DESCRIPTIVE NOTES

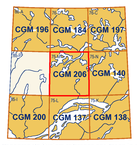
An old southwestward ice flow is recorded by crag-and-tails across the map area, but they are more prominent in the south. These landforms, up to 4 km long, exhibit variable states of preservation, from little modification to heavily meltwater-dissected slopes. In the south central region north of Lac du Mort, they are locally overtain by major moraine ridges. Small isolated crag-and-tails in the southwest part of the map area, however, indicate that this older flow direction is also recorded in the southwestern region. A younger westward flow in the northeastern map quadrant. Those small isolated crag-and-tails may relate to another older flow originating from very localized cold-based ice or old ice-accumulation zones associated with till veneer, undifferentiated till or moraine complexes. Alternatively these isolated crag-and-tails may actually represent pre-crag landforms, with till ramping up to outcrops, and formed by the regional southeastward flow. The entire map area was glaciated by late Wisconsin ice which flowed westward in the north, to southwestward in the south. In the southern regions, this resulted in older moraines and crag-and-tails being overprinted by flutings of the last ice flow. Where the old southwestward flow was parallel to the youngest flow, in the extreme southeast bedrock-dominated corner, the respective fluted landforms are not easily discernable. Preservation of the crag-and-tails and of the old moraines, some well-preserved and others heavily pitted and disrupted, would suggest the possible existence of localized cold-based ice at some point. The association of southwestward till and moraines in the adjoining NTS map sheet to the east may also reflect similar localized cold-based ice. The last deglaciation also resulted in a series of major moraine ridges, as well as minor moraines in the central and southern parts of the map sheet, though a clear pattern of ice retreat is not readily identified based on the absence of significant, continuous end moraines.

Abstract

Reconnaissance mapping, through aerial photograph interpretation and limited legacy field data in the MacKay Lake map area, provides a basic understanding of surficial sediments and glacial history. The region appears to have experienced more than one ice flow, but fluted till and crag-and-tails record a dominant last, southwestward flow. Bedrock is well exposed in some areas of the northeastern and extreme southeastern regions of the map area. Elsewhere, extensive till deposits occur, with variable surface expressions. Till blanket and till veneer are common throughout the map areas, whereas morainal deposits appear in the central regions and increase in importance towards the south and west. Glaciofluvial complexes and corridors consisting of eskers, ice-contact sediments and scoured bedrock, record a generally west-southwestward meltwater flow across the map area during deglaciation. A few raised beaches and trim lines along the shores of MacKay Lake range from 410 to 440 m elevation. Their limited extent may suggest confined ice marginal glacial lakes during deglaciation.

Résumé

La cartographie de reconnaissance établie grâce à l'interprétation de photographies aériennes et d'un nombre limité d'anciennes données de terrain dans la région de la carte du lac MacKay nous donne une compréhension des sédiments superficiels et de l'histoire glaciaire. Pendant le Wisconsinien tardif, la région était enfouie sous la glace qui s'écoulait vers le sud ouest. La roche mère est exposée, dans certaines zones au nord est et à l'extrême sud est de la carte. Ailleurs, on trouve de grands dépôts de till dont l'expression en surface est variable. Du till épais, des placages de till, du till cannelé et des blocards (crag-and-talk) sont répandus sur tout le territoire de la carte, alors que les dépôts morainiques apparaissent dans les régions centrales et accroissent en importance vers le sud et l'ouest. Des complexes et des corridors fluvioglaciaires formés d'eskers, de sédiments juxtaglaciaires et de roche mère décapée signalent l'écoulement de l'eau de fonte lors de la déglaciation dans une direction générale ouest sud ouest dans la région cartographiée. On trouve quelques plages soulevées et des lignes de démarcation le long du rivage du lac MacKay entre 410 et 440 m d'altitude. Leur étendue limitée semble suggérer l'existence pendant la déglaciation de lacs glaciaires confinés, en marge de la glace.



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

Cover illustration
Fluted landforms, MacKay Lake, Northwest Territories. Photograph by P. Morse, 2014-216

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CANADIAN GEOSCIENCE MAP 206

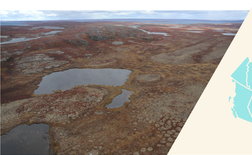
RECONNAISSANCE SURFICIAL GEOLOGY

MacKAY LAKE

Northwest Territories

NTS 75-M

1:125 000



QUATERNARY

HOLOCENE

NONGLACIAL ENVIRONMENT

Isn — **Icing or snowpack:** ice and snow; variable thickness; annual or perenial accumulations formed along streams or rivers; observed on aerial photographs taken in 1954.

O — **Organic deposits, undifferentiated:** peat and muck; variable thickness; formed predominantly by the accumulation of vegetative material in bogs; occurs in depressions, poorly drained areas, along lake shorelines and valley bottoms; may contain ice-wedge polygons; small unmapped organic deposits occur in most terrain units.

A — **Alluvial sediments, undifferentiated:** silt to gravel; variable thickness; deposited by modern streams and rivers; may include floodplains and alluvial fans in braided and meandering rivers; may be overlain by organics.

LAST GLACIATION (WISCONSIN)

PROGLACIAL AND GLACIAL ENVIRONMENT

GLd — **Glaciolacustrine deltaic sediments:** sand and gravel; variable thickness; associated with temporary glacier-dammed lake; may contain massive ground ice.

GFp — **Glaciofluvial outwash plain sediments:** sand and gravel; greater than 2 m thick; generally flat-topped subaerial deposits or terraces with channelled surfaces, associated with esker systems; may contain buried glacial ice.

GFc — **Glaciofluvial ice-contact sediments:** sand and gravel; variable thickness; flat-topped to irregular hummocky topography; may include small eskers; may contain massive ground ice.

GFe — **Glaciofluvial esker sediments:** sand, gravel, and cobbles; greater than 2 m thick; form ridges with both sharp-crested and flat-topped segments with mounds and flanking aprons; deposited by meltwater at or behind the ice margin; formed subglacially or in subaerially exposed ice-walled channels; may be associated with zones of scoured bedrock and till veneer, boulder lags, isolated kame deposits, and small transverse ridges within corridors; may exhibit kettle lakes and contain buried glacial ice.

GF — **Glaciofluvial sediments, undifferentiated:** sand and gravel; greater than 2 m thick; surface expression represents various ice-contact and meltwater environments of deposition.

GLACIAL ENVIRONMENT

Tv — **Till veneer:** diamicton; less than 1–2 m thick but may be thicker locally, occurs as a continuous to discontinuous layer where bedrock structure may be visible, as a lag on broad scoured bedrock or corridors, and as dissected or pitted deposits with fluted landforms and minor moraine or other small ridges of variable origin; certain areas between MacKay Lake and Lac Capot Blanc exhibit small circular to semi-circular ponds possibly associated with cold-based ice.

Tb — **Till blanket:** diamicton; greater than 2 m thick; variable morphology includes till plains mimicking bedrock topography, as drumlinoids and crag-and-tails which can exhibit crosscutting relationships and dissected/pitted surfaces.

Th — **Hummocky till:** diamicton; greater than 2 m thick; forms irregular to rolling terrain with hummocks of variable size with no particular orientation; may contain subdued minor and major morainal ridges.

Tm — **Moraine complex:** diamicton; variable thickness; forms major morainal ridges; straight to semi-circular with variable orientation and length (1–5 km), from parallel to perpendicular to ice flow; may be heavily dissected and pitted locally; may overlie older fluted landforms but also reworked into flutings by younger ice flow in southern map area; may be associated with stagnant ice kettle topography, cold-based ice or possibly margins of remnant ice masses.

Tr — **Ridged till:** diamicton; greater than 2 m thick; forms minor ribbed and rarely major morainal ridges; straight to sinuous with variable orientation and length (100s of m to 1–2 km); isolated or grouped; formed parallel to perpendicular to ice flow.

T — **Till, undifferentiated:** diamicton; variable thickness; exhibits irregular to subdued topography with no distinct glacial landforms or surface expression; may contain rare moraines or flutings and be heavily dissected; may represent a variety of depositional environments; may be associated with cold-based ice or possibly dispersal centres locally.

PRE-QUATERNARY

R — **Bedrock, undifferentiated:** metasedimentary and metavolcanic rocks, granite, gabbro, and kimberlite; Archean, Proterozoic, and younger; may include patches of till veneer and glaciofluvial sediments; may be locally fluted by glacial ice or scoured by meltwater.

- Geological contact, defined
- Terrace scarp
- Beach ridge, trimline
- Minor meltwater channel, sense unknown
- Minor meltwater channel, sense known
- Minor moraine ridge, variable size
- Major moraine ridge
- Esker, direction unknown
- Esker, direction known
- Buried drumlin
- Drumlinoid (1 = oldest, 2 = youngest)
- Drumlin (1 = oldest, 2 = youngest)
- Crag-and-tail (1 = oldest, 2 = youngest)
- Fluted bedrock or drift, direction unknown
- Fluted bedrock (roche moutonnée), direction known (1 = oldest, 2 = youngest)
- Fluted bedrock or drift, poorly defined, direction unknown
- Patterned ground
- Kame
- Striation, sense known
- Small outcrop

REFERENCES

Henderson, J.F., 1944. MacKay Lake, District of Mackenzie, Northwest Territories; Geological Survey of Canada, Map 736A, scale 1:253 440. doi:10.4095/107499

Recommended citation

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Canadian Geoscience Maps

Canada

Author: D.E. Kerr

Geology based on aerial photograph interpretation by D.E. Kerr, 2014.
Striation data from J.F. Henderson, 1944.

Geology conforms to Surficial Data Model v. 2.0

Geomatics by L. Robertson

Cartography by R. Chan

Initiative of the Geological Survey of Canada as part of Natural Resources Canada's Geo-mapping for Energy and Minerals (GEM) Program.

Map projection Universal Transverse Mercator, zone 12.
North American Datum 1983

CANADIAN GEOSCIENCE MAP 206
RECONNAISSANCE SURFICIAL GEOLOGY
MacKAY LAKE
Northwest Territories
NTS 75-M

1:125 000

2 0 2 4 6 8 10 km

Base map at the scale of 1:50 000 from Natural Resources Canada, with modifications.

Elevations above mean sea level are expressed in metres (NTS 75-M/03, 75-M/04, 75-M/05, 75-M/06, 75-M/07, 75-M/08, 75-M/09, 75-M/10, 75-M/11, 75-M/12, 75-M/13, 75-M/14, 75-M/15, and 75-M/16) and feet (NTS 75-M/01 and 75-M/02)

Mean magnetic declination 2014, 15°21'E, decreasing 27' annually. Readings vary from 14°27'E in the SE corner to 16°13'E in the NW corner of the map.

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

Data may include additional observations not portrayed on this map. *See* documentation accompanying the data.

This publication is available for free download through GEOSCAN (http://geoscan.nrcan.gc.ca/).

Preliminary publications in this series have not been scientifically edited.

CANADIAN GEOSCIENCE MAP 206
RECONNAISSANCE SURFICIAL GEOLOGY
MacKAY LAKE
Northwest Territories
NTS 75-M