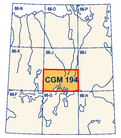
Abstract

Preliminary surficial geology studies, based on air photo interpretation and limited legacy and recent field data, were undertaken in the Joe Lake map area to provide an understanding of the distribution and nature of surficial materials, and regional glacial history. Much of the western area is characterized by streamlined till landforms indicating ice flow towards the north-northwest to north, but locally an older north-northeast flow is crosscut by the younger north-northwestward flow. Similar features occur in the eastern half but are more subdued. Small areas of hummocky till occur in the map area and are associated with longitudinal moraine ridges developed generally parallel to ice flow. Northward flowing subglacial meltwater corridors consisting of eskers, washed till, boulder lags and scoured bedrock, cross the entire area. Glaciomarine deltas, beaches and associated sediments extend up to 160–170 m a.s.l. in the western region, and are found more consistently near 160 m a.s.l. in the eastern half of the map area where these sediments overlie much of the till at lower elevations. The consistency of the elevation of the glaciomarine deltas implies a rapid ice retreat relative to isostatic uplift. There is evidence of glaciolacustrine environments at 170–180 m elevation in the southwest but additional investigations are needed to determine their extent.

Résumé

Pour établir la distribution et la nature des sédiments de surface et l'histoire glaciaire du secteur du lac Joe, nous avons entrepris des études préliminaires de la géologie de surface en analysant des photos aériennes et un ensemble limité d'anciennes et de nouvelles données de terrain. La zone occidentale est en grande partie caractérisée par des formes de relief de till profilé qui indique que l'écoulement glaciaire n'est fait vers le nord-nord-ouest à nord. A certains endroits des drumlinoïdes plus anciens vers le nord-nord-est sont traversés par le dernier écoulement glaciaire vers le nord-nord-ouest. Des caractéristiques semblables se manifestent dans la moitié est, mais elles sont plus subtiles. Des zones de till bosselé sont présentes et associées à des crêtes morainiques longitudinales qui, pour la plupart, se sont formées le long de l'écoulement glaciaire. Des corridors d'eau de fonte sous-glaciaire s'écoulant vers le nord et formés d'eskers, de till lessivé, de résidus de blocs et de substratum rocheux décapé, traversent le secteur en entier. Des deltas glaciomarins, des plages et les sédiments qui y sont associés s'élèvent à jusqu'à 160–170 m au-dessus du niveau de la mer dans la région ouest. On les trouve de façon plus constante à 160 m au-dessus du niveau de la mer dans la moitié est, où ces sédiments recouvrent une grande partie du till à plus faible altitude. La constance d'altitude des deltas glaciomarins implique un retrait rapide du front glaciaire relatif au relèvement isostatique. Il y a des preuves de milieux glaciolacustres à des altitudes de 170 à 180 m dans le sud-ouest, mais il faudra étudier ce secteur davantage pour déterminer l'étendue de ces milieux.



National Topographic System reference

Cover illustration
Elongated drumlinoid ridges surrounded by fine-grained glaciomarine sediments NAPL air photograph A14917-161.

Catalogue No. M183-1/194-2014E-PDF
ISBN 978-1-100-24700-7
doi:10.4095/295191

© Her Majesty the Queen in Right of Canada, as represented by the Minister of Natural Resources Canada, 2014

Natural Resources Canada / Ressources naturelles du Canada

CANADIAN GEOSCIENCE MAP 194

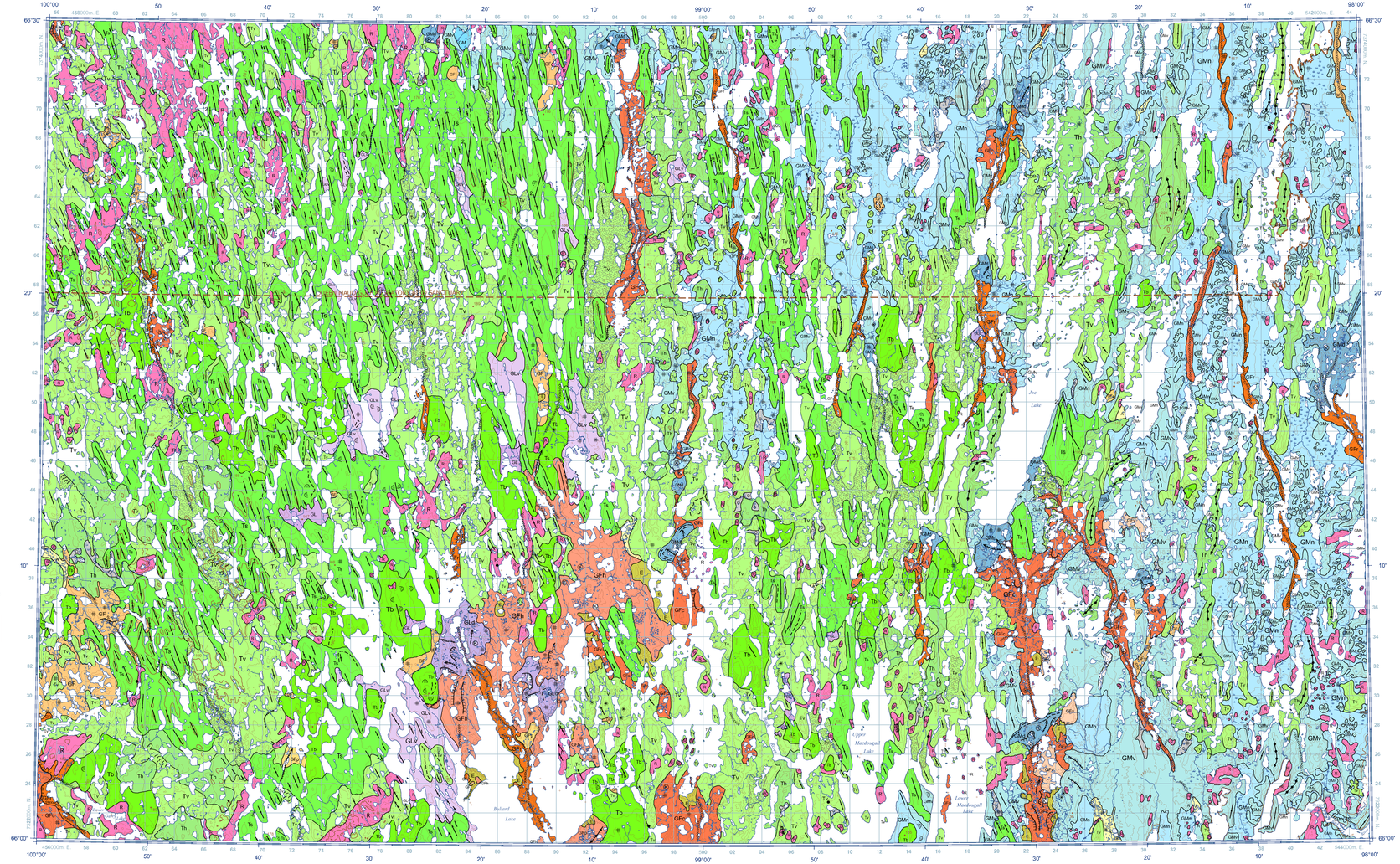
RECONNAISSANCE SURFICIAL GEOLOGY

JOE LAKE

Nunavut

NTS 66-J south half

1:125 000



QUATERNARY

HOLOCENE

NONGLACIAL ENVIRONMENT

Icings and snowpacks: seasonal ice formed along rivers (observed on aerial photographs taken in 1955).

O — **Organic deposits, undifferentiated:** bog, swamp, and shallow lake deposits; variable thickness; generally overlies glaciomarine or glaciofluvial sediments.

E — **Eolian sediments, undifferentiated:** sand, variable thickness, may include active and stabilized parabolic dunes with blow outs, generally associated with glaciofluvial sediments.

A — **Alluvial sediments, undifferentiated:** sand and gravel; variable thickness; may include floodplains, braided and meandering streams, and terraces; commonly overlain by organics in low lying areas.

LAST GLACIATION (WISCONSIN)

PROGLACIAL AND GLACIAL ENVIRONMENT

GMd — **Glaciomarine deltaic sediments:** sand and gravel; variable thickness; surface flat, channelled, or kettled; may exhibit raised beaches; deposited at or near the seaice interface by meltwater; may contain ground ice.

GMn — **Glaciomarine nearshore sediments:** silt and sand; variable thickness; commonly overlain by organics in low lying areas; deposited in shallow glacial sea; may exhibit patterned ground.

GMv — **Glaciomarine veneer:** silt and sand; <2 m thick; generally overlies till.

GM — **Glaciomarine sediments, undifferentiated:** silt and sand; variable thickness; deposited in a glacial sea.

GLd — **Glaciolacustrine deltaic sediments:** sand and gravel; variable thickness; surface flat, channelled, or kettled; deposited in glacial lakes by meltwater; may contain ground ice.

GLv — **Glaciolacustrine veneer:** silt and sand; <2 m thick; deposited in small, isolated glacial lakes.

GL — **Glaciolacustrine sediments, undifferentiated:** silt and sand; variable thickness; deposited in small, isolated glacial lakes.

GFp — **Glaciofluvial outwash plain sediments:** sand, gravel, and boulders; variable thickness; deposited by meltwater streams at, or beyond the ice front; may contain ground ice.

GFv — **Glaciofluvial veneer:** sand, gravel and boulders; <2 m thick; deposited by meltwater in various environments.

GFc — **Glaciofluvial ice-contact sediments:** sand, gravel, and boulders; variable thickness; flat-topped or ridged; deposited by meltwater streams in contact with glacier ice; may contain ground ice; may exhibit kettle lakes and ice wedges.

GFh — **Glaciofluvial hummocky sediments:** sand, gravel, and boulders; variable thickness; forming irregular ridges to planar surfaces; deposited by meltwater streams in contact with inactive glacier ice; may contain ground ice.

GFr — **Glaciofluvial esker sediments:** sand, gravel, and boulders; variable thickness; forming eskers and ridges up to 15 km long; deposited by meltwater streams flowing within ice tunnels; may contain ground ice.

GF — **Glaciofluvial sediments, undifferentiated:** sand, gravel, and boulders; variable thickness; deposited by meltwater in various environments; may contain ground ice.

GLACIAL ENVIRONMENT

Tv — **Till veneer:** diamicton; <2 m thick; lodgement and ablation till that mimics underlying bedrock; unit may include small isolated patches of bedrock, glaciofluvial deposits, till blanket, and minor transverse ridges; may be reworked by meltwater and glaciolacustrine and glaciomarine processes.

Tb — **Till blanket:** diamicton; >2 m thick; lodgement or basal meltout till; surface commonly gently rolling and fluted locally; masks underlying bedrock topography; may contain smaller areas of till veneer.

Th — **Hummocky till:** diamicton; variable thickness but >2 m; forming hillocks or ridges (moraines) associated with stagnant ice; may include small patches of glaciofluvial outwash and ice-wedge polygons.

Ts — **Streamlined till:** diamicton; variable thickness but >2 m; may be extensively fluted, individual flutings (drumlinoids, drumlins, and crag-and-tails) seldom exceed 5 km in length.

PRE-QUATERNARY

R — **Bedrock, undifferentiated:** may include patches of till veneer, glaciofluvial and glaciomarine sediments, and washed scoured lag.

- Lag deposits, washed, scoured
- Geological contact, defined
- Terrace scarp
- Beach crest
- Limit of glaciomarine submergence
- Minor meltwater channel, sense unknown
- Minor meltwater channel, sense known
- Minor moraine ridge
- Major moraine ridge
- Esker, sense known
- Drumlin (1 = oldest, 2 = youngest)
- Drumlinoid ridge (1 = oldest, 2 = youngest)
- Crag-and-tail
- Fluted bedrock, roche moutonnée, sense known
- Retrogressive thaw flow
- Patterned ground (ice wedge polygons)
- Solifluction lobes
- Kettle lake
- Kame
- Striation, sense unknown
- Striation, sense known
- Sample location

REFERENCES

NOTE: Additional field ice flow and station/sample data from:

Craig, B.C., 1961. Surficial geology, northern District of Keewatin; Geological Survey of Canada, Preliminary Map 7-1961. doi:10.4095/108770

McMartin, I., Berman, R.G., Normandeau, P.X., and Percival, J.A., 2013. Till composition of a transect across the Thelon tectonic zone, Queen Maud block, and adjacent Rae craton: results from the Geo-Mapping Frontiers' Chantrey project; Geological Survey of Canada, Open File 7418. doi:10.4095/293801

Recommended citation
St-Onge, D.A. and Kerr, D.E., 2014. Reconnaissance surficial geology, Joe Lake, Nunavut, NTS 66-J south half; Geological Survey of Canada, Canadian Geoscience Map 194 (preliminary), scale 1:125 000. doi:10.4095/295191

ess.nrcan.gc.ca

Canadian Geoscience Maps

Authors: D.A. St-Onge and D.E. Kerr

Geology based on aerial photograph interpretation by D.A. St-Onge, 2013, with revisions and compilation by D.E. Kerr, 2014.

Geology conforms to Surficial Data Model v. 2.0

Data conversion by D.E. Kerr and S. Eagles, 2014

Geomatics and cartography by L. Landon-Roy

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 14. North American Datum 1983

CANADIAN GEOSCIENCE MAP 194

RECONNAISSANCE SURFICIAL GEOLOGY

JOE LAKE

Nunavut

NTS 66-J south half

1:125 000

2 0 2 4 6 8 10 km

Base map at the scale of 1:250 000 from Natural Resources Canada, with modifications. Elevations in metres above mean sea level

Proximity to the North Magnetic Pole causes the magnetic compass to be erratic in this area. Mean magnetic declination 2014, 0°15'W, increasing 15' annually. Readings vary from 1°33'E in the SW corner to 2°07'E in the NE 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/).

This map is not to be used for navigational purposes.

Preliminary publications in this series have not been scientifically edited.

CANADIAN GEOSCIENCE MAP 194

RECONNAISSANCE SURFICIAL GEOLOGY

JOE LAKE

Nunavut

NTS 66-J south half