Descriptive Notes

An abundance of glacially streamlined landforms and hummocky till with numerous minor moraines and larger ridges dominate the Lac la Martre landscape. Drumlins and drumlinoids, up to 8 km long or more, are most prevalent in the northwest and central regions, whereas they are interspersed between zones of undifferentiated till and ridged and hummocky till elsewhere. The general direction of streamlined landforms varies from northwestward to southwestward trending. A series of small moraines west of Lac la Martre form ridges parallel to fluted landforms, and some are dissected by meltwater corridors. Eskers are rare and trend southwestward, except for a few smaller segments trending northwest in the northwest map area. Fine-grained glaciolacustrine sediments, associated with glacial Lake McConnell, were deposited as veneers in broad, poorly-drained low-lying areas of the southernmost map area. Inland from the western shores of Lac la Martre and Bartlett Lake, some glaciofluvial sediments and shattered bedrock ridges were reworked into glaciolacustrine beaches. Beaches occur between 270 and 300 m a.s.l., and mark the decreasing elevation of the short-lived glacial lake. Glaciolacustrine sediments and till in the southern regions are commonly overlain by extensive organics and exhibit thermokarst activity. Ice flow in the northern and central regions was dominantly to the northwest, but is overprinted by a younger and weaker westward flow. A southwestward and westward ice flow is recorded in the eastern and southern regions. The larger moraines near the intersection of these flows may mark the retreat of ice margins or stagnating lobes during deglaciation about 11–10 ka BP.

References and additional outcrop source

Cocking, R.B., Deblonde, C., Kerr, D.E., Campbell, J.E., Eagles, S., Everett, D., Huntley, D.H., Inglis, E., Lavoilette, A., Parent, M., Plouffe, A., Robertson, L., Smith, I.R., and Weatherston, A., 2016: Surficial Data Model, version 2.2.0: Revisions to the science language of the integrated Geological Survey of Canada data model for surficial geology maps; Geological Survey of Canada, Open File 8041, 45 p. doi:10.4095/298767

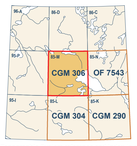
Douglas, R.J.W., Norris, A.W., and Norris, D.K., 1960. Geology, Horn River, District of Mackenzie, Northwest Territories; Geological Survey of Canada, Preliminary Map 48-1959, scale 1:506 880. doi:10.4095/108638

Abstract

Streamlined landforms are prevalent in the northwest and central regions, interspersed between zones of till and ridged and hummocky till elsewhere. Small moraines west of Lac la Martre form ridges parallel to fluted landforms, and some are dissected by meltwater corridors. Eskers trend southwestward with a few exceptions. Glaciolacustrine sediments, associated with glacial Lake McConnell, occupy poorly-drained low-lying areas of the southernmost map area. West of Lac la Martre and Bartlett Lake, some glaciofluvial sediments and bedrock ridges were reworked into glaciolacustrine beaches between 270 and 300 m a.s.l. In southern regions, extensive organics with thermokarst are common. A northwestward ice flow in northern and central regions is overprinted by a younger and weaker westward flow. Southwestward and westward ice flow is recorded in eastern and southern regions. Larger moraines near the intersection of these flows may mark the retreat of ice margins or stagnating lobes.

Résumé

Des reliefs fuselés sont répandus dans les régions du nord-ouest et du centre. Ailleurs, ils sont dispersés entre des zones de till non différencié, de till à crêtes morainiques et de till bosselé. Une série de petites moraines à l'ouest du lac la Martre forment des crêtes parallèles à des reliefs profilés et certaines d'entre elles sont recoupées par des corridors d'eau de fonte. Les eskers sont dirigés vers le sud-ouest, sauf quelques exceptions. Des sédiments glaciolacustres, associés au Lac glaciaire McConnell, occupent les basses terres mal drainées à l'extrémité sud de la région cartographique. À l'ouest des lacs la Martre et Bartlett, des sédiments fluvioglaciaires et de crêtes du substratum rocheux ont été remaniés sous la forme de plages glaciolacustres, entre 270 et 300 m au-dessus du niveau de la mer. Dans les régions du sud, on observe de vastes étendues de dépôts organiques présentant des reliefs thermokarstiques. Dans les régions du nord et du centre, aux traces d'un écoulement glaciaire dirigé vers le nord-ouest se superposent celles d'un écoulement plus récent et de plus faible intensité dirigé vers l'ouest. Dans les régions de l'est et du sud, on relève des traces d'écoulements glaciaires vers le sud-ouest et l'ouest. Des moraines de plus grande taille présentes à proximité de la rencontre de ces écoulements pourraient marquer la position de marges glaciaires en retrait ou de lobes stagnants lors de la déglaciation.



National Topographic System reference and index to adjoining published Geological Survey of Canada maps

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CANADIAN GEOSCIENCE MAP 306

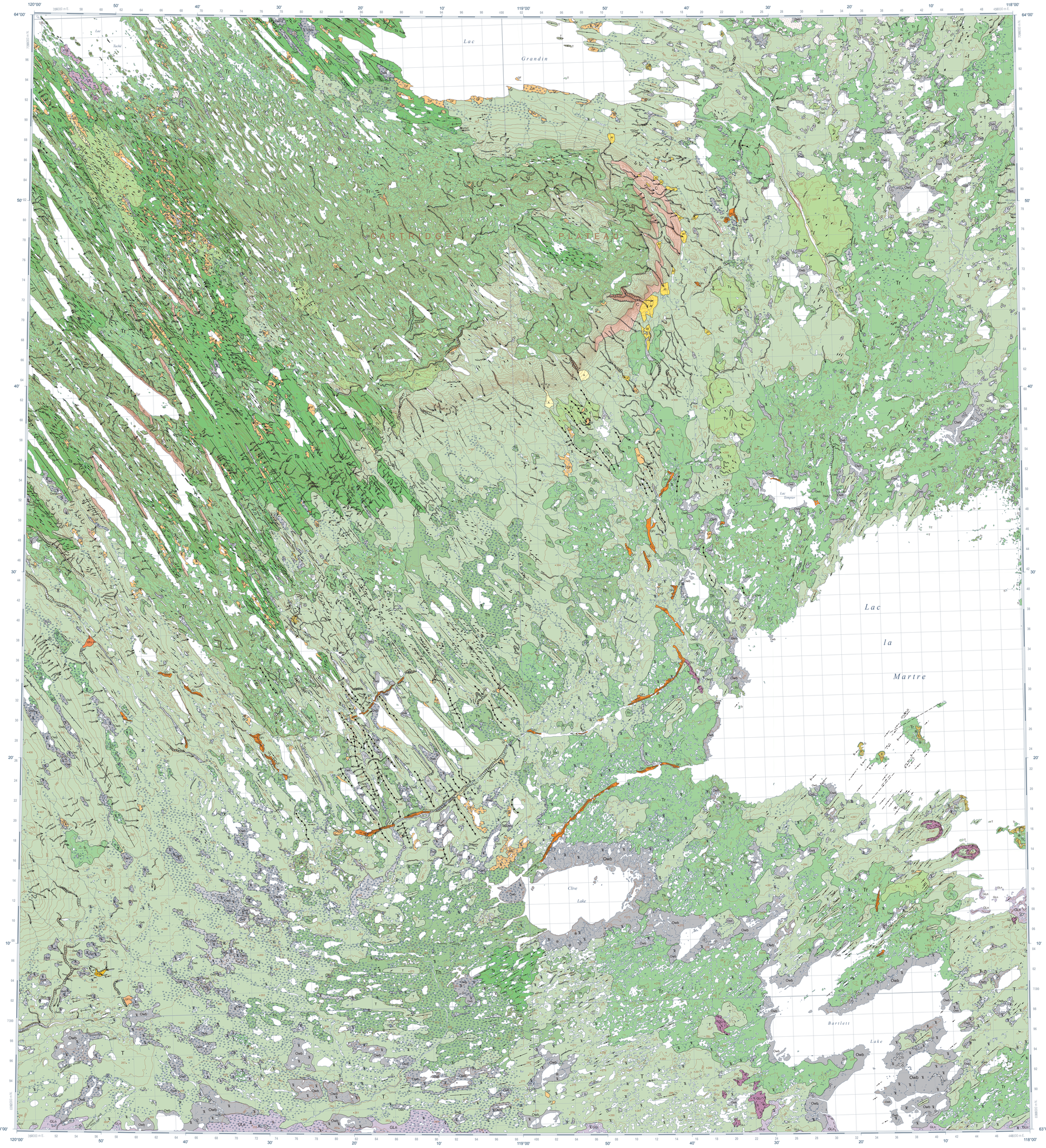
RECONNAISSANCE SURFICIAL GEOLOGY

LAC LA MARTRE

Northwest Territories

NTS 85-M

1:125 000



QUATERNARY

HOLOCENE

POSTGLACIAL ENVIRONMENT

Owf — **Fen deposits:** marsh vegetation in shallow water; less than 1 m thick; associated with small drained lakes in the northeast map area.

Owb — **Bog deposits:** organic vegetation; may include fine-grained mineral soil; generally less than 2–3 m thick; raised deposits bordering lake margins; may include small tundra ponds and thermokarst depressions.

O — **Organic deposits, undifferentiated:** fen, bog, muskeg and floating aquatic vegetation in lakes and ponds; 0.5 to 2 m thick or more; poor surface drainage; widespread and commonly overlies glaciolacustrine sediments and till though not identified on map.

E — **Eolian sediments, undifferentiated:** fine to medium sand; variable thickness; deposited by wind; may contain dunes and blow outs; derived primarily from glaciofluvial sediments and fine-grained till.

C — **Colluvial deposits, undifferentiated:** sand and gravel to angular and rounded cobbles and boulders; variable thickness; deposited by gravity induced movement; forming scree and talus slope deposits along bedrock and overburden escarpments; as well as along steeper flanks of larger drumlinoids; may include landslide deposits; may include small areas of bedrock.

Af — **Alluvial fan sediments:** silt, sand and gravel; variable thickness; deposited by streams; forming fans by inactive (post-glacial) and active intermittent streams draining the Cartridge Plateau; may be vegetated.

A — **Alluvial sediments, undifferentiated:** silt, sand and gravel; variable thickness; deposited by streams; includes inactive and seasonally flooded terrain and terraces along modern meandering streams and rivers; may be overlain by organics.

PROGLACIAL AND GLACIAL ENVIRONMENT

GLr — **Glaciolacustrine beach sediments:** sandy gravel; may contain cobbles and boulders; variable thickness; derived mainly from reworked glaciofluvial sediments, forming raised beaches associated with ancestral glacial Lake McConnell, as a result of isostatic uplift; may also include shingle beaches derived from exposed bedrock outcrops.

GLn — **Glaciolacustrine nearshore sediments:** fine sand to silty clay; variable thickness from 0.25 m to greater than 2 m; associated with glacial Lake McConnell in the southern-most regions; commonly draped over till; may include marl, muskeg and organics of variable thickness, found surrounding modern lakes; may contain thermokarst features.

GL — **Glaciolacustrine sediments, undifferentiated:** fine sand to silty clay; variable thickness; associated with ponding of meltwater in glacially-dammed lakes during ice retreat.

GFp — **Glaciofluvial outwash plain sediments:** sand and gravel; variable thickness; generally flat-topped; occur as a plain, may include terraces and ice-contact sediments.

GFf — **Glaciofluvial outwash fan sediments:** sand and gravel; variable thickness; forming proglacial outwash fan possibly grading into glacial Lake McConnell and sourced from proglacial meltwater channels.

GFc — **Glaciofluvial ice-contact sediments:** sand and gravel; variable thickness; may contain kettles, eskers and hummocks.

GFr — **Glaciofluvial esker sediments:** sand and gravel to cobbles; variable thickness; deposited by glacial meltwater; forming ridges deposited in tunnels, channels or openings in glacier; may contain kettles and hummocks.

GF — **Glaciofluvial sediments, undifferentiated:** sand and gravel to cobbles; variable thickness; deposited by glacial meltwater; may form pitted or flat-topped ice-contact deposits in depressions between fluted landforms; may be overlain by organics and exhibit thermokarst.

GLACIAL ENVIRONMENT

Th — **Hummocky till:** diamicton; variable thickness; deposited directly by glacier; forms small, low, subdued hummocks in shallow depressions in larger areas of ridged or streamlined till; surface may be pitted with small ponds.

Tr — **Ridged till:** diamicton; variable thickness; includes areas of minor morainal ridges with variable orientations; may include scoured till, poorly defined meltwater corridors, eskers and kettle lakes.

Ts — **Streamlined till:** diamicton; variable thickness; strongly fluted till defined by drumlinoids, crag-and-tails and drumlins, with smaller crosscutting landforms superimposed on larger forms; locally heavily dissected by meltwater flows.

Tv — **Till veneer:** diamicton; less than 2 m thick but may be thicker locally; may be fluted and modified by glaciofluvial processes locally; may contain small bedrock outcrops and glaciofluvial veneer.

T — **Till, undifferentiated:** diamicton; poorly sorted; variable thickness but generally greater than 2 m; locally contains flutings and minor and major moraine ridges; locally modified by glaciofluvial, glaciolacustrine, lacustrine and fluvial processes during isostatic uplift; surface may be overlain by organics with thermokarst and contain small areas of glaciolacustrine veneer below 290–300 m elevation.

Thermokarst depression

Patterned ground

Dune crest, paleowind unspecified

Kettle

Geological contact, defined

Terrace, meltwater channel scarp

Beach crest, depositional and erosional

Meltwater channel:
- *Minor, direction unknown*
- *Minor, direction known*

Moraine ridge:
- *Minor, unspecified*
- *Major, unspecified*

Esker:
- *Direction unknown*
- *Direction known*

Drumlinoid ridge:
- *Buried, length to scale, 1 = oldest, 2 = youngest*
- *Large, length to scale, 1 = oldest, 2 = youngest*

Drumlin:
- *Buried, length to scale*
- *Large, length to scale, 1 = oldest, 2 = youngest*

Crag-and-tail, length to scale

Fluted bedrock:
- *Direction unspecified, length to scale*
- *Direction known, length to scale*

× Small outcrop, from airphoto interpretation and Douglas et al., 1960

Recommended citation
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Authors: D.E. Kerr, P.D. Morse, and S.A. Wolfe

Geology by D.E. Kerr, 2016 by airphoto interpretation of 1:70 000 scale airphotos taken in 1953.

Geology conforms to Surficial Data Model v. 2.2

Geomatics by L. Robertson

Cartography by D. Viner

Initiative of the Geological Survey of Canada, conducted under the auspices of the Mackenzie Region Project as part of Natural Resources Canada's Geo-mapping for Energy and Minerals (GEM) program

Map projection Universal Transverse Mercator, zone 11. North American Datum 1983

Base map at the scale of 1:50 000 from Natural Resources Canada, with modifications. Elevations in metres above mean sea level

CANADIAN GEOSCIENCE MAP 306
RECONNAISSANCE SURFICIAL GEOLOGY
LAC LA MARTRE
Northwest Territories
NTS 85-M
1:125 000

2 0 2 4 6 8 10 km

Mean magnetic declination 2017, 19°07'E, decreasing 23.3' annually; Readings vary from 18°36'E in the SE corner to 19°36'E in the NW corner of the map.

This map is not to be used for navigational purposes.

Title photograph: Flutings dissected by meltwater channels. NAPL A14396-66

The Geological Survey of Canada welcomes corrections or additional information from users.

Data may include additional observations not portrayed on this map. See map info document accompanying the downloaded data for more information about this publication.

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Preliminary publications in this series have not been scientifically edited.

CANADIAN GEOSCIENCE MAP 306
RECONNAISSANCE SURFICIAL GEOLOGY
LAC LA MARTRE
Northwest Territories
NTS 85-M