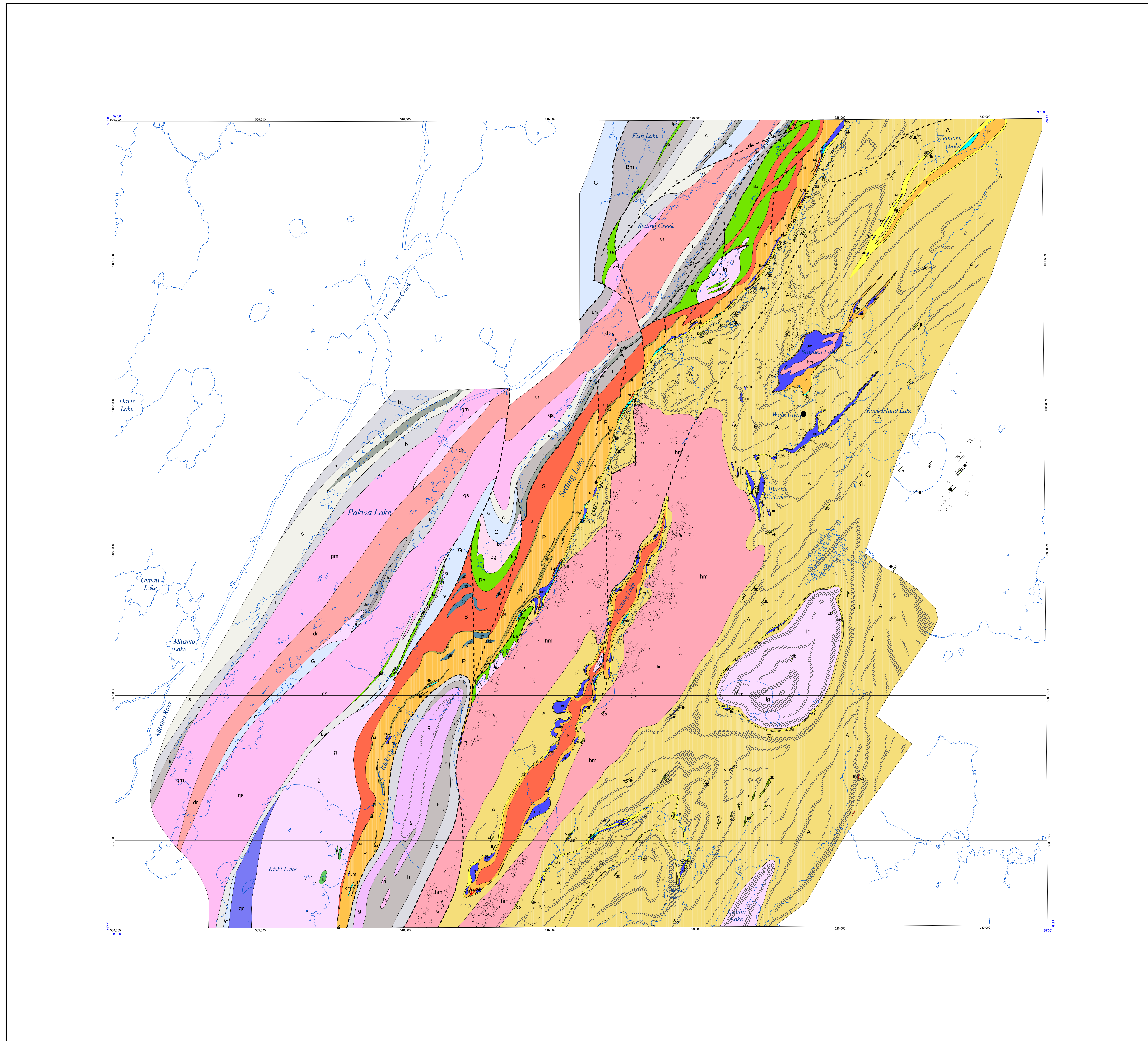


Geology of the Pakwa Lake area (63J/15)



LEGEND

INTRUSIVE ROCKS, ORTHOGNEISS

- mk Gabbro of MacKenzie dyke swarm
- mb Metadiabase or metagabbro dykes. In O or A, usually belong to Molson dyke swarm
- pg Pegmatite
- g Granite, granitoid rocks
- lg Leucogranite
- bg Biotite granite
- hm Hornblende granite
- hg Hornblende - biotite granite
- dr Granodiorite
- qm Quartz monzonite
- qs Quartz syenite
- bm Biotite - hornblende quartz monzonite
- qd Quartz diorite
- gp Metagabbro, usually associated with um or occurring as subvolcanic sills
- um Damite (serpentinized), metaperidotite, metapyroxenite, serpentine, derived ultramafic schist; usually as sills in Osipwan Group sequence

BURNWOOD AND GRASS RIVER GROUPS, undivided

- G GRASS RIVER GROUP, undivided; mainly magnetic-bearing paragneiss
- s Meta-arenite, undivided, layered to laminated, locally pebbly; magnetite-enriched, in places sillimanite-bearing; locally migmatized
- s2 Pebble metaconglomerate, felsic
- st Metasandstone, crossbedded, locally pebbly
- b Meta-arenite, undivided, layered to laminated, biotite-rich, magnetite-enriched, locally pebbly
- r Felsic orthogneiss, metatuff (?)
- b2 Metavolcanic gneiss, felsic
- b1 Metasandstone, layered to laminated, pebbly
- h Meta-arenite, undivided, usually hornblende-enriched
- h2 Meta-arenite, interbedded with a metaconglomerate cp
- h1 Meta-arenite, usually hornblende- and garnet-enriched
- cp Metaconglomerate, polytextured, rich in mafic fragments, interbedded with meta-arenite

BURNWOOD GROUP, undivided; greywacke-mudstone metaturbidite, garnet- and graphite-enriched, locally cordierite- and sillimanite-bearing; includes magnetized derivatives

- Bm Migmatite derived from Bw or Bp
- Bw Metagreywacke - mudstone paragneiss, garnet- and biotite-rich
- Bp Metapelite, cordierite- and garnet-enriched, local magnetite

OSIPWAN GROUP SUPRACRUSTAL ROCKS, undivided

- Ba Bah Lake assemblage, undivided; metabasalt flows, pillowed or massive, local breccia; derived amphibolite; metagabbro - diabase subvolcanic sills; picroite sills; minor interflow chert, iron formation, volcanogenic sediment
- a Amphibolite (rafts in granitoid)
- sa Bah Lake amphibolite
- pp Metapelite or porphyroblastic metapelite sill (not limited to the Bah Lake assemblage)
- gp Metagabbro, subvolcanic sill (not limited to the Bah Lake assemblage)
- S Setting Formation, undivided; feldspathic quartzite and metapelite interlayered in varying proportions in a metabasalt sequence containing calc-silicate "concretion"; quartzose greywacke; rare occurrences of multiple layers of quartz-rich, oligomictic conglomerate grading upwards to sandstone - siltstone - shale
- cc Cummingtonite - cordierite schist, layered, a single occurrence at Setting Lake
- P Pipe Formation, undivided; iron formation, chert, metapelite schist; minor semipelite, dolomite marble, calc-silicate
- P3 Sequence of silicate and oxide facies iron formations, sulphidic chert; minor dolomite marble, calc-silicate; near the top sandstone - pelite metaturbidite
- dm Dolomite marble intercalation enclosed in silicate facies iron formation of P3
- ox Iron formation, oxide facies, found only in P3
- si Iron formation, silicate facies, stratigraphic position unknown unless determined by its host P1 or P2
- se Iron formations of several facies occurring close together
- if Iron formation, facies unspecified, stratigraphic position unknown
- P2 Metapelite schist with sulphide facies iron formation near its top; minor calc-silicate and chert
- se Iron formation, sulphide facies, stratigraphic position unknown unless determined by its host P1 or P2
- P1 Sequence of iron formations and associated chert layers
- si Iron formation, silicate facies, stratigraphic position unknown unless determined by its host P1 or P2
- se Iron formation, sulphide facies, stratigraphic position unknown unless determined by its host P1 or P2
- T Thompson Formation, undivided; marble or marble, layered, varied in composition and texture
- T3 Olivine - phlogopite - dolomite marble, coarse grained
- T2 Semipelite, very thin layer between T1 and T3
- T1 Marble, laminated to thinly layered; dolomite marble

MANSON FORMATION, undivided; basal clastic rocks

- M2 Semipelite schist, rhythmically layered, calc-silicate layer near top; pegmatite segregations in high grade metamorphic derivatives
- M1 Basal metaconglomerate, sandstone, shale; graded beds, fining upwards

ARCHEAN BASEMENT AND OSIPWAN GROUP, undivided

- A ARCHEAN BASEMENT MEGAMTITE - GNEISS, undivided, retrogressed, leucogranite to diorite in composition, host to distinct bodies of orthogneiss (1 to 6), ages uncertain
- 6 Biotite granite orthogneiss
- 5 Leucocranite gneiss, garnet- and magnetite-bearing
- 4 Migmatite, stromatic, magnetite-enriched
- 3 Alkali-feldspar syenite gneiss, porphyroblastic
- 2 Enderbite gneiss
- 1 Metagabbro, layered, garnetiferous

SYMBOLS

- Fault
- Structural trend derived from the vertical gradient of a magnetic anomaly
- Outcrop
- Contact

Scale: 1:50,000

Schematic illustrations of the relationships of Archean gneisses, Manson, Thompson, Pipe and Setting Formations.

Index Map

Suggested references:

- TMG Geology Working Group 2001: THOMPSON NICKEL BELT GEOLOGY, Manitoba Geological Survey, Preliminary Map 2001FN-2, Geology of the Pakwa Lake area (63J/15), scale 1:50,000.
- Map projection: Universal Transverse Mercator, Zone 14, North American Datum 1983.

Manitoba Industry, Trade and Mines

MANITOBA GEOLOGICAL SURVEY

Geology contributors: J. J. Macek, H. V. Zwanzig, C. R. McGregor

FALCONBRIDGE LIMITED

Geology and Geophysics contributors: P. Tirschmann, P. Nagel, A. J. Ault, R. K. Lyons, B. M. Czornobay, M. Napoli, J. Gertzbein, D. M. Seneshen, P. Golightly

INCO EXPLORATION

INCO LIMITED

Geology and Geophysics contributors: L. R. Larson, R. Stewart, A. J. Ault, R. K. Lyons, B. M. Czornobay, M. Napoli, J. Gertzbein, D. M. Seneshen, P. Golightly

HUDSON BAY EXPLORATION AND DEVELOPMENT LIMITED

Geology and Geophysics contributors: D. H. Simms, N. Richardson, A. K. Vowles, D. E. McKeachie, M. W. Zang

SELECTED REFERENCES:

Baragar, W.R.A. and Scoates R.F.A., 1981: The Circum-Superior Belt: A Proterozoic plate margin? In *Proterozoic Plate Tectonics*, ed. J.A. Kröner, Elsevier Scientific Publishing Company, Amsterdam, p. 297-330.

Bleeker, W. and Macek, J.J., 1986a: Thompson Nickel Belt Project: Pipe Pit Mine: in Report of Field Activities 1986, Manitoba Energy and Mines, p. 111-115.

Bleeker, W. and J.J. Macek, 1986b: Pipe Pit Mine (Orebody A, B, C, D, E, F, G and H), 1:400, Manitoba Energy and Mines, Geological Services, Preliminary Maps 1986T-1 to 1986T-8.

Bleeker, W., 1989: Litho-structural map of the Thompson Open Pit, Thompson Nickel Belt, Manitoba, scale 1:2000, with accompanying map description, Geological Survey of Canada, Open File 2089.

Bleeker, W., 1993a: New structural - metamorphic constraints on Early Proterozoic oblique collision along the Thompson Nickel Belt, northern Manitoba, Canada in *The Early Proterozoic: Trans-Hudson Orogen of North America*, ed. J.F. Lewry and M.R. Stueffer, Geological Association of Canada Special Paper 37, p. 57-74.

Bleeker, W., 1993b: Evolution of the Thompson Nickel Belt and its related deposits, 8th IAGOD Symposium, (eds) G.A. Baltes, A.H. Syme, E.C. Bleeker, W. Macek, J.J., and Gordon, T.M., Geological Survey of Canada, Open File 2165, p. 93-136.

Bleeker, W., 1993c: Evolution of the Thompson Nickel Belt and its related deposits, Manitoba, Canada, unpublished Ph.D. thesis, University of New Brunswick, Fredericton, New Brunswick, 401p.

Coats, C.J.A., Quirk, T.T., 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, *Geological field excursion A31-C31, International Geological Congress, XXIV Session, Canada*.

Huuberg, J.J.W., 1980: The Archean Pikawiton granite domain and its position at the margin of the northwestern Superior Province, central Manitoba, Manitoba Mines Branch, Geological Paper 60-3, 16 p.

Macek, J.J. and Bleeker, W., 1989: Thompson Nickel Belt project - Pipe Pit Mine, Setting and Osipwan Lakes: III: Report of Field Activities 1989, Manitoba Energy and Mines, Minerals Division, p. 73-77.

Macek, J.J. and Nagel, P., 1982: Sub-Paleozoic Precambrian geology of the Churchill-Superior Boundary Zone between the Hayes and Kings Rivers (63J) Manitoba Energy and Mines, Geological Services, Open File OF92-3, 55p.

Pendery, W.V. and Geological Staff, 1982: Geology and nickel sulphide deposits of the Thompson belt, Manitoba: a Precambrian sulphide deposit, 115: Robinson memorial volume, (ed) R.W. Hutchinson, J.D. Spence and J.M. Franklin, Geological Association of Canada, Special Paper 25, p. 165-209.

Scoates, R.F.J. and Bleeker, J.J., 1978: Molson Dyke Swarm: Manitoba Mines Branch, Geological Paper 78-13, 3 p.

Zwanzig, H.V., 1999: Mapping in the Setting Lake area (parts of NTS 63J/15 and 63J/16, S2002), in Report of Activities 1999, Manitoba Industry, Trade and Mines, Geological Services, p. 18-23.

Published 2001

Electronic cartography support: P.G. Lenton, B. Lenton
Field support: N. Bradston, C. Letley, E. Ducharme
Laboratory support: D. Berk, G. Berger, D. Grogan, R. Urru, V. Varga
Administrative support: D. Kirz, L. Bobin, L. Chudy
Managerial support: W. D. McTichie, C. Kaszycki, E. C. Syme

Electronic cartography support: Y. Zwiakak, G. Schwen
Field support: R. Kelly, J. Liwanag, S. King, J. Giroux, F. E. McGregor, J. P. Macek
Administrative support: L. M. Jarman
Managerial support: J. Robertson, D. MacEachern, J. E. Lee

Electronic cartography support: D. C. Sorensen, D. Boardman, J. R. Rifeil
Field support: J. M. Szwarcuk, F. J. Pugh, R. Brooks, J. P. Z. Macek
Administrative support: P. A. Gimble
Managerial support: J. J. Hannila, R. Worfolk, M. Toderian, R. C. Somerville, G. B. Sorensen

Electronic cartography support: B. Fitzsimons, E. J. Wright
Field support: R. Lindsay
Administrative support: W. Donaldson, E. W. Brown
Managerial support: E. Yarrow, J. Pickett, T. Lewis

This map is a preliminary representation of the results of a mapping and compilation program. It is not to be regarded as a final interpretation of the geology of the area. The data used in producing this map was transferred from un-revised airphotos and thus is subject to distortion. No attempt was made to remove this distortion for this preliminary release.