Manitoba Energy and Mines
Geological Compilation Map Series
NTS 64B-Uhlman Lake
1:250 000

MARGINAL NOTES

The **Uhlman Lake region** (NTS 64B) lies in the Churchill Structural Province and is underlain by Early Proterozoic (Aphebian) rocks, predominantly tonalite, granodiorite and granite. The region encompasses parts of four geological domains interpreted as fundamental tectonic units of the Trans-Hudson Orogen. From north to south the domains are: (key map, below).

(1) the southeastern margin of the Southern Indian domain,
(2) the east end of the Lynn Lake domain,
(3) the central part of the Leaf Rapids domain, and
(4) part of the northern margin of the Kisseynew domain.

Each domain contains a unique succession of supracrustal rocks. Intrusive suites, however, are not necessarily restricted to individual domains.

The **Southern Indian domain**[1] contains predominantly foliated granitic rocks, subordinate metasedimentary gneiss (generally migmatite) and amphibolite. The metasedimentary rocks consist of:

(1) biotite gneiss ± garnet, and migmatite derived from graphitic greywacke (**W**),

(2) magnetite-bearing quartzose gneiss (**Sn**) which may be derived from Sickle Group arkosic sandstone, or from a similar rock of different age, and

(3) orthogneiss, mylonite gneiss, amphibolite and probable metasandstone (cw**N**, **N**) in a zone of high aeromagnetic signature.

Intrusive rocks are dominated by the Baldock batholith (Lenton and Corkery, 1981). The batholith is composed of late tectonic predominantly megacrystic granite (BL**Gp**) and younger seriate granite (BL**Gr**). It has a uniform calc-alkaline composition and may be the same age as the Wathaman-Chipewyan batholithic complex (U-Pb zircon age 1850-1878 Ma; Bickford and Van Schmus, 1985; Zwanzig et al., 1985).

The **Lynn Lake domain** extends east from NTS 64C as far as Southern Indian Lake. The domain contains narrow belts of moderately to highly metamorphosed supracrustal rocks within massive to foliated granitic rocks. The supracrustal rocks occur in two divisions:

(1) the Wasekwan Group mafic volcanic rocks (w**Vr**), volcanic-derived amphibolites (w**A**) and metagreywacke gneisses (w**W**), the latter pervaded by granitic rocks and locally migmatized; and

(2) metaconglomerate (**C**) with hornblende-bearing matrix and local tonalite clasts; this unit resembles the conglomerate at Hughes River on the south margin of the Southern Indian domain in NTS 64C.

Intrusive rocks at the east end of the Lynn Lake domain are predominantly tonalite (**T**), granodiorite (**G**) and granite (**G**). These are contemporaneous with, or younger than, tonalite (P**T**) of the Pool Lake intrusive suite (1876 Ma U-Pb zircon age; Baldwin et al., 1985) in NTS 64C.

The **Leaf Rapids domain** is a predominantly intrusive terrane that also encompasses the Rusty Lake metavolcanic belt. Metavolcanic rocks are best exposed in four homoclinal fault blocks (Baldwin, 1981) between Churchill and Rat Rivers. Metarhyolite (R**V**) from location 1 yields a U-Pb zircon age of 1878±3 Ma indicating that the Rusty Lake metarhyolite is approximately 35 Ma younger than Wasekwan Group metarhyolite from the Lynn Lake belt (Baldwin et al., 1985). Accordingly, Rusty Lake metavolcanic rocks are designated as Ruttan Group(R), rather than Wasekwan Group(w) to which they were previously assigned by Burwash (1962). The Ruttan Group hosts massive Cu-Zn sulphide lenses at the Ruttan Mine (mineral locality 4; Speakman et al., 1982) as well as numerous other sulphide mineral occurrences (Baldwin, 1981).

The four homoclinal fault blocks in the Rusty Lake metavolcanic belt are:

(1) the Karsakuwigamak Block (northwest of Karsakuwigamak Lake),
(2) the Ruttan Block (containing the Ruttan Mine),
(3) the Northern Block (containing Rusty and Muskayk Lakes), and
(4) the Eastern Block (north of Karsakuwigamak Lake).

The position of block-bounding faults is inferred from discontinuous stratigraphy, opposing facing directions and lithologic contrasts, local shearing, and discontinuities in aeromagnetic and gradiometric signatures. Although stratigraphy can be correlated internally, attempts to correlate between fault blocks have generally been unsuccessful. Nevertheless, lithologies in the fault blocks are similar and comprise primary and reworked volcanic rocks.

The Ruttan Group in the Eastern and Ruttan Blocks comprises largely basalt flows (R**Vh**, R**Vr**), lesser redeposited mafic breccia, felsic breccia and conglomerate (R**Vf**) and minor rhyolite (R**V**). The Ruttan Block is separated by a granite pluton (**G**) into a south- to southeast-facing northern segment and a north-facing southern segment. In the northern segment volcaniclastic greywacke, conglomerate, siltstone (R**W**) and minor chemical sediments overlie felsic breccia (R**Vf**) hosting the Ruttan Mine deposit. Thin rhyolite flows are associated with felsic volcaniclastic rocks (R**Vf**) in the southern segment of this block. In the Eastern Block thin units of redeposited volcanic breccia are associated with rhyolite (R**V**) and basalt flows (R**Vr**). Facies variations suggest that units in the southern segment of the Ruttan Block are distal equivalents to similar units in the northern segment. Furthermore the Eastern Block and the southern segment of the Ruttan Block contain similar lithologies in similar proportions and may be stratigraphically equivalent. East of Rat River, two segments of poorly exposed metavolcanic rocks bounded by inferred faults appear similar to those in the Eastern Block.

The Karsakuwigamak Block contains a thick (8 km max.), north- to northeast-facing sequence comprising basal volcanic conglomerate, sandstone, and siltstone (R**Vf**), overlain by a dominantly rhyolitic volcanic sequence comprising massive flows, brecciated flows, ignimbrites, air-fall deposits, debris-flow deposits, volcanic conglomerate and sandstone(R**V**). Erosional unconformities and regoliths occur within the volcanic sequence.

In the Northern Block, volcanic-derived conglomerate, sandstone and siltstone are the most abundant rock types. The lower (southern) part of the Northern Block succession comprises thick accumulations of polymictic volcanic conglomerate and sandstone to siltstone turbidites (R**Vf**). The upper part of the Northern Block succession, containing tonalite-cobble metaconglomerate and interbedded arkosic metasandstone (**C**), metagreywacke with sulphide facies iron formation (**W**) and minor high-iron basalt (**V**), may be significantly younger than unit R**Vf** and is not considered part of the Ruttan Group.

Along the Churchill River, exposures (now flooded) of tonalite-cobble metaconglomerate (s**C**) and interlayered, cross-stratified metasandstone lie unconformably on foliated tonalite (**Tn**). These sedimentary rocks although tentatively assigned to the Sickle Group may be correlative with metaconglomerate (**C**) overlying the Ruttan Group. They also bear a resemblance to the metaconglomerate (**C**) near Magrath Lake (above) and the metaconglomerate at Hughes River in NTS 64C. (Manitoba Energy and Mines, in prep.).

The structural history of the Rusty Lake metavolcanic belt is less complex than that of the Lynn Lake domain in NTS 64C (Manitoba Energy and Mines, in prep.). The earliest deformation recognized in the Rusty Lake belt is simple block faulting which occurred prior to and after emplacement of the subvolcanic gabbros. The resulting homoclinal blocks lack the large-scale east-northeast-trending folds that affected the Wasekwan Group during phase 2 deformation in the Lynn Lake domain in NTS 64C (Manitoba Energy and Mines, in prep.). The northwest-trending foliation in the Rusty Lake belt is parallel to, and probably coeval with a late foliation which developed during phase 3 in the Lynn Lake domain in NTS 64C (Manitoba Energy and Mines, in prep.).

The largest portion of the Leaf Rapids domain is underlain by intrusive rocks that have been divided into six major suites.

(1) Hypabyssal gabbro, locally with amygdaloidal margins (**B**), intruded the Ruttan Group and is the oldest plutonic rock in the Rusty Lake volcanic belt.

(2) Foliated tonalite (**Tn**) along the north margin of the Leaf Rapids domain may be correlative with the Pool Lake intrusive suite in the Lynn Lake domain and consequently may be coeval with Ruttan Group volcanic rocks.

(3) Diorite, gabbro and quartz diorite (**D**) flanking the Rusty Lake belt are of unknown relative age.

(4) Granitoid bodies have intruded the Ruttan Group and the hypabyssal gabbro. Plutons within the volcanic belt are generally zoned from a quartz diorite margin to a granite core. Those lying outside the volcanic belt comprise tonalite and granodiorite. High-level plutonic breccia occurs locally at the contacts with supracrustal rocks.

(5) Ridge tonalite (RG**T**) forms a distinctive east-trending belt east of the Rusty Lake metavolcanic belt. The tonalite is bounded on the north by migmatites (cw**N**) which obscure its age relationship to the Baldock batholith.

(6) Intrusive rocks of the Livingston plutonic belt form an extensive east-trending terrane along the south flank of the Leaf Rapids domain. The plutons, ranging from tonalite to granodiorite with rare granite (L**G**, L**Gv**), intrude both the Ridge tonalite and rocks of the Kisseynew domain.

The **Kisseynew domain** is a sedimentary gneiss belt south of the Leaf Rapids domain. It is composed of paragneiss, amphibolite and migmatite derived through upper amphibolite facies metamorphism and polyphase deformation of Early Proterozoic sedimentary and minor volcanic strata (Clark, 1974). The relationship between these rocks and the Ruttan Group is uncertain.

The sedimentary gneiss succession comprises three divisions.

(1) The lowest division (Burntwood River Metamorphic Suite) is composed of quartzofeldspathic paragneiss and migmatite (B**W**) derived from greywacke-mudstone turbidites.

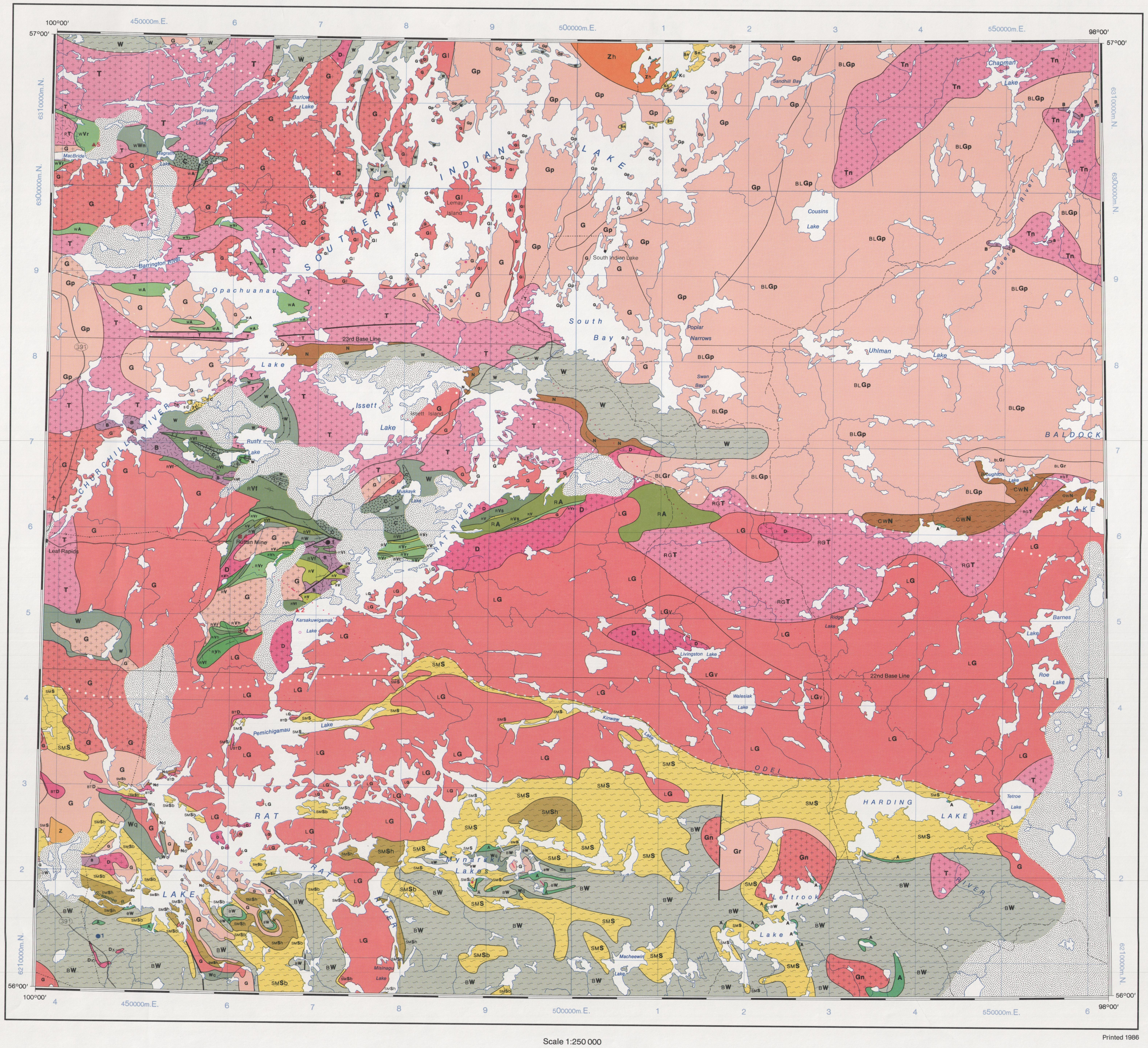
(2) The middle division comprises thin amphibolite and paragneiss units (**A**, **Wq**) derived from mafic volcanic rocks and clastic to chemical sediments. Cordierite-bearing gneisses (**Nd**) of uncertain origin have been assigned to this division.

(3) The upper division (Sickle Metamorphic Suite) conformably overlies the amphibolite (**A**) and is composed of quartzofeldspathic paragneiss (SM**S**, SM**Sb**), locally hornblende-bearing (SM**Sh**), derived from lithic sandstone, calcareous sandstone and arkose. These rocks are stratigraphically equivalent to the Sickle Group in the Lynn Lake domain in NTS 64C. (Manitoba Energy and Mines, in prep.).

The structural pattern of the Kisseynew domain (Rat Lake-Mynarski Lakes area; Schledewitz, 1972; Elphick, 1972) is interpreted to reflect early recumbent folds (phase 1) which developed during tectonic transport to the north and northeast. Subsequent north-south compression (phase 2) generated upright east-trending isoclinal folds and may have generated locally-developed cross folds with north-south axial planes. Large-scale intrusions of leucocratic granodiorite and tonalite (L**G**, **G**) were emplaced in the later stages of phase 2. Intrusion of microcline granite (**G**) during phase 3 deformation was accompanied by shearing, faulting, transposition of gneissic layering and cordierite-sillimanite growth. A subsequent deformation (phase 4) resulted in folding about northeast-trending axial planes. Deformation phases 2 to 4 in the Rat Lake-Mynarski Lakes area are considered to be coeval with phases 5 and 6 in the Lynn Lake domain in NTS 64C (Manitoba Energy and Mines, in prep.).

The **Uhlman Lake region** is interpreted to represent part of an Early Proterozoic arc terrane that may have collided with the Superior Province craton during evolution of the Trans-Hudson Orogen (see Manitoba Energy and Mines, in prep. and Syme, 1985). Preliminary immobile element data of the Ruttan Group (Pearce and Cann, 1973 and unpublished data) are consistent with an origin in a volcanic arc. U-Pb zircon ages indicate that the Ruttan Group is younger than the Wasekwan Group metavolcanic rocks in the Lynn Lake domain but coeval with the Pool Lake intrusive suite that intruded the Wasekwan Group after a major phase of deformation in NTS 64C (Manitoba Energy and Mines, in prep.). The absence of recognizable Archean rocks suggests that the crust in the Uhlman Lake region evolved as superimposed Early Proterozoic volcanic arcs from ca. 1.9 to 1.86 Ga. The Baldock granite and other late-orogenic intrusions probably had a lower crustal source. However, presently available geochemical data (Lenton and Corkery, 1981) do not permit distinction between a subduction or collision-related origin for the magma.

[1] Unless otherwise noted, domain descriptions are only applicable to the Uhlman Lake map sheet (NTS 64B).



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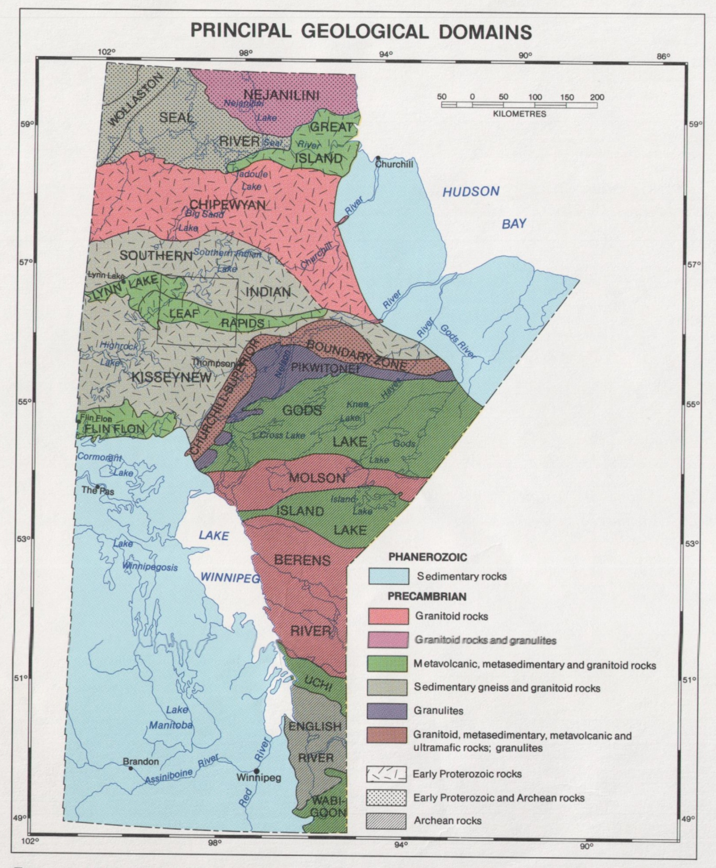
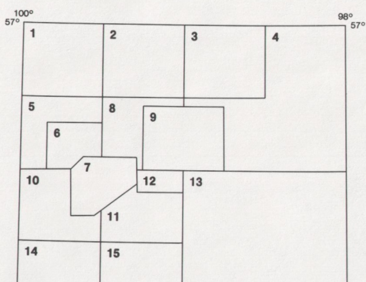
PRINCIPAL GEOLOGICAL DOMAINS



SOURCES OF INFORMATION



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In addition, recent unpublished data have been incorporated.

[1] Mineral Resources Division

MINERAL DEPOSITS AND IMPORTANT OCCURRENCES

	Location Name	Commodities	Reference
1 ●	Suwannee Lake	gr, cs	Manitoba MRD[1], Map 80-1
2 ▲	CB 1001	Cu, Zn, Ag	91938[2]; MI 64B/5 CU 2[3]
3 ▲	Dar 35, 37	Zn	Baldwin, 1982; MI 64B/5 ZN 1
4 ■	RUTTAN MINE	Cu, Zn	Baldwin, 1982; MI 64B/5 CU 1
5 ▲	MacBride Lake (Sand 4)	Zn, Cu	91924; MI 64B/13 ZN 1

PROPERTY STATUS

Metals

PRESENT PRODUCER ■
Important mineral property ▲

Industrial Minerals

Past producer ●

COMMODITIES

Metals

Ag	silver
Cu	copper
Zn	zinc

Industrial Minerals

cs	crushed stone
gr	granite

[1] Mineral Resources Division.

[2] Numbers refer to Open Assessment Files, Exploration Services, Manitoba Energy and Mines.

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

LEGEND

PRECAMBRIAN

Late Proterozoic

Diabase dyke - Mackenzie swarm; magnetic linear (possible diabase dyke)

Early Proterozoic

Younger Plutonic Rocks

- Zh — Hornblende-bearing monzogranite
- Z — Hornblende syenite
- G — Granite; Gp - megacrystic granite; Gr - seriate-porphyritic granite; BLGr - seriate-porphyritic granite; BLGp - megacrystic granite (Baldock granite)
- G — Granodiorite; Gi - leucocratic granodiorite; LG - granodiorite, tonalite, granite; LGv - muscovite-bearing granodiorite - granite (Livingston granodiorite)
- BTD — Diorite, quartz diorite - Black Trout diorite
- B — Gabbro

Plutonic Rocks of Uncertain Age

- G — Granite
- G — Granodiorite, granite; Gn - gneissic granodiorite
- T — Tonalite, quartz diorite, granodiorite; Tn - gneissic tonalite; RGT - Ridge tonalite
- D — Quartz diorite, diorite, amphibolite; Dx - pyroxene diorite
- Ultramafic rocks (exposed; submerged or encountered in diamond drill holes)
- B — Gabbro

LYNN LAKE DOMAIN

Metamorphic Rocks of Uncertain Age

- C — Polymictic conglomerate, minor greywacke

Older Plutonic Rocks

- PT — Tonalite - Pool Lake intrusive suite ●1 1878 ± 3 Ma

Wasekwan Group (medium to high metamorphic grade)

- wWn — Paragneiss, metagreywacke, amphibolite
- wA — Amphibolite (derived from mafic volcanic rocks)
- wVr — Aphyric and porphyritic basalt, related volcaniclastic rocks

Reference for U-Pb zircon age
●1 Baldwin et al., 1985

LEAF RAPIDS DOMAIN

Sickle Group

- sC — Polymictic metaconglomerate, metasandstone

Older Plutonic Rocks

- B — Gabbro

Unnamed Metasedimentary and Metavolcanic Rocks

- W — Greywacke, calc-silicate rock, iron formation (mainly sulphide facies) (dotted line)
- C — Polymictic conglomerate and interbedded sandstone
- V — Aphyric pillowed basalt

Ruttan Group (low to high metamorphic grade)

- RV — Redeposited pyroclastic rocks (including debris flows); RVf - volcaniclastic rocks (interbedded conglomerate, sandstone and siltstone); RVs - schist derived from RVf
- RV — Rhyolite (including pyroclastic rocks)
- RVt — Mafic volcaniclastic rock, flows; RA - amphibolite derived from RVt, minor quartz diorite
- RVr — Basalt (aphyric and porphyritic)
- RW — Volcaniclastic greywacke, conglomerate and siltstone
- RVh — Basalt (with pyroxene phenocrysts altered to hornblende)

KISSEYNEW DOMAIN

Sickle Metamorphic Suite (migmatite)

- SMS — Quartzofeldspathic gneiss derived from sandstone (undivided); SMSb - feldspar-rich biotite gneiss
- SMSh — Hornblende-bearing quartzofeldspathic gneiss ± diopside

Metamorphic Rocks of Uncertain Age

- Nd — Cordierite-sillimanite-anthophyllite gneiss
- Wq — Quartzofeldspathic biotite paragneiss
- A — Amphibolite, calc-silicate rock, hornblende-biotite gneiss

Burntwood River Metamorphic Suite

- BW — Greywacke-mudstone-derived gneiss, migmatite

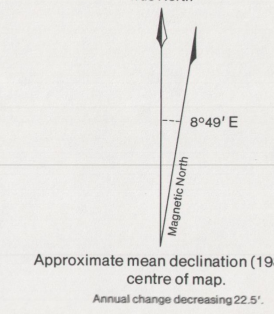
SOUTHERN INDIAN DOMAIN

Metamorphic Rocks of Uncertain Age

- N, CWN — Quartzofeldspathic gneiss ± hornblende, may include metasandstone; CWN - quartzofeldspathic gneiss, migmatite (derived from sandstone), amphibolite - Campbell-Waskaiowaka gneisses
- Sn — Quartzofeldspathic gneiss, migmatite derived from sandstone
- A — Amphibolite
- Kc — Calc-silicate rock
- W — Quartz-biotite gneiss (greywacke-derived), migmatite, amphibolite

STRATIGRAPHIC NOTE

The lithologies within the major stratigraphic divisions are not in stratigraphic order.



SYMBOLS

- Geological boundary (approximate)
- Fault
- Stratigraphic top (upright, overturned)
- Syncline (overturned)
- Domain boundary
- Area of little or no outcrop
- ●1 Sample locality for U-Pb zircon age determination

Synoptic geology by D.A. Baldwin, M.T. Corkery, H.P. Gilbert, P.G. Lenton, W.D. McRitchie, D.C.P. Schledewitz and H.V. Zwanzig

Deposits and important mineral occurrences compiled by D.A. Baldwin

Compilation by J.S.D. Parker

Cartography by T. Franceschet

Suggested reference to this publication: Manitoba Energy and Mines, 1986: Bedrock Geology Compilation Map Series, 1:250 000, NTS 64B - Uhlman Lake.

Additional references for NTS 64B - Uhlman Lake are available in Manitoba Energy and Mines, Open File OF86-1.

BEDROCK GEOLOGY COMPILATION MAP SERIES

UHLMAN LAKE

NTS AREA 64B

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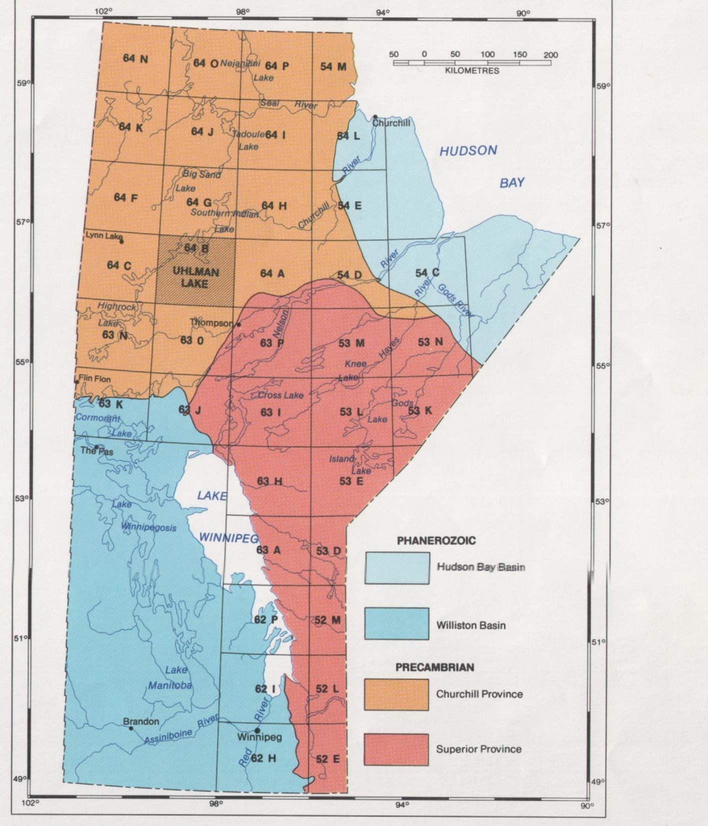
INDEX MAP AND MAJOR TECTONIC DIVISIONS



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