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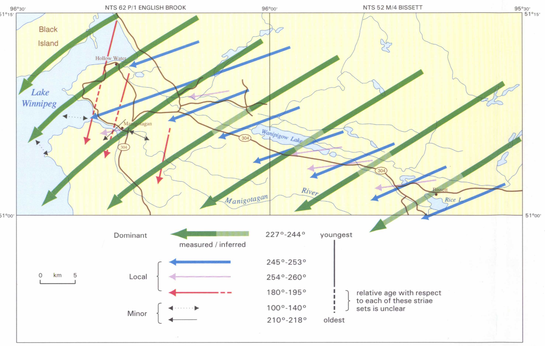
GEOLOGICAL SURVEY OF CANADA | COMMISSION GÉOLOGIQUE DU CANADA

Manitoba



GENERALIZED INTERPRETATION OF ICE FLOW HISTORY

Exposed bedrock surfaces throughout the area, are commonly striated, polished, and glacially moulded. The dominant ice flow direction is towards the southwest (236°-244°); however, a continuum in striae orientations is present ranging from 227° to 260°. The more westerly measurements (245°-260°) are almost exclusively restricted to Wanipigow River valley; the more regionally widespread southwesterly striation orientation (236°-244°) is present on outcrops both north and south of the river valley. On the rare faceted outcrops, where relative ages are preserved, the westerly trends predate the southwesterly (236°- 244°) striation orientations which appear to be associated with the main glacial event affecting the region. Two sets of the older, more westerly striations have been recognized: an older one at 254°-260° and a younger one at 245°-254°. They are interpreted as the result of earlier ice flow events, rather than from a slight deviation in ice flow direction associated with the main glaciation (236°- 244°) of the area.

In the English Brook area (NTS 62 P/1), near Lake Winnipeg, the striation record is more complex. In this area, the dominant ice flow orientation (236°-244°) observed in the eastern part of the study area swings towards the south-southwest. Striation measurements on rocks outcropping in the centre of Black Island and on the shore of the mainland and several islands in the lake trend approximately 230°. Southerly trending striae (180°-195°) have also been measured near the mouth of Manigotagan River. Where relationships are preserved, these striae orientations appear to predate those formed by the more regional southwesterly and west-southwesterly ice flow. Along the shore of Lake Winnipeg and at the mouth of Manigotagan River, some striae trending south-southwest (210°-218°) and southeast (100°-140°) have been recognized. The south-southwesterly orientations are interpreted as older than both the local southerly and regional southwesterly trending striae. Southeasterly trending striae (100°-140°) are older than those formed by the dominant southwesterly ice flow, but the age relationship to other striae sets is unclear.

The significance of these relative ages is not fully understood. The broad range in southwesterly trending striae orientations, coupled with several inconsistencies in relative ages, suggests that this striae pattern was developed through the repetition of similar ice flow events through time (i.e. several glaciations, and/or the interaction of ice lobes, and/or a fluctuating ice margin during deglaciation). Striae orientations observed in the Rice Lake area have been reported from the interlake region of Manitoba (Wardlaw et al., 1969; Groom, 1985; Nielsen, 1989). In the interlake area, southeasterly trending striae (approximately 135°) poststate those indicating ice flow to the south (Wardlaw et al., 1969; Nielsen, 1989). Southwesterly trending striae are rare but, where relationships are preserved, they have been interpreted as both predating (Wardlaw et al., 1969) and poststating (Groom, 1985) southeasterly trending striae.

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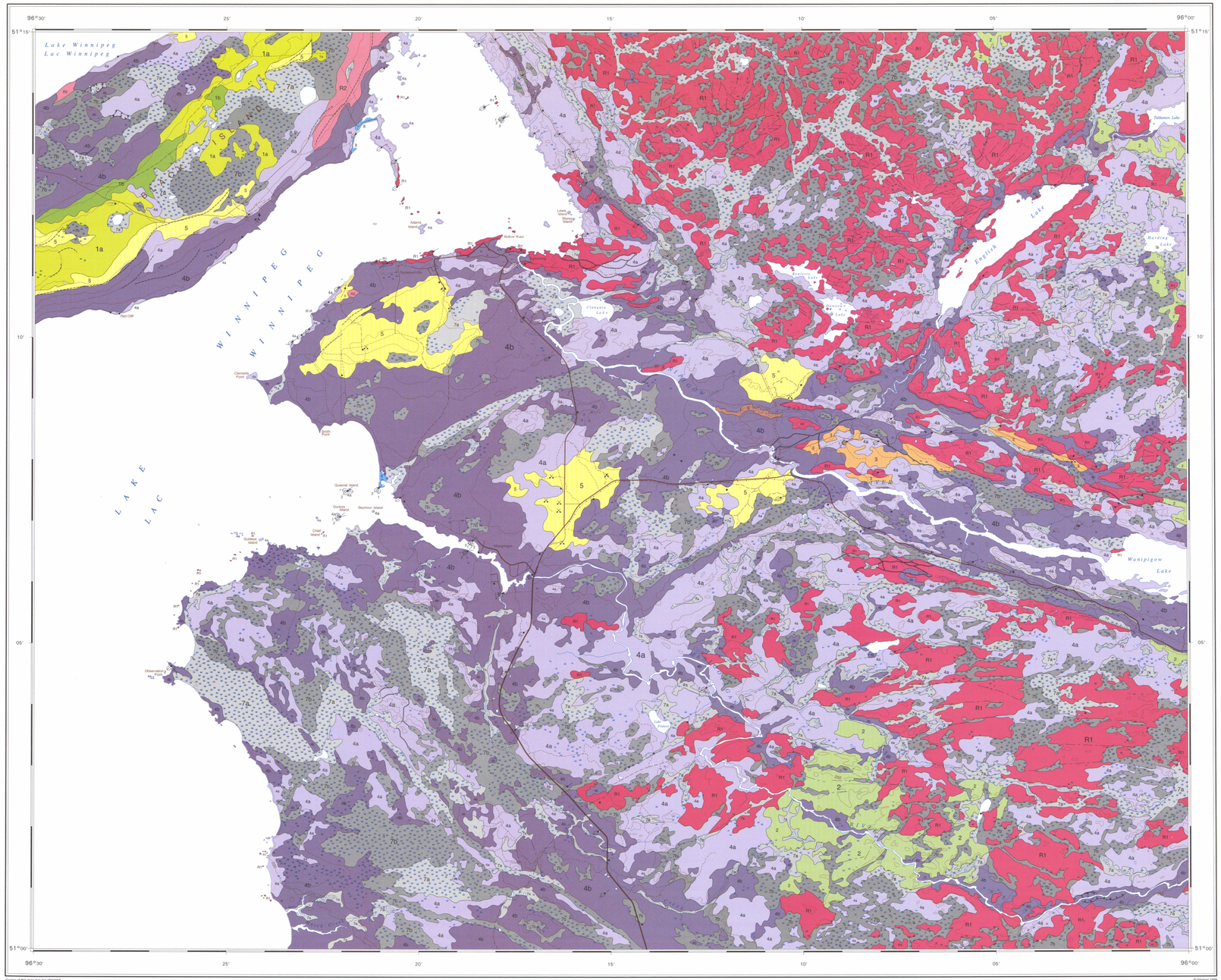


Copies of this map may be obtained from the Geological Survey of Canada: 601 Booth Street, Ottawa, Ontario K1A 0E8 3303-33rd Street, N.W., Calgary, Alberta T2L 2A7

LOCATION MAP

Geology by P.J. Henderson, 1992, 1993; assisted by C.M. Zdanowicz,1992

Digital cartography by Y.F. St Pierre Savard, Geoscience Information Division

Contribution to Canada-Manitoba Partnership Agreement on Mineral Development (1990-1995), a subsidiary agreement under the Canada-Manitoba Economic and Regional Development Agreement

Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada

MAP 1898A

SURFICIAL GEOLOGY

ENGLISH BROOK

MANITOBA

Scale 1:50 000 - Échelle 1/50 000

Kilometres 1 0 1 2 3 4 Kilometres

Transverse Mercator Projection
CM 96°15', Scale Factor 1

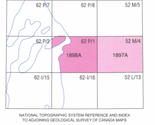
Projection transverse de Mercator
MC 96°15', facteur d'échelle 1

Digital base map from data compiled by Geomatics Canada, modified by the Geoscience Information Division

Copies of the topographic map for this area may be obtained from the Canada Map Office, Natural Resources Canada, Ottawa, Ontario K1A 0E9

Magnetic declination 1998, 4°21'E, decreasing 5.7' annually

Elevations in metres above mean sea level



NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND INDEX TO ACADEMIC GEOLOGICAL SURVEY OF CANADA MAPS

LEGEND

This legend is common to maps 1897A and 1898A

QUATERNARY

HOLOCENE - POST-LAST GLACIATION

NONGLACIAL ENVIRONMENT

8 — ***LAKE WINNIPEG DEPOSITS:*** *sand, minor gravel and silt; >1 m thick; forms small bars and beaches at or near the present level of Lake Winnipeg*

ORGANIC DEPOSITS: *peat, muck; 1 to 5 m thick; poorly drained ground forming swamps, marshes, bogs, and fens; occurs in enclosed basins or over extensive areas underlain by fine-grained, poorly drained glaciolacustrine sediments*

7b — ***Bog peat:*** *decomposed sphagnum moss and wood, occurs as raised irregular surfaces with an open to closed tree cover, may contain some fen peat*

7a — ***Fen, swamp, or marsh:*** *wet sedge peat or organic muck, minor moss peat; occurs as flat grassy surfaces with few trees, and includes areas with visible surface water*

6 — ***ALLUVIAL DEPOSITS:*** *sand, gravel, silt and clay; 1 to 3 m thick, deposited by streams as modern floodplains and deltas; may include small remnants of Holocene degradational terraces*

WISCONSINAN - LAST GLACIATION

PROGLACIAL ENVIRONMENT

GLACIAL LAKE DEPOSITS: *massive to stratified clay, silt, sand, and gravel; thickness varies from thin veneer to tens of metres; well sorted; generally horizontally bedded; deposited in proglacial, deltaic, littoral and deep water environments of glacial Lake Agassiz*

5 — ***Littoral sediments:*** *sand and gravel, minor silt; 1 to 5 m thick; may form isolated or a series of ridges, 1 to 3 m high, which include bars and beaches; commonly developed on wave-washed glaciofluvial sediments deposited as subaqueous outwash. On irregular terrane, littoral sediments may occur as isolated regressive deposits formed as glacial lake levels fell*

Offshore sediments: *silt, clay, fine sand, with minor gravel deposited as ice-rafted debris or dropstones; rhythmically bedded to massive; may include thin veneer of regressive sand and recent alluvium*

4b — ***Offshore sediment blanket:*** *continuous; >1 m thick and may exceed 10 m in places; deposits occur in major river valleys or form flat, poorly drained plains commonly mantled by organic deposits*

4a — ***Offshore sediment veneer:*** *discontinuous thin (<1 m) cover over bedrock; thicker accumulations may occur in depressions*

GLACIAL ENVIRONMENT

3 — ***GLACIOFLUVIAL DEPOSITS:*** *interbedded sand, gravel, silt, and diamicton; 2 to 30 m beds are massive, stratified, or cross-stratified; sorting varies; diamicton units commonly occur in layers or lenses; deposited as subaqueous outwash by meltwater flow below glacial ice/ice dam; may form in contact with or in front of the glacier; modified to varying degrees as glacial lake levels lowered*

GLACIAL DEPOSITS: *till and related sediments, composed of sandy to silty diamictons; deposited at the margin or beneath the glacier; variable thickness; thicker accumulations occur on highlands or on the down-ice side of bedrock knobs*

2 — ***SANDY TILL:*** *grey to grey-brown sandy diamicton (40-80% sand), commonly stony; noncalcareous to slightly calcareous; massive to poorly stratified; derived from erosion of Precambrian bedrock; clasts exclusively from Shield terrane. Unit occurs as thin, discontinuous veneer (averaging <1 m thick) interspersed with outcrop; thicker accumulations may occur locally in depressions and on the down-ice side of topographic highs; till surface morphology reflects underlying bedrock structure; in places, the unit occurs as a poorly sorted gravel, lacking the fine grain sizes characteristic of till, due to reworking by nearshore glaciolacustrine processes*

SILTY TILL: *grey to grey-brown silty diamicton; calcareous; derived primarily from erosion of Paleozoic clastic and carbonate rocks; calcareous; contains varying proportions of Shield and Paleozoic-derived clasts*

1b — ***Silty till blanket:*** *forms a continuous cover, 1 m to several metres thick, which overlies bedrock or previously deposited glaciogenic sediment; unit masks underlying topography; till surface may be covered by a thin veneer of Lake Agassiz clay or gravel resulting from reworking by nearshore glaciolacustrine processes*

1a — ***Silty till veneer:*** *forms a discontinuous, thin cover over bedrock; 0 to 3 m thick depending on underlying bedrock topography*

PRE-QUATERNARY

BEDROCK: *rock outcrop or rock thinly covered (<50 cm) by surficial materials; outcrop surfaces may be striated and grooved, or moulded to form roche moutonnée; commonly wave-washed during lowering of glacial lake levels*

R2 — ***Paleozoic sedimentary rocks:*** *consists primarily of a basal friable quartz sandstone of the Winnipeg Formation overlain by dolomitic limestone and dolostone of the Red River Formation, occurs as flat-lying outcrops*

R1 — ***Precambrian metasedimentary and metavolcanic rocks and associated igneous intrusive bodies:*** *consists of Archean supracrustal and intrusive rocks of the Rice Lake greenstone belt, acid to intermediate plutonic and gneissic rocks of the Wanipigow River plutonic complex, and a suite of paragneiss, schist, tonalite and monzonite which forms the Manigotagan gneissic belt; rolling topography with low to moderate relief; glacially eroded outcrops commonly moulded to form roches moutonnées*

Geological boundary

Beach ridge; wave cut terrace; strandline

Abandoned channel; large, small (arrow indicates flow direction)

Drumlinoid and streamlined features parallel to iceflow

Roche moutonnée

Striae (ice flow direction known, unknown, poorly defined), crossed striae (1 = oldest)

Rock escarpment

Bedrock outcrop

Depressional lineament along structural element

Gravel and/or sand pit (active, abandoned)

Quarry or mine (active, abandoned)

Mine tailings

Observation site

Published 1998

Manitoba PARTNERSHIP ASSOCIATION Canada

ENTENTE DE PARTENARIAT SUR L'EXPLOITATION MINÉRALE 1990 – 1995

PARTNERSHIP AGREEMENT ON MINERAL DEVELOPMENT 1990 -1995

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1897A

Canada