Canada

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Manitoba Industry, Trade and Mines

Map of Magmatic Ni-Cu +/- PGE Occurrences and Mafic - Ultramafic Bodies in Manitoba

Geological Survey of Canada - Manitoba Industry, Trade and Mines Collaborative Program, 2000

Manitoba Industry, Trade and Mines - Map ER2000-1-1

By: Larry Hulbert & Jon Scoates
Geological Survey of Canada

25 0 50 100

Kilometres

Scale 1:1 500 000

Universal Transverse Mercator
NAD 27 - Zone 14

Digital cartography by: MapIT

Territory of Nunavut

Province of Saskatchewan

Province of Ontario

United States of America

Hudson Bay

Manitoba Mineral Occurrence Site Names

MAN-1	BERRY CREEK	MAN-58	C.B. 639
MAN-2	NEW COLONY GROUP	MAN-59	DUN 2
MAN-3	C.N.3 (COPPER DOME)	MAN-60	MANBRIDGE MINE
MAN-4	TAG 4-TUC 1	MAN-61	BUCKO SHAFT
MAN-5	RICE ISLAND	MAN-62	WINTERING LAKE NORTH
MAN-6	EUREKA ISLAND	MAN-63	RESTING LAKE
MAN-7	MUNDIC GROUP	MAN-64	LEX 6
MAN-8	TAG GROUP-ARCTIC GROUP	MAN-65	GAB 11
MAN-9	WEST GROUP	MAN-67	BOWDEN SHAFT
MAN-10	BILL	MAN-68	DISCOVERY
MAN-11	CABIN # 9	MAN-69	PIN 1
MAN-12	DUMAS 6	MAN-70	EIGHT LAKE NICKEL
MAN-13	RUSTY 2	MAN-71	YORK 11
MAN-14	JUNIPOT	MAN-72	BAKER LAKE
MAN-15	KIDD 2	MAN-73	C.B. 3232
MAN-16	WIS 32	MAN-74	LITTLE LIMESTONE LAKE
MAN-17	RUSH NO 2	MAN-75	RESERVATION 31
MAN-18	TULUNE LAKE	MAN-76	RESERVATION 34 AREA 1
MAN-19	LYNN LAKE A PLUG	MAN-77	EXCEL
MAN-20	LYNN LAKE EL MINE	MAN-78	WILLIAM LAKE
MAN-21	MINTON LAKE	MAN-79	EASTERVILLE
MAN-22	TOW LAKE GROUP	MAN-80	DUMBARTON MINE
MAN-23	LYN GROUP	MAN-81	MASKWA WEST
MAN-24	WEIR RIVER	MAN-82	MAYVILLE
MAN-25	NAMEW LAKE	MAN-83	TIM
MAN-26	MISSI RAPID	MAN-84	ORE NO 9
MAN-27	MACBEN LAKE	MAN-85	EAGLE GROUP
MAN-28	HOOK ISLAND	MAN-86	ROY NO 4
MAN-29	JOE GROUP	MAN-87	ORE FAULT NO 23
MAN-30	PUKATAWAGAN BAY	MAN-88	PAGE (CU-NI)
MAN-31	MULCAHY LAKE	MAN-89	BIRD LAKE CHROME
MAN-32	TADOULE LAKE CU	MAN-90	DUCK
MAN-33	KASMERE LAKE NICKEL	MAN-91	C.B. 4425 (CARROT RIVER)
MAN-34	MEL ZONE	MAN-92	NICKEL CANTER GROUP
MAN-35	MYSTERY LAKE SOUTH	MAN-93	JAN GROUP
MAN-36	MOAK MINE	MAN-94	NI GROUP
MAN-37	THOMPSON MINE	MAN-95	STEVENSON LAKE CU-NI
MAN-37-X1	NICHOLS LAKE	MAN-96	DOBBS LAKE
MAN-37-X2	DISPAGAN LAKE	MAN-97	CUTHBERT LAKE
MAN-37-X3	THOMPSON AIRPORT DEPOSIT	MAN-98	LANDING LAKE
MAN-37-X4	SETTING LAKE	MAN-99	COP 1, 2
MAN-37-X5	MUSKEG CITY	MAN-100	BIX
MAN-37-X6	SETTING LAKE SOUTH	MAN-101	RESERVE 1-18
MAN-38	BIRCHTREE MINE	MAN-102	CLANGULA LAKE QUARRY
MAN-40	EVA 29 & 68	MAN-103	LAKE GROUP
MAN-41	SPLIT LAKE NICKEL	MAN-104	INDIAN RESERVE CONDUCTOR
MAN-43	TOP GROUP	MAN-105	PIPESTONE ROCK
MAN-44	PEACE	MAN-106	PIN
MAN-45	SOAB SOUTH MINE	MAN-107	SHORE NO 2
MAN-46	SOAB NORTH MINE	MAN-108	ENGLISH LAKE EAST
MAN-47	SET GROUP	MAN-109	FOX GROUP
MAN-48	GRASS	MAN-110	MCLAREN CREEK
MAN-49	JUNI	MAN-110X	POOL LAKE
MAN-50	HAMBONE	MAN-111	FOX RIVER SILL
MAN-51	PIPE MINE	MAN-112	NOSE
MAN-52	TAYLOR RIVER	MAN-112X	LINKLATER IS AREA
MAN-53	WAX 175	MAN-113	MINAGO PROPERTY
MAN-54	COOK NO. 15	MAN-224-X	GARNER LAKE
MAN-55	JOEY	MAN-448	RESTING LAKE SOUTH
MAN-56	GORMLEY LAKE EAST	MAN-449	MYSTERY LAKE NORTH
MAN-57	GORMLEY LAKE SOUTHEAST	MAN-450	W.H.M GROUP
		MAN-451	MCBRATNEY LAKE

★ (2) Current producer
★ (7) Past producer ▲ (32) Developed prospect
▲ (16) Deposit with reserve △ (66) Occurrence
● Mafic-Ultramafic Bodies
○ Diamond Drill Hole

LEGEND

PHANEROZOIC

Cenozoic

Tertiary

Paleocene

Ttm — Turtle Mountain Formation (+158m): Goolands Member – bentonitic carbonaceous sands, silts and clays; thin lignite beds. Peace Garden Member – grey silty shales and minor sand

Mesozoic

Cretaceous

Upper Cretaceous

Kb — Boissevian Formation (30-42m): greenish grey sandstone; minor shale, in part kaolinitic

Km — Riding Mountain Formation (285-340m): Millwood Member (m) - soft greenish bentonitic shale. Odanah Member (o) - hard grey siliceous shale. Coulter Member (c) - soft grey bentonitic clayey siltstone and shale

Kvr — Vermilion River Formation (50-190m): Morden Member - black carbonaceous shale. Boyne Member - grey calcareous speckled shale and carbonaceous shale. Pembina Member - thinly interbedded carbonaceous shale, bentonite, and bentonitic shale

Kf — Favel Formation (15-45m): calcareous speckled shale ("Second Speck"); minor limestone, bentonite and "oil shale"

Upper and Lower Cretaceous

Ka — Ashville Formation (55-115m): dark grey carbonaceous shale, in part bituminous; minor sand, silt and bentonite, (Local occurrence of thick bar-type sandstone in subsurface - Ashville or Viking Sand)

Lower Cretaceous

Ksr — Swan River Formation (0-105m): sandstone, inplaces glauconitic; kaolinitic shale, minor lignite. May include some non-marine Jurassic beds in the north. Also includeschannel and/or karst fill within Paleozoic outcrop belt. Locally missing from outcrop sequence due to non-deposition

Jurassic

J — Amaranth Formation: red argillaceous dolomitic siltstone and sandstone overlain by gypsum or anhydrite. Reston Formation: limestone and dolomite, shale interbeds. Melita Formation: fine-grained sandstone, variegated shale, minor limestone. Total Jurassic thickness 0-280m

Paleozoic

Permian?

P — St.Martin Complex (0-300m): carbonate breccia (fragments Ordovician to Devonian), polymict breccia, granitic microbreccia, trachyandesite. Comprises crater fill in crypto-explosion (meteorite impact?) structure

Devonian

Upper and Middle Devonian

Dsr — Souris River Formation (65-95m): sequence of basal red shale (First Red Beds), argillaceous micrite, high-calcium micritic limestone, and upper dolomite in northern area; complex facies of limestone and dolomite to the south

Middle Devonian

Ddb — Dawson River Formation (45-60m): sequence of basal red shale (Second Red Beds); bituminous dolomite grading upwards to micritic limestone to brachiopod biomicrite (high-calcium); red to grey fossiliferous coral stromatoporoid limestone (high-calcium), locally dolomitized

Dw, Dwi — Elm Point Formation: high-calcium limestone biomicrite (platform facies). Winnipegosis Formation: lower member - dolomitized platform facies (grades laterally to DEP); upper member - thin inter-reef bituminous laminates or thick reefal carbonates (Dwr). Total thickness 12-105m

Da — Ashern Formation (5-12m): dolomitic shale and argillaceous dolomite, red to greenish grey; local basal breccia

HUDSON BAY BASIN AREA

Dmr — Moose River Formation (~50m): fine to medium-grained dolomitic limestone, argillaceous limestone and argillaceous dolomite; minor anhydrite, chert and red shale

Dk — Kwateboahegan Formation (~45m): limestone, medium to dark brown, fossiliferous, bituminous, partly reefal; minor dolomite

Lower Devonian

Dstr — Stooping River Formation (~80m): aphanitic to finely crystalline limestone, sparsely fossiliferous; minor argillaceous limestone and dolomite

Dknu — Kenogami River Formation (~10m): Upper Member (u) - finely crystalline to aphanitic limestone; thin interbeds argillaceous silty sandy dolomite

Silurian

Skrl — Kenogami River Formation (~200m): Lower Member (l) - dolomite, slightly calcareous and argillaceous; some limestone and dolomitic limestone; minor anhydrite. Middle Member (m) - reddish brown to greenish grey calcareous argillaceous sandy siltstone and silty shale; minor sandstone; some gypsum

Sat — Attawapiskat Formation (35-60m): limestone, cryptocrystalline to calcarenitic and oolitic; in part reefal, vuggy. Interfingers laterally with SKR

A, S — Interlake Group (50-105m): Fisher Branch (FB), Inwood (I), Moose Lake (ML), Atikameg (A), East Arm (EA) and Cedar Lake (CL) Formations; micritic, fossiliferous, stromatolitic and biostromal dolomites with several sandy/argillaceous marker beds

Ser — Ekwan River Formation (~45m): limestone, skeletal calcarenites; in part argillaceous and dolomitic

Ssr — Severn River Formation (~235m): limestone, dolomitic limestone and dolomite, very fine-grained, fucodial; in part algal bioclastic and pelletal; minor anhydrite and shale

Ordovician (and Lower Silurian)

Os — Stonewall Formation (10-20m): dolomite, fine-grained, sparsely fossiliferous, in part conglomeratic. Medial sandy argillaceous marker may define Ordovician-Silurian boundary

Upper Ordovician

gp, gp — Osm — Stony Mountain Formation (35-45m): Gunn and Penitentiary Members (gp) - calcareous shale, fossiliferous limestone and argillaceous dolomite. Gunton and William Members (gw) - nodular dolomite, and sandy argillaceous dolomite

Ohfr — Red Head Rapids Formation (~25m): dolomite, thin-bedded microcrystalline, in part silty and siliceous

fg, s, ch, dh — Orr — Red River Formation (45-150m): Dog Head Member (dh) - mottled dolomiticlimestone, passes northward to dolomite. Cat Head Member (ch) - cherty dolomite; passes southward to mottled limestone. Selkirk Member (s) - mottled dolomitic limestone and limestone; passes northwards to dolomite. Fort Gary Member (fg) - massive to laminated dolomite; minor argillaceous dolomite and high-calcium limestone; in part cherty

Ocr — Churchill River Group (~145m): Caution Creek and Chasm Creek Formations - limestone, slightly to moderately dolomitic and argillaceous, microcrystalline, variably bioclastic, minor shale, dolomite, chert and anhydrite

Obcr — Bad Cache Rapids Group (~70m): Portage Chute Formation - thin basal sandstone-shale member; limestone, mottled, slightly dolomitic and argillaceous, variably fossiliferous; considerable nodular chert and siliceous limestone. Surprise Creek Formation - microcrystalline dolomite, slightly bioclastic, prominent bituminous lamination; some anhydrite and salt casts

Ow — Winnipeg Formation (0-60m): basal sandstone overlain by complex sequence of quatzose sandstone and shale

PRECAMBRIAN

Proterozoic

32 — Diabase dikes (Mackenzie swarm), known and interpreted from aeromagnetic anomolies

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; (31e) hornblende granite-syenite

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: (28a) peridotite-pyroxene; (28b) serpentinite; (28c) hornblendite-hornblende peridotite and pyroxenite

Metamorphic and Metasedimentary Rocks

27 — Migmatite, agmatite and gneiss complex

26 — Arkose-, arenite-, and quartzite-drived 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 arkosic 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, local quartzite and/or marble; (24c) iron formation

23 — Greywacke- and mudstone derived gneiss and migmatite (Amisk and Wasekwan Groups 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 volanic rocks)

22 — Felsic metavolcanic rocks, flows and pyroclastic deposits: (22a) rhyolite; (22b) dacite

21 — Mafic and intermediate metavolcanic flows, pyroclastic deposits and associated metasediments; local ultramafic flows: (21a) andesite; (21b) basalt; (21c) ultramafic flow

Archean and inferred Archean

20 — Charnockite-mangerite and derived granitoid gneiss: (20a) homoblized 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: (17a) shale, dolomitic limestone, siltstone, iron formation; (17b) basalt and komatiite; (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) to (9)

14 — Mafic/ultramafic and diabase dykes (Molson swarm), known and interpreted from aeromagnetic anomalies

Archean

Late Intrusive Rocks

13 — Granite, minor granodiorite

12 — Granodiorite, minor tonalite and migmatite

Late Metasedimentary and Metavolcanic Rocks (Oxford Lake Group, Island Lake Series, San Antonio Formation)

11 — Greywacke, conglomerate, arkose, arenite

10 — Mafic and felsic fragmental volcanic rocks, porphyritic mafic to felsic flows, derived sediments

Metamorphosed Early Intrusive Rocks, Gneisses and Migmatites

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 gneisses with minor gabbro and anorthosite: enderbite, opalite, charnockite, and related gneiss; inclusions of units (5a) and (6)

6 — Metasedimentary gneiss

5 — Amphibolite: (5a) mafic and ultramafic granulite, banded iron formation, quartzite, and calc-silicate rocks

4 — Gabbro, gabbronorite: (4a) diorite; (4b) anorthosite

Early Metavolcanic and Metasedimentary Rocks (Rice Lake Group, Hayes River Group)

3 — Greywacke, mudstone, conglomerate, arkose, banded iron formation

2 — Felsic to intermediate, mainly pyrocalstic volcanic flows, minor intrusive and sedimentary rocks

1 — Basalt, minor andesite, minor sedimentary and mafic intrusive rocks (serpentinite, serpentinized peridote, pyroxenite) and differentiated ultramafic/mafic intrusions

Cobalt Lake Sediment Geochemistry

Cobalt (AAS)

20 ppm	Maximum
10 ppm	75 %ile
7 ppm	50 %ile
5 ppm	25 %ile
< dl	Minimum

Copper Lake Sediment Geochemistry

Copper (AAS)

469 ppm	Maximum
25 ppm	75 %ile
18 ppm	50 %ile
13 ppm	25 %ile
4 ppm	Minimum

Nickel Lake Sediment Geochemistry

Nickel (AAS)

58 ppm	Maximum
26 ppm	75 %ile
17 ppm	50 %ile
12 ppm	25 %ile
2 ppm	Minimum

Legend - Inset Maps

Scale 1:3 500 000

25 0 50 100 150

Kilometres

△ Mineral Occurence

○ Mafic-Ultramafic Bodies and Diamond Drill Holes

Regional Total Field Magnetics Map

nT

925, 442, 302, 216, 150, 94, 45, 0, 48, 105, -194, -360

Regional Bouguer Gravity Map

mGals

0, -20, -40, -60, -80

Explanatory Notes

Magmatic Ni-Cu +/- PGE occurrences are designated by the property name and status. Symbols representing sites of noteworthy mafic-ultramafic intrusions are also shown on the on the map but for the sake of clarity without labels and associated legend; however, further details pertaining to these sites are easily accessible by placing the cursor on the site symbol in the MapInfo© GIS map window.

Additional information is also available on the accompanying CD as a Microsoft Access© table with links to analytical tables and pertinent references where available. This compilation incorporates information from a number of sources:

- Natural Resources Canada Canmindex and National Mineral Inventory files
- NGR lake sediment geochemical database
- GSC geophysical image files, geological maps and reports
- Manitoba Industry, Trade and Mines, geological reports, maps and assessment files

In addition, new records obtained from a number of mineral rights holders, as well as analytical data generated by the authors have been incorporated.

Background geology printed on a modified version of the Geology, magnetic and gravity maps of Manitoba, Viljoen et al., 1999.

References

Viljoen, D., Chackowsky, L., Lenton, P. and Broome, H.J., 1999. Geology, magnetic and gravity maps of Manitoba: a digital perspective. GSC OF D3695 and MEM OF99-12 (CD-ROM).