

-100°

-98°

-96°

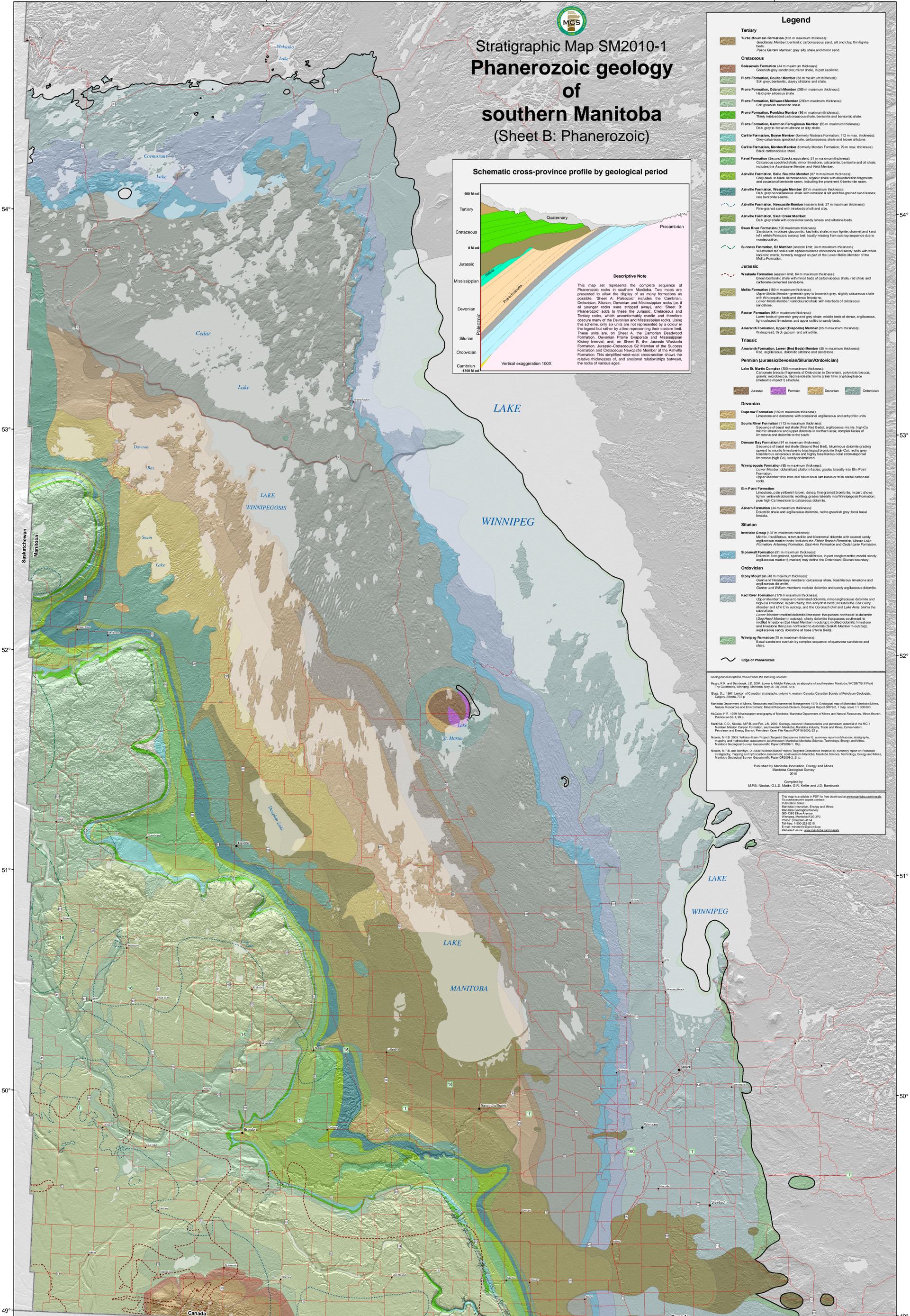
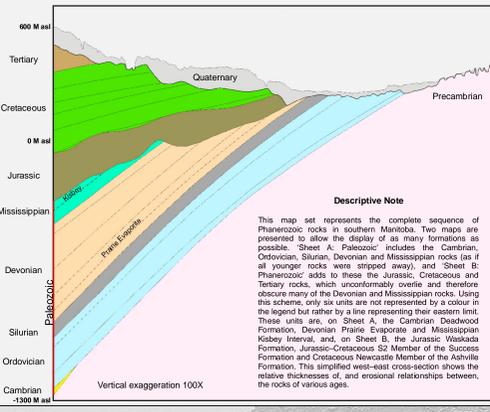


Stratigraphic Map SM2010-1 Phanerozoic geology of southern Manitoba (Sheet B: Phanerozoic)

Legend

- Tertiary**
 - Turtle Mountain Formation** (158 m maximum thickness): Goodlands Member: bentonitic carbonaceous sand, silt and clay; thin lignite beds. Peace Garden Member: grey silty shale and minor sand.
- Cretaceous**
 - Boisevain Formation** (44 m maximum thickness): Greenish-grey sandstone; minor shale, in part bedded.
 - Pierre Formation, Coulter Member** (83 m maximum thickness): Soft grey, bentonitic, clayey siltstone and shale.
 - Pierre Formation, Odsahn Member** (209 m maximum thickness): Dark grey silty shale.
 - Pierre Formation, Millwood Member** (200 m maximum thickness): Soft greenish bentonitic shale.
 - Pierre Formation, Pembina Member** (86 m maximum thickness): Thinly interbedded carbonaceous shale, bentonite and bentonitic shale.
 - Pierre Formation, Gammon Ferruginous Member** (85 m maximum thickness): Dark grey to brown mudstone or silty shale.
 - Carlisle Formation, Boyce Member** (Formerly Niswara Formation; 112 m max. thickness): Grey calcareous speckled shale, carbonaceous shale and brown siltstone.
 - Carlisle Formation, Morden Member** (Formerly Morden Formation; 79 m max. thickness): Black carbonaceous shale.
 - Favel Formation** (Second Specks equivalent; 51 m maximum thickness): Calcareous speckled shale, minor limestone, calcarenite, bentonite and oil shale; includes the Assiniboine Member and Kild Member.
 - Ashville Formation, Belle Fourche Member** (87 m maximum thickness): Grey black to black carbonaceous, organic shale with abundant fish fragments and occasional bentonite seams, including the prominent X-bentonite seam.
 - Ashville Formation, Westgate Member** (57 m maximum thickness): Dark grey calcareous shale with occasional silt and fine-grained sand lenses; rare bentonite seams.
 - Ashville Formation, Newcastle Member** (eastern limit; 27 m maximum thickness): Fine-grained sand with interbeds of silt and clay.
 - Ashville Formation, Swift Creek Member** (eastern limit): Dark grey shale with occasional sandy lenses and siltstone beds.
 - Swan River Formation** (100 maximum thickness): Sandstone; thin black, greenish, bedded shale; minor lignite, channel and lens silt within Paleozoic outcrop belt; locally missing from outcrop sequence due to nondeposition.
 - Success Formation, S2 Member** (eastern limit; 34 m maximum thickness): Unconformable red shale with spherulitic concretions and sandy beds with white kaolinitic matrix; formerly mapped as part of the Lower Melia Member of the Melia Formation.
- Jurassic**
 - Waskada Formation** (eastern limit; 64 m maximum thickness): Green bentonitic shale with minor beds of carbonaceous shale, red shale and calcarenite-concreted sandstone.
 - Melia Formation** (180 m maximum thickness): Upper Melia Member: greenish grey to brownish grey, slightly carbonaceous shale with occasional beds and lenses of sandy beds. Lower Melia Member: variegated shale with interbeds of calcareous sandstone.
 - Reston Formation** (65 m maximum thickness): Lower beds of greenish grey and grey shale; middle beds of dense, argillaceous, light-colored limestone; upper beds of sandy shale.
 - Amaranth Formation, Upper (Egmont) Member** (85 m maximum thickness): Widespread, thick gypsum and anhydrite.
- Triassic**
 - Amaranth Formation, Lower (Red Beds) Member** (65 m maximum thickness): Grey black to black carbonaceous, organic shale with abundant fish fragments and occasional bentonite seams, including the prominent X-bentonite seam.
- Pemian (Jurassic/Ordovician/Silurian/Ordovician)**
 - Lake St. Martin Complex** (200 m maximum thickness): Carbonate breccia (fragments of Ordovician to Devonian), polymictic breccia, granitic breccia, basaltic breccia, locally massive, forms a large part of the Ordovician-Silurian boundary.
- Devonian**
 - Dupre Formation** (189 m maximum thickness): Limestone and dolomite with occasional argillaceous and anhydritic units.
 - Souris River Formation** (13 m maximum thickness): Sequence of basal and axial (First Red Beds), argillaceous micrite, high-Ca micritic limestone and upper dolomite in northern area, complex facies of limestone and dolomite to the south.
 - Dawson Bay Formation** (91 m maximum thickness): Sequence of basal red shale (Second Red Beds), bituminous dolomite grading upward to micritic limestone, locally argillaceous micrite, high-Ca micritic limestone and upper dolomite in northern area, complex facies of limestone and dolomite to the south.
 - Winnipegosis Formation** (95 m maximum thickness): Lower Member: dolomitized platform facies, grades laterally into Elm Point Formation. Upper Member: thin inter-bedded bluish laminae or thin red carbonaceous rocks.
 - Elm Point Formation**: Limestone, pale yellowish brown, dense, fine-grained biotinitic; in part, shows lighter yellowish dolomitic nodules; grades laterally into Winnipegosis Formation; pure high-Ca limestone to calcareous dolomite.
 - Ashern Formation** (24 m maximum thickness): Dolomitic shale and argillaceous dolomite, red to greenish grey, local basal breccia.
- Silurian**
 - Sonolite Group** (137 m maximum thickness): Micritic, fossiliferous, arenaceous and biotinitic dolomite with several sandy argillaceous marker beds, including the Fisher Branch Formation, Moose Lake Formation, Alkerming Formation, East Arm Formation and Cedar Lake Formation.
 - Sonolite Formation** (51 m maximum thickness): Dolomite, fine-grained, sparsely fossiliferous, in part conglomeratic, medium sandy argillaceous marker (marker) may define the Ordovician-Silurian boundary.
- Ordovician**
 - Sony Mountain** (48 m maximum thickness): Quartz and chertiferous members: calcareous shale, fossiliferous limestone and argillaceous dolomite.
 - Quartz and Wilton members**: nodular dolomite and sandy argillaceous dolomite.
 - Red River Formation** (173 m maximum thickness): Upper Member: massive to laminated dolomite, minor argillaceous dolomite and high-Ca limestone; in part cherty; thin anhydrite beds; includes the First Garry Member and UH1 C in outcrop; and the Coronach UH1 and Lake Alton UH1 in the subsurface. Lower Member: mottled dolomitic limestone that passes northeast to dolomite (Dog Head Member in outcrop); cherty dolomite that passes southeast to mottled limestone (Car Head Member in outcrop); mottled dolomitic limestone and limestone that pass northwest to dolomite (Cooks Member in outcrop); argillaceous sandy dolomite at base (Pillsbury Beds).
 - Winnipeg Formation** (75 m maximum thickness): Basal sandstone overlain by complex sequence of quartzose sandstone and shale.

Schematic cross-province profile by geological period



Geological descriptions derived from the following sources:

Berry, P.K. and Bamber, J.D. 2006. Lower to Middle Paleozoic stratigraphy of southwestern Manitoba; WCSB/TGI 8 Field Trip Geology, Winnipeg, Manitoba, May 28-29, 2006, 72 p.

Glass, D.J. 1997. Lesson of Canadian stratigraphy, volume 4, western Canada. Canadian Society of Petroleum Geologists, Calgary, Alberta, 772 p.

Natural Resources and Environment, Resources and Environmental Management 1979. Geological map of Manitoba, Manitoba Mines, Natural Resources and Environment, Mineral Resources Division, Geological Report 0979-2, 1 map, scale 1:1 000 000, Publication No. 199.

McClure, H.R. 1959. Mississippian stratigraphy of Manitoba. Manitoba Department of Mines and Natural Resources, Mines Branch, Publication No. 199.

Mertnik, C.D., Nicolas, M.P.B. and Fox, J.N. 2000. Geology, reservoir characteristics and petroleum potential of the M-1 Member, Mission Canyon Formation, southwestern Manitoba. Manitoba Stratigraphy, Trade and Mines, Conservation, Petroleum and Energy Branch, Petroleum Open File Report OFP2000-02.

Nicolas, M.P.B. 2009. Wilson Basin Project (TerraNova Geoscience Initiative 8): summary report on Mesozoic stratigraphy, mapping and hydrocarbon assessment, southern Manitoba. Manitoba Science, Technology, Energy and Mines, Manitoba Geological Survey, Geoscientific Paper GP2009-1, 19 p.

Nicolas, M.P.B. and Bamber, J.D. 2006. Wilson Basin Project (TerraNova Geoscience Initiative 8): summary report on Paleozoic stratigraphy, mapping and hydrocarbon assessment, southern Manitoba. Manitoba Science, Technology, Energy and Mines, Manitoba Geological Survey, Geoscientific Paper GP2006-2, 21 p.

Published by Manitoba Innovation, Energy and Mines
Manitoba Geological Survey
2010

Compiled by
M.P.B. Nicolas, G.L.D. Maffei, G.R. Keller and J.D. Bamber

This map is available in PDF for free download at www.manitoba.ca/naturalresources by purchase and register contact
Manitoba Innovation, Energy and Mines
200-1985 St. Bon Avenue
Winnipeg, Manitoba R2P 2X2
Phone: (204) 945-4144
Toll free: 1-800-525-2115
E-mail: manitoba@manitoba.ca
Website: www.manitoba.ca/naturalresources

