Knee Lake-Gods Lake belt consists of a lower, mainly volcanic section (Hayes River Group - HRG) which has been intruded by tonalitic to granitic plutons and related gneisses (Bayly Lake Complex - BLC); these rocks are unconformably overlain by a volcano-sedimentary section (Oxford Lake Group - OLG) (Hubregtse, 1976 and 1985; Gilbert, 1985). U-Pb zircon data by Davis (pers. comm.) indicates an age of 2830 Ma for the upper HRG; the BLC yields ages of 2883, 2783 and 2730 Ma, consistent with field evidence that the complex largely postdates the HRG. An age of 2706 +4/-2 Ma was obtained for the lower OLG and a minimum age for the OLG is indicated by an estimated age of 2692 Ma for a granite emplaced in the upper OLG.

The HRG (up to 11 km thick) comprises pillowed and massive basalt with abundant related gabbro, subordinate ultramafic sills, and minor intermediate and felsic flows, fragmentals and sedimentary rocks. The original extent of the essentially bimodal volcanic section is unknown due to intrusive or faulted contacts at the base and an erosional upper contact. At Oxford Lake, basalt in the lower HRG is mostly plagioclase-phyric whereas the upper HRG flows are mainly aphyric. Plagioclase-megaphyric basalt (locally pillowed) is a minor component of the group. The lower HRG at Oxford Lake consists largely of intravolcanic gabbros (H**B**) and contains sporadic ultramafic sills (H**U**); similar ultramafics occur in the middle and upper HRG at Knee Lake. These rocks may include minor extrusive phases (at Oxford Lake) and possibly younger, post-HRG intrusions. Hubregtse (1976, 1978) recognized six volcanic cycles in the HRG at southern Knee Lake, defined by lower mafic tholeiitic sections with intermediate to felsic calc-alkaline caps. Oxide iron formations occur sporadically in the HRG and a large body of volcanic-derived sedimentary rocks (H**V**) occurs in the upper HRG at the narrows of Knee Lake.

The Bayly Lake Complex (BLC) consists largely of tonalitic to granodioritic intrusions and granitoid gneisses, commonly layered and with minor amphibolite interlayers, which may in part be derived from supracrustal rocks. The granitoid rocks are divided into:

(1) Gneissoid tonalite-granodiorite terranes (B**T**) ± subordinate amphibolite which occur between the supracrustal belts, and;

(2) Relatively more homogeneous and massive plutons of granodiorite with subordinate tonalite (B**G**) which are commonly microcline-and/or quartz-phyric. The plutons occur mainly at the margins of the supracrustal belts.

U-Pb zircon data from the BLC (above) indicate plutonism lasted at least 150 million years.

The Lynx Bay assemblage in western Oxford Lake consists of intermediate volcanic fragmental rocks and related porphyries and sedimentary rocks. The assemblage is interpreted (Hubregtse, 1985) as genetically related to spatially associated porphyritic tonalite (BLC) and displays a lithologic zonation indicating the proximity of a volcanic centre. These rocks are characterized by intense faulting, sulphide mineralization, and hydrothermal alteration resulting in the development of chloritoid and andalusite. The composition, textures and setting of the Lynx Bay assemblage are distinctly different from those of the HRG; the assemblage is largely intermediate, commonly porphyritic, with adjacent igneous counterparts, whereas the HRG is mainly mafic and aphyric, with no recognized related plutons. Contacts between the BLC and HRG are intrusive or faulted, locally with evidence of intense deformation (e.g. cataclasite near Magill Lake and blastomylonite at Gods Lake Narrows).

The Oxford Lake Group (OLG) comprises a lower, largely volcanic subgroup of limited extent overlain by more extensive sedimentary rocks in a basin (graben?) up to 20 km wide extending from Oxford Lake to Magill Lake. Equivalent sedimentary rocks occur in a more restricted section extending through Gods Lake Narrows. The volcanic subgroup of the OLG is significantly different from the HRG volcanics: fragmentals, not flows, are predominant; the volcanism is not cyclic; and the rocks are chemically distinct, comprising calc-alkaline to shoshonitic types (Hubregtse, 1976; Brooks et al., 1982; Gilbert, 1985). Polymictic conglomerate (O**C**) occurs extensively at the base of the OLG except where the lower volcanic subgroup is developed and the conglomerate conformably overlies these subaqueous volcanics, which have been reworked into the conglomerate. Elsewhere, the conglomerate is derived from the BLC and the HRG, with which it is unconformable. Vertical zonation in the OLG sediments indicates progressively deeper levels of erosion in the source area from the Lynx Bay assemblage down to older plutonic rocks of the BLC. Above the polymictic conglomerate (which is up to 2.4 km wide at Oxford Lake) diverse fine grained sediments (O**W**) and intraformational conglomerates represent shallow- to deep-water depositional environments; a progressive deepening of the sedimentary basin occurs away from the underlying OLG volcanics at eastern Oxford Lake.

Two orogenic events have been recognized (pre- and post-OLG) in the Oxford Lake-Knee Lake-Gods Lake belt. Major structural trends are commonly influenced by the configurations of flanking granitoid intrusions and thus the ages of major folds in the HRG are generally uncertain; only where folds are truncated by intrusions of the BLC (e.g. at Gods Lake) can an early age be determined. The HRG section is monoclinal and south-facing in the Oxford Lake-southern Knee Lake area, but major folds are developed in the mafic volcanic section at Gods Lake. Repeated tight to isoclinal folds are characteristic of the sedimentary HRG section at the narrows of Knee Lake and the OLG strata. Structural unconformity between the OLG and HRG is evident at some localities, but not at outcrop scale. The unconformity is also demonstrated by truncation of early metamorphic zones in the HRG by later metamorphism, and by analysis of the metamorphic history at Oxford Lake (Hubregtse, 1985); the PT ratio was higher for M1 (first orogenic event, confined to the HRG) than for M2 (second orogenic event) which affected the OLG and all older rocks. Major, late wrench faults with displacements estimated at up to 15 km occur within the supracrustal belts, parallel to the late faulting (Hubregtse, 1985). Major faults are interpreted along the margins of some belts, at the contacts with tonalitic gneiss (e.g. at the south margins of the Oxford Lake-Knee Lake-Gods Lake belt, and the Munro Lake belt). Movement along these contacts was possibly initiated early and later rejuvenated, with development of blastomylonite and emplacement of concordant granitoid bodies. Several minor ultramafic intrusions occur at the faulted south margin of the Munro Lake belt.

Late intrusions associated with the second orogenic event occur at Oxford Lake (syntectonic Semple River granodiorite) and Magill Lake (late tectonic granite); the latter is a highly fractionated granite with abundant related pegmatite (P. Cerny, pers. comm.; Lenton, 1985). Post-OLG gabbro and diabase dykes include a pre-orogenic set (deformed by the second orogenic event) and late undeformed dykes related to the 1884 Ma Molson and late Proterozoic Mackenzie swarms (Fahrig et al., 1965; Scoates and Macek, 1978; Machado et al., 1986).

The Munro Lake greenstone belt, interpreted as a major synclinal structure (Elbers, in prep.) is lithologically similar to the Hayes River Group. However, correlation is not established owing to lack of continuity and stratigraphic differences - greywacke and minor argillite (commonly porphyroblastic) are more extensive at Munro Lake than in the HRG section to the north, and amphibolite rather than greenschist facies is the prevalent metamorphic grade. Possible equivalents of the OLG rocks have not been found at Munro Lake. The tonalitic gneiss terrane (BLC) surrounding the Munro Lake belt may, in part, predate the latter (Elbers, op. cit.) but their relative ages and possible correlation with the HRG remain uncertain. The Munro Lake belt is more comparable with the Goose Lake belt than with the supracrustal rocks of the Oxford Lake-Knee Lake-Gods Lake area (Elbers, op. cit.) but the sedimentary rocks of these belts are distinctive. Those at Munro Lake consist mainly of intermediate greywacke (commonly with cordierite) whereas at Goose Lake intravolcanic epiclastics are mainly mafic, calcic rocks (with hornblende ± carbonate) with only minor cordierite-bearing, semipelitic units. Crossbedded arkose, greywacke (**S**) and related, granodiorite-derived conglomerate (**C**) comprise a section up to 2.2 km wide along the north side of the volcano-sedimentary rocks at Goose Lake. The arkose/conglomerate unit is less deformed and metamorphosed than the volcanic section to the south, and although interpreted as older than the latter (Elbers, op. cit.) is re-assigned to the upper part of the Goose Lake supracrustal section based on review of structural data and the similarity of the arkose/conglomerate unit with the fluvial uppermost sections of the Island Lake and Cross Lake belts (NTS 53E and 63-I).

The **Molson Lake domain** contains predominantly igneous rocks with migmatitic enclaves. Two distinct suites of igneous rocks are recognized:

(1) tonalite to tonalitic gneiss with discontinuous lenses of diorite and agmatitic amphibolite all of which are intruded extensively by leucotonalite (**T**l);

(2) major granodiorite intrusions (**G**), a localized pyroxene monzodiorite body (**Z**x) and numerous stocks of granite to pegmatitic granite.

Field evidence indicates that a suite of diorites and tonalites intruded a suite of altered supracrustal rocks consisting of massive and finely layered amphibolites and variably garnetiferous, quartzofeldspathic gneisses. All these rocks were pervasively intruded by leucocratic tonalite resulting in gneissic and migmatitic enclaves of the older rocks within the leucocratic tonalite. The suite of tonalite rocks (**T**) of the Molson Lake domain is similar to the gneissoid tonalites (B**T**) of the Bayly Lake Complex (Gods Lake domain).

A suite of variably deformed and recrystallized mafic dykes (**B**x) postdates the emplacement of the leucotonalite and associated migmatization but apparently predates the major granodiorite intrusions. The granodioritic rocks comprise large areas of a microcline-megaphyric phase (**G**k), a more localized hornblende-bearing, coarse grained phase (**G**h) and a coarse grained, biotite granodiorite (**G**). Some areas of the leucotonalite (**T**l) are variably intruded by the granodiorite and are mapped as a distinct mixed or hybrid terrane (**Th**l).

A pyroxene monzodiorite (**Z**x), which extends into the Cross Lake map area to the west (NTS 63-I), yields a U-Pb zircon age of 2705 ± 6 Ma (Turek et al., 1985). This age is identical to that of the consanguineous (?) volcanic rocks of the lower Oxford Lake Group (2706 +4/-2 Ma) in the Gods Lake domain. The monzodiorite clearly intrudes the earlier tonalitic gneiss - leucotonalite complexes, but its age relative to the granodiorite suite is uncertain. Granite to pegmatitic granite appears to be the youngest intrusive rock. Dykes of granite cross-cut the granodiorite and the pyroxene monzodiorite. Granite has a uranium background value of 8 ppm but is locally enriched (Soonawala, 1979) with uranium values in the 25 ppm range (up to 65 ppm).

In the **Oxford House region** geochemical, lithological and structural data (Hubregtse, 1976, 1978, 1985; Brooks et al., 1982) suggest that the HRG formed in a rifting environment with only a few (subaerial) felsic volcanic islands on relatively thin (ca. 15 km) crust. Intrusion of the BLC - formed possibly through partial melting of sagging HRG rocks - increased the crust to continental thickness (approximately 30 km). The OLG includes sediments and shoshonitic to calc-alkaline volcanics representing waning Archean volcanism, with comagmatic(?) plutonic equivalents at Cinder Lake (syenite complex) and in the Molson Lake domain (monzodiorite, **Z**x). Highly fractionated granitoid melts such as the Magill Lake granite were probably derived through partial melting of (granulite facies?) deeper crust (Clark and Weber, 1987) where they were enriched in incompatible elements. Fractionation and rare element enrichment may have occurred during ascent into higher crustal levels.

The absence of volcanic rocks and the occurrence of probable plutonic counterparts of the OLG in the Molson Lake domain are consistent with the interpretation of syn- or post-OLG uplift of the Molson Lake domain relative to the Gods Lake domain. Prominent normal(?) faults such as the one on the south side of the Oxford Lake-Knee Lake-Gods Lake belt may have been caused by a tensional regime (possibly related to uplift of the Pikwitonei granulites farther north and west). Faults such as the one along the south margin of the Munro Lake belt with ultramafic lenses may represent reverse faults or thrusts.

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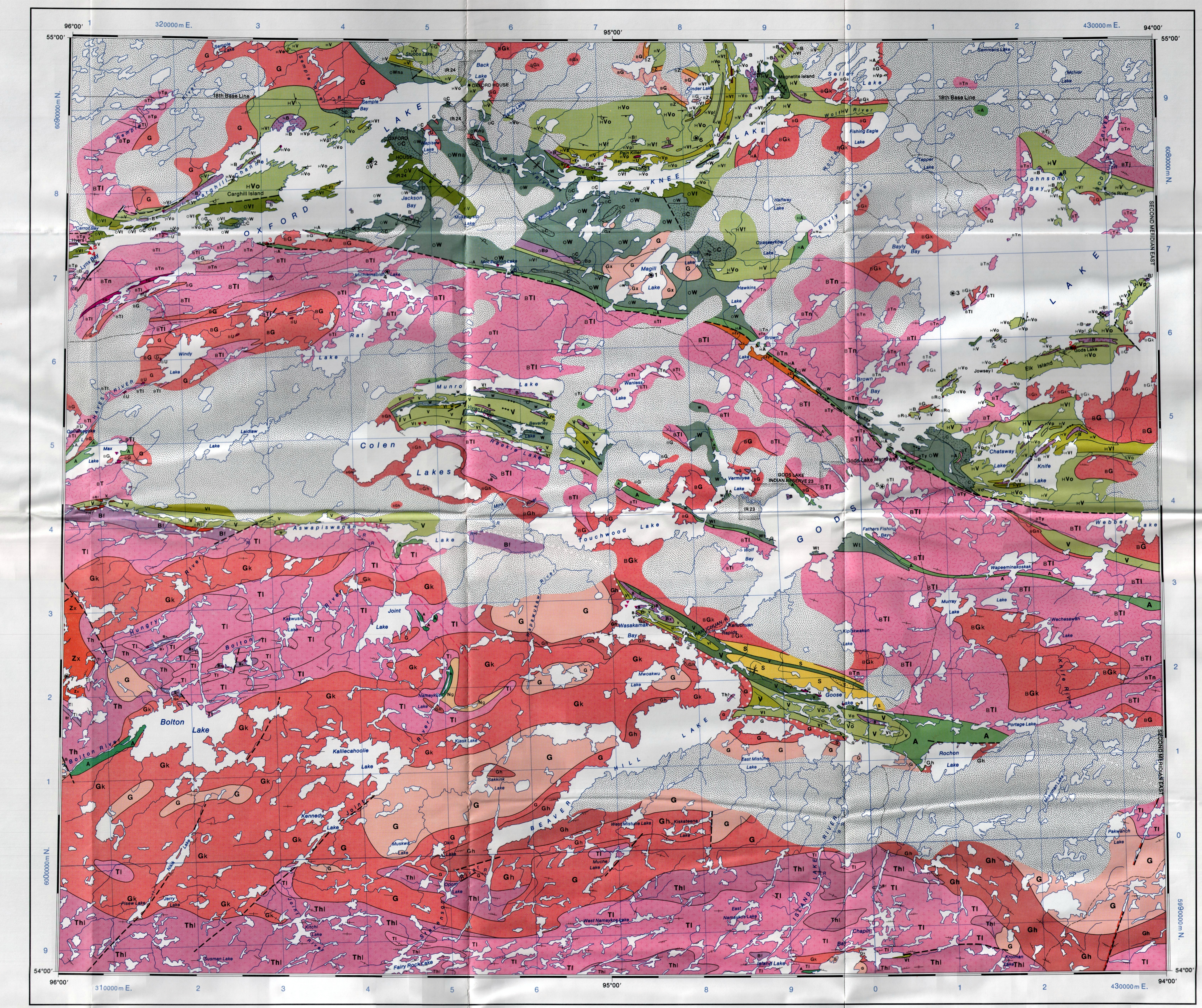
[1] Unless otherwise noted, domain descriptions are only applicable to the Oxford House map sheet (NTS 53L).



Printed 1988

Scale 1:250 000

KILOMETRES 5 0 5 10 15 20 25 KILOMETRES

LEGEND

PRECAMBRIAN

Proterozoic

Symbol	Description
⟍	Gabbro, diabase (Mackenzie swarm)
⟋	Gabbro, diabase (Molson swarm)

Archean

GODS LAKE DOMAIN

Post-Oxford Lake Group Plutonic Rocks

	Unit	Description
	B	Gabbro
1 ⊛	G	Granite; 1: *ca. 2692 Ma;* **Gx** - pegmatitic granite
	G	Granodiorite, porphyritic granodiorite

OXFORD LAKE-KNEE LAKE-GODS LAKE BELT

Oxford Lake Group

	Unit	Description
	oW	Feldspathic greywacke, arkosic wacke, mudstone; o**Wna** - amphibole-biotite gneiss; o**Wng** - garnet-biotite gneiss
	oC	Polymictic conglomerate
	oB	Gabbro; o**Bp** - porphyritic gabbro, diabase
	oVt	Felsic to intermediate tuff
2 ⊛	oV	Mafic to felsic volcanic rocks; 2: *2706 +4/-2 Ma;* o**Vf** - volcanic fragmentals and related sedimentary rocks

Bayly Lake Complex

	Unit	Description
	BG	Granite
	BZ	Syenite; B**Zx** - pegmatitic syenite
3 ⊛	BG / BGh	Granodiorite, porphyritic granodiorite; B**G**k - microcline-phyric granodiorite; 3: *2783±3Ma;* B**Gn** - gneissoid granodiorite; B**Gh** - granodiorite with inclusions of granitoid gneiss
4,5 ⊛	BT / BTj	Tonalite; B**Tp** - porphyritic tonalite; B**Tn** - tonalite to tonalitic gneiss; B**Ty** - mylonitic tonalite; B**Tj** - tonalite with inclusions of supracrustal rocks and derived gneiss; B**Tl** - tonalite to tonalitic gneiss with subordinate amphibolite interlayers; 4: *2730 Ma;* 5: *2883 Ma*
	BZy	Protomylonitic quartz monzonite
	BRf	Plagioclase porphyry; B**Rq** - quartz porphyry
	BB	Gabbro, diabase
	BU	Hornblendite, clinopyroxenite

Lynx Bay assemblage

Unit	Description
BV	Volcaniclastic and related sedimentary rocks
BVf	Intermediate volcanic fragmental rocks, related chloritoid schist

Hayes River Group

	Unit	Description
	HV	Volcaniclastic and related sedimentary rocks
	HW	Feldspathic greywacke, argillite
6 ⊛	HV	Felsic and intermediate volcanic rocks, mainly flows and related sills; H**Ve** - aphyric felsite; H**Vp** - porphyritic flows, sills; 6: *2830 Ma;* H**Vf** - volcanic fragmental rocks, related sediments
	HV	Mafic and intermediate volcanic rocks, mainly aphyric flows; H**Vf** - plagioclase-phyric flows; H**Vpf** - plagioclase-megaphyric flows; H**Vo** - pillowed flows; H**Vf** - volcanic fragmental rocks, related sediments
	HA	Amphibolite, mainly derived from mafic and intermediate volcanic rocks
	HB	Gabbro; H**Bf** - plagioclase-phyric gabbro
	● ○ HU	Serpentinized peridotite, related ultramafic rocks (Open symbol - drill intersection)

MUNRO LAKE BELT AND ASWAPISWANAN LAKE-GOOSE LAKE BELT

Unnamed Sedimentary Rocks

Unit	Description
S	Arkose and feldspathic greywacke, crossbedded
C	Polymictic conglomerate

Unnamed Supracrustal and Intrusive Rocks

Unit	Description
V	Volcaniclastic and related sedimentary rocks
W	Feldspathic greywacke, argillite; **Wt** - tuffaceous greywacke
C	Volcanic conglomerate
V	Felsic and intermediate volcanic rocks; **Vp** - porphyritic flows, sills; **Vf** - volcanic fragmental rocks, related sediments; **Vt** - tuff; **Vy** - mylonitic rock
V	Mafic and intermediate volcanic rocks, mainly flows; **Vo** - pillowed flows; **Vt** - tuff, related sediments
A	Amphibolite, mainly derived from mafic and intermediate volcanic rocks
B	Gabbro; **Bx** - pyroxene-phyric gabbro; **Bf** - plagioclase-phyric gabbro (agmatitic)
▼ ▽ U	Serpentinized peridotite (Open symbol - drill intersection)

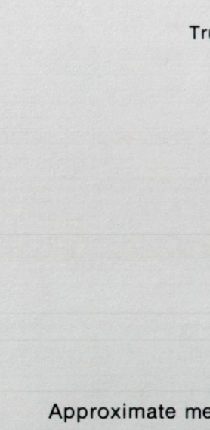
MOLSON LAKE DOMAIN

Younger Plutonic Rocks

	Unit	Description
	G	Granite, pegmatitic granite
7 ⊛	Zx	Pyroxene-bearing monzodiorite; *7:2705 ±6 Ma*

Rocks of Uncertain Age

Unit	Description
Gh	Hybrid granodioritic to granitic gneiss
G	Granodiorite; **G**k - microcline-phyric granodiorite; **G**h - hornblende-bearing granodiorite
Bx	Pyroxene-phyric gabbro; **Bf** - plagioclase-phyric gabbro (agmatitic)
•	Clinopyroxenite, hornblendite phases within gabbro
Tl, Tl / Th, Thl	Leucotonalite; **T**l - tonalite to tonalitic gneiss with subordinate amphibolite interlayers; **Th** - tonalite with granodiorite intrusions; **Th**l - leucotonalite with granodiorite intrusions
Ng	Garnet-bearing quartzofeldspathic gneiss
Vt	Felsic to intermediate tuff
A	Amphibolite



Approximate mean declination (1988) for centre of map.
Decreasing 20.4' annually.

References for U-Pb zircon ages:

Samples	Reference
1, 2, 3, 4, 5, 6 ⊛	*Davis, D., pers. comm., 1986*
7 ⊛	*Turek et al., 1985*

STRATIGRAPHIC NOTE

The map units within the major stratigraphic divisions are in approximate stratigraphic order.

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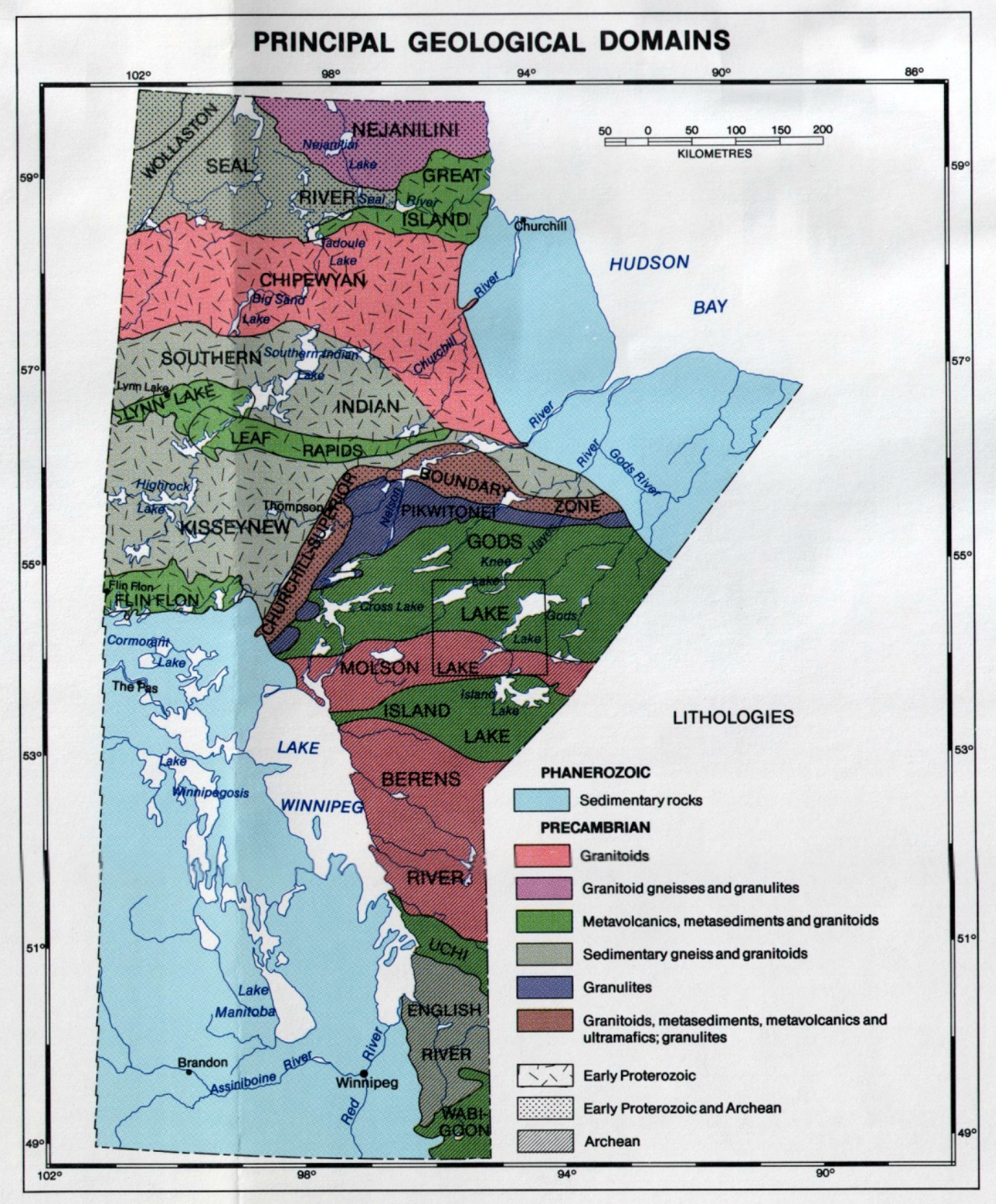
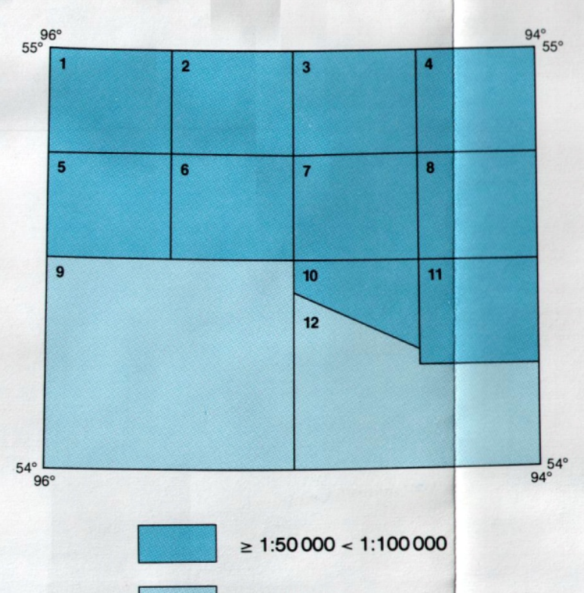
Additional references for Oxford House, NTS 53L, are available in Manitoba Energy and Mines, Open File Report OF86-1.

PRINCIPAL GEOLOGICAL DOMAINS



SOURCES OF INFORMATION



Key	Scale
🟦	≥ 1:50 000 < 1:100 000
🟦	≥ 1:100 000

1 Hubregtse, J.J.M.W., 1985: Carghill Island, Map GR83-1-5; Manitoba Energy and Mines, Geological Report GR83-1A; 1:50 000.
2 Gilbert, H.P., Elbers, F.J. and Hubregtse, J.J.M.W., 1985: Oxford House, Map GR83-1-6; Manitoba Energy and Mines, Geological Report GR83-1B; 1:50 000.
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7 Gilbert, H.P., Marten, B.E. and Elbers, F.J., 1985: Vermilyea Lake, Map GR83-1-12; Manitoba Energy and Mines, Geological Report GR83-1B; 1:50 000.
8 Gilbert, H.P. and Marten, B.E., 1985: Gods Lake, Map GR83-1-13; Manitoba Energy and Mines, Geological Report GR83-1B; 1:50 000.
9 Schledewitz, D.C.P., 1980: Oxford House Southwest; Manitoba MRD[1], Preliminary Map 1980 K-3; 1:100 000.
10 Elbers, F.J. and Marten, B.E., 1973: Kanuchuan Rapids; Manitoba MRD, Preliminary Map 1973 H-12; 1:50 000.
11 Marten, B.E. and Elbers, F.J., 1973: Murray Lake; Manitoba MRD, Preliminary Map 1973 H-13; 1:50 000.
12 Schledewitz, D.C.P., 1980: Oxford House Southeast; Manitoba MRD, Preliminary Map 1980 K-4; 1:100 000.

In addition, recent unpublished data have been incorporated.

[1] Mineral Resources Division

MAIN LITHOLOGIC BELTS

MINERAL DEPOSITS AND IMPORTANT OCCURRENCES

	Name	UTM Northing/Easting	Commodities	References
1 ▲	Jowsey Island	6057200/417000	Au	MI 53L/9 AU1[1]
2 ●	Gods Lake Mine	6058900/425850	Au	MI 53L/9 AU2
3 ▲	Big Lynx	6073800/330300	Au, Ag, Cu, Zn	MI 53L/13 AU1
4 ▲	Mora	6073200/309250	Cu, Au, Ag, Zn	MI 53L/13 CU3
5 ▲	New Falu	6073800/309400	Sb, Au, Ag, Cu	MI 53L/13 SB1
6 ▲	McLaughlin Lake	6069700/359300	Li	Bannatyne, 1985; MI 53L/14 LI1
7 ▲	Neda Gold	6082200/366300	Au, Ag	MI 53L/14 AU2
8 ▲	Gods River (Bil Group)	6079700/424850	Li	Bannatyne, 1985; MI 53L/16 LI1

PROPERTY STATUS

Metals

Past Producer ....●
Important mineral property ....▲

Industrial Minerals

Important mineral property ....▲

COMMODITIES

Metals

Symbol	Commodity
Ag	silver
Au	gold
Cu	copper
Sb	antimony
Zn	zinc

Industrial Minerals

Symbol	Commodity
Li	lithium

[1] Mineral Inventory card, Exploration Services, Manitoba Energy and Mines.

SYMBOLS

- Geological boundary (approximate)
- Bedding (inclined, overturned)
- Pillows (inclined, overturned)
- Foliation (dip unknown, 0°-29°, 30°-59°, 60°-79°, 80°-90°)
- Syncline (upright, overturned)
- Anticline
- Fault (defined, inferred)
- Iron formation
- Domain boundary
- Area of little or no outcrop
- 2 ⊛ Sample locality for U-Pb zircon age determination

Synoptic geology by H.P. Gilbert and D.C.P. Schledewitz

Compilation by D. Kowerchuk

Cartography by T. Franceschet and D.L. McShane

Suggested reference to this publication:
Manitoba Energy and Mines, 1987; Bedrock Geology Compilation Map Series, Oxford House, NTS 53L, 1:250 000.

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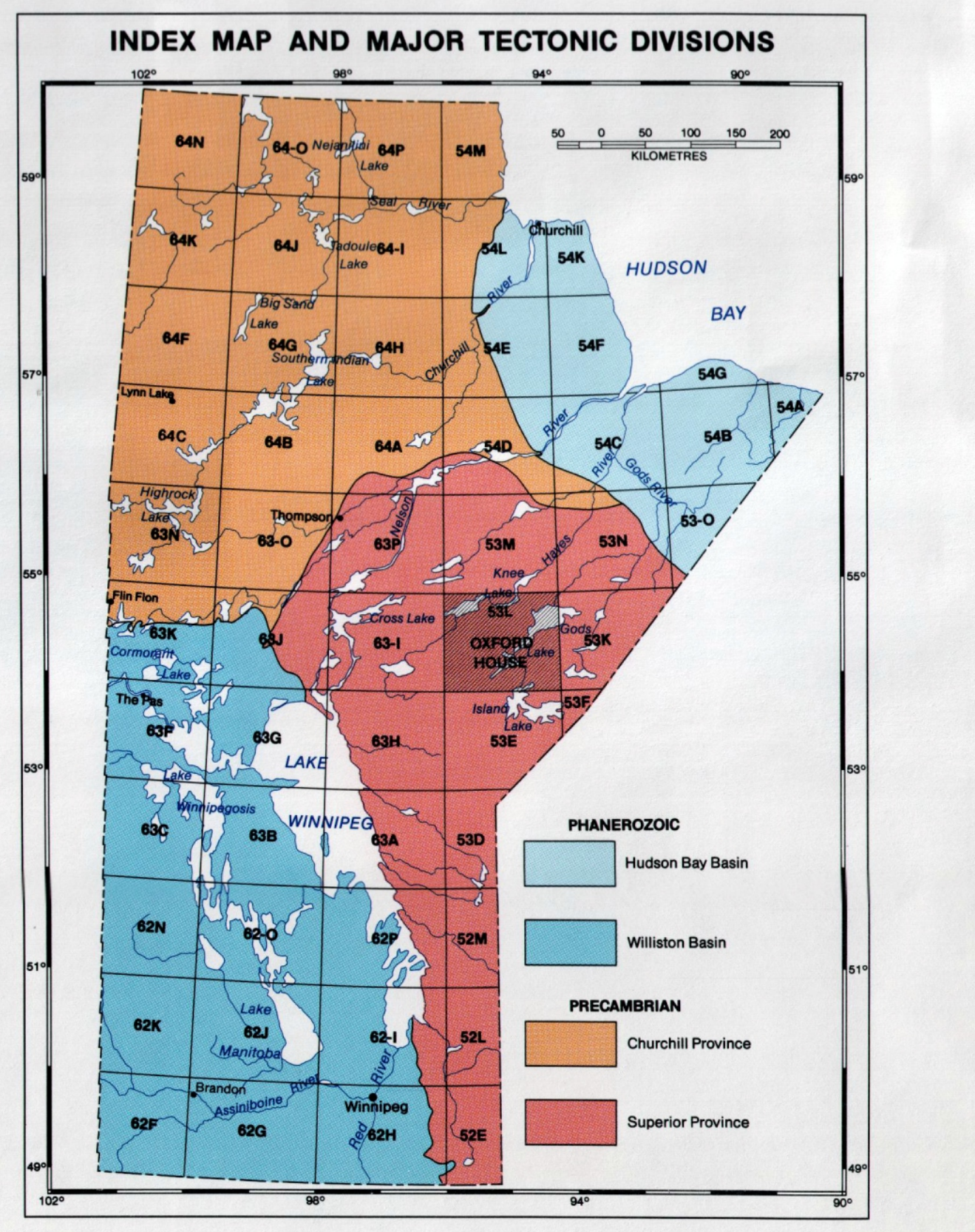

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