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Table 1. Geochronology sample - Radiocarbon, Ceratophyllum demersum (Olson and Broecker, 1959).

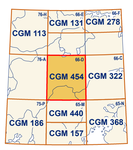
Dated sample location	Lab. number	Radiocarbon age (BP)	Elevation (m a.s.l.)	Material	Latitude	Longitude
1	L-428	5500 ± 250	116	Leaves	64.31999	-102.6799

Abstract

Preliminary surficial geology studies, based on air photo interpretation and limited legacy field data in the Tammarvi River map area, provide an understanding of the nature of surficial materials and regional glacial history. The glaciated landscape records evidence of old southwestward ice flow, preserved in the extreme southwest, followed by younger dominant northwestward flow across the rest of the region, relating to the Dubawnt Lake Ice Stream. Northwest-trending streamlined till and associated fluted landforms record the last flow event, but subsequent ice stagnation resulted in the widespread deposition of hummocky till and rare major moraine ridges in the north, accompanied by formation of ridged till and subglacial meltwater activity. The end of deglaciation is defined by the formation and demise of glacial Lake Thelon, whose extent in the southern and east-central map regions can be inferred from the elevation of deltas (230 to 160 m) and beaches (230 to 130 m).

Résumé

Des études préliminaires de la géologie des formations superficielles dans la région cartographique de Tammarvi River, fondées sur l'interprétation de photos aériennes et une quantité limitée d'anciennes données de terrain, permettent de comprendre la nature des matériaux superficiels et l'histoire glaciaire régionale. Le paysage glaciaire conserve les traces d'un ancien écoulement glaciaire de direction sud-ouest dans l'extrémité sud-ouest de la carte, lequel a été suivi de l'écoulement dominant vers le nord-ouest lié au courant glaciaire de Dubawnt Lake, qui s'est étendu au reste de la région. Du till profilé et des reliefs cannelés associés de direction nord-ouest témoignent du dernier événement d'écoulement, mais la stagnation subséquente de la glace a entraîné le dépôt répandu de till bosselé ainsi que de rares crêtes morainiques d'importance dans le nord et a été accompagnée de la formation de till à crêtes et d'une activité d'eau de fonte sous-glaciaire. La fin de la déglaciation est définie par la formation et la disparition du Lac glaciaire Thelon, dont l'étendue dans les régions sud et centre est de la carte peut être déduite de l'altitude de deltas (de 230 à 160 m) et de plages (de 230 à 130 m).



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

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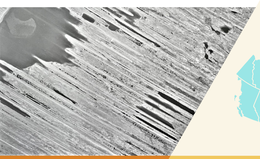
CANADIAN GEOSCIENCE MAP 454
RECONNAISSANCE SURFICIAL GEOLOGY
TAMMARVI RIVER
Nunavut–Northwest Territories
NTS 66-D
1:125 000



QUATERNARY

HOLOCENE

POSTGLACIAL ENVIRONMENT

O — **Organic deposits, undifferentiated:** peatbogs and muskeg; variable thickness but generally less than 2 m; formed predominantly by the accumulation of vegetative material in bogs; occurs in depressions; may contain ice-wedge polygons; generally underlain by till or glaciolacustrine sediments; small unmapped organic deposits occur in most map units.

EOLIAN SEDIMENTS: fine to medium sand transported and deposited by wind.

Er — **Ridged dune sediments:** fine to medium sand; variable thickness; deposited by wind; active and stabilized areas; contain linear and parabolic dunes, and blowouts; derived primarily from glaciofluvial and glaciolacustrine sediments.

E — **Eolian sediments, undifferentiated:** fine to medium sand; variable thickness; deposited by wind; active and stabilized areas; may contain dunes and blowouts; derived primarily from glaciofluvial and glaciolacustrine sediments.

C — **Colluvial deposits, undifferentiated:** sand and gravel to angular and rounded cobbles and boulders, composition depends on parent material; variable thickness; deposited by gravity-induced movement; forming scree and talus slope deposits along steeply inclined bedrock and overburden surfaces; may include small areas of bedrock.

ALLUVIAL SEDIMENTS: silt, sand, and gravel deposited by modern streams and rivers since deglaciation.

Ap — **Floodplain sediments:** sand, gravel, and cobbles; variable thickness; seasonally flooded; more elevated older surfaces may exhibit paleochannels and ice-wedge polygons.

Af — **Fan sediments:** silt, sand, and gravel; variable thickness; forming a triangle-shaped deposit.

At — **Terraced sediments:** silt, sand, and gravel; 3 to 5 m thick; forming raised terraces above modern rivers; confined to valleys; more elevated older surfaces may exhibit paleochannels and ice-wedge polygons; may be underlain by various till units.

A — **Alluvial sediments, undifferentiated:** fine to coarse sand with minor gravel; 3 to 10 m thick; generally associated with combinations of smaller floodplains and terraces.

LACUSTRINE SEDIMENTS: silt and sand, deposited in modern lakes and ponds.

Ld — **Deltaic sediments:** silt and sand; deposited at the mouth of a river or stream draining into a lake.

L — **Lacustrine sediments, undifferentiated:** silt and sand; variable thickness; associated with small drained or partially infilled lakes; may be vegetated.

PROGLACIAL AND GLACIAL ENVIRONMENT

GLACIOLACUSTRINE SEDIMENTS: sediments deposited at or beyond a retreating ice front by meltwater entering a glacial lake, as well as ponding of meltwater in small, isolated ice-dammed lakes; may contain ground ice.

GLr — **Beach sediments:** sandy gravel, may contain cobbles and boulders; variable thickness; derived mainly from reworked glaciofluvial sediments and till; forming raised beach ridges and swales associated with glacial lakes in the Thelon River valley and its tributary river valleys; may also include shingle beaches derived from bedrock outcrops.

GLd — **Deltaic sediments:** sand, gravel, and cobbles, stratified; up to 10 m or more thick; deposited at the mouth of a proglacial river draining into a glacial lake; surfaces may exhibit paleochannels and ice-wedge polygons; may exhibit kettle lakes.

GLn — **Nearshore sediments:** silt to gravel; variable thickness; deposited in shallow water environments.

GLv — **Glaciolacustrine veneer:** silt to gravel; less than 2 m thick but may be greater locally; generally overlies till in areas submerged by glacial lakes; may include thermokarst features, reworked till surfaces, and be overlain by organics; geological contacts with other map units are approximate.

GL — **Glaciolacustrine sediments, undifferentiated:** silty clay, sand, gravel, and cobbles; 0.5 to 10 m or more thick; generally underlain by till; coarser surface material may reflect reworking by successively lower lake levels; geological contacts with other map units are approximate.

GLACIOFLUVIAL SEDIMENTS: sand and gravel; deposited by meltwater flowing from, or in contact with, glacier ice; may contain ground ice.

GFp — **Outwash plain sediments:** sand and gravel; 2 to 10 m or more thick; surfaces may exhibit kettle lakes, paleochannels, terraces, and ice-wedge polygons; may overlie bedrock locally.

GFt — **Terraced sediments:** sand and gravel; 2 to 10 m or more thick; forming raised terraces above active and inactive braided streams and meandering rivers; surfaces may exhibit meltwater paleochannels.

GFf — **Fan sediments:** sand and gravel; 2 to 10 m or more thick; forming a triangle-shaped deposit.

GFc — **Ice-contact sediments:** sand to rounded gravel; massive to cross-stratified; 2 to 15 m or more thick; deposited at or beyond the ice margin and subglacially; occur as hummocky terrain; may exhibit esker ridges, kames, and kettle lakes; may contain ground ice.

GFr — **Esker sediments:** sand, gravel, and cobbles; 2 to 15 m or more thick; forming sinuous ridges with both sharp-crested and flat-topped ridges; may include flanking aprons, kames, kame terraces, and outwash plains; formed subglacially, and may be associated with subglacial meltwater corridors, major meltwater channels, or isolated segments on bedrock.

GF — **Glaciofluvial sediments, undifferentiated:** sand, gravel, and minor silt; 1 to 20 m or more thick; may occur as combinations of small braided fans, outwash plains, eskers, and hummocky terrain with minor moraine ridges; may contain ground ice.

GLACIAL ENVIRONMENT

GLACIAL SEDIMENTS (TILL): unsorted glacial debris, diamicton; deposited beneath, or along the margin of glacier as lodgment till, melt-out till, and gravity-flow deposits; may contain ground ice.

Th — **Hummocky till:** diamicton; 0.5 to 10 m or more thick; irregular to rolling terrain consisting of small to large mounds, rounded to irregular reticulated ridges, and minor moraine ridges; resulting from stagnating ice; disintegration moraine (veneer or greater) overlying streamlined till and bedrock; contains erosional depressions, kames, kettles, and ice-wedge polygons; surface may be reworked by glaciolacustrine processes; may contain massive ground ice.

Tm — **Moraine complex:** diamicton; 2 to 5 m or more thick; forming recessional moraine ridges; may contain minor unmapped ice-contact sediments.

Tr — **Ridged till:** diamicton, sand, gravel; 0.5 to 2 m or more thick; contains minor ribbed moraines, other minor moraine ridges, and unspecified ridges varying in orientation from parallel to transverse to ice flow; commonly associated with meltwater corridors; deposits too small to be mapped may be associated with glaciofluvial sediments, till veneer, and bedrock; locally overlies streamlined till; surface may be reworked by glaciolacustrine processes.

Ts — **Streamlined till:** diamicton; variable thickness; strongly fluted till defined by a close grouping of drumlinoids, drumlins, and crag-and-tail ridges of various dimensions, including mega-scale glacial lineations, up to 10 km or more long, associated with the Dubawnt Lake Ice Stream; may be underlain by outwash and other older tills (C.R. Stokes, personal communition, 2008).

Tv — **Till veneer:** diamicton; 0.5 to 2 m thick; occurs as a discontinuous layer where underlying bedrock structure is generally visible; may exhibit erosional lags, and narrow linear meltwater corridors alternating with ribbons of till on bedrock; may include minor moraine ridges, small areas of bedrock outcrop, and till blanket.

Tb — **Till blanket:** diamicton; 2 to 5 m or more thick; occurs as gently undulating till; weakly to moderately fluted; surface may be reworked by glaciolacustrine processes.

T — **Till, undifferentiated:** diamicton; 2 to 5 m or more thick; includes various tills and glaciofluvial outwash sediments whose surfaces may be modified by glaciolacustrine processes; steeper slopes may be colluviated.

PRE-QUATERNARY

R — **Bedrock, undifferentiated:** predominantly sandstone with northwest-trending dykes; surface may be glacially striated, fluted, and meltwater-scoured between till deposits; may include small pockets of isolated till, glaciolacustrine, and glaciofluvial sediments.

Stratigraphic relationship: two map-unit designators separated by a slash (/) are used where a stratigraphic relationship is observed or confidently inferred (e.g. Th/Ts indicates hummocky till overlying streamlined till). The map-unit polygon is coloured according to the overlying unit.

Geological contact:
- *Defined*
- *Approximate*
- *Concealed under intermittent water*

Thermokarst depression

Ice-wedge polygons

Pingo

Dune crest

Terrace scarp

Beach crest, may include erosional trim line

Kettle

Limit of glaciolacustrine submergence, defined

Meltwater channel:
- *Minor subglacial or proglacial, paleocurrent direction unknown*
- *Minor subglacial or proglacial, paleocurrent direction known*
- *Major channel scarp*

Meltwater erosional depression

Subglacial meltwater erosional scarp

Moraine ridge:
- *Minor, may include other unspecified ridges*
- *Major end, recessional, unspecified*

Ice-contact scarp

Kame

Esker ridge:
- *Direction unknown*
- *Direction known or inferred*
- *Direction unknown, with beach ridges*
- *Direction known or inferred, with beach ridges*

Drumlinoid ridge:
- *Buried, poorly defined, 1 = older, 2 = youngest*
- *Large, may include mega-scale glacial lineations, 1 = older, 2 = youngest*

Drumlin ridge:
- *Buried*
- *Large, 1 = older*

Crag-and-tail ridge:
- *Buried, poorly defined*
- *Large, 1 = older, 2 = youngest*

Pre-crag ridge

Fluted bedrock ridge, well defined, direction known, 1 = older, 2 = youngest

Striation:
- *Well defined, ice-flow direction unknown*
- *Well defined, ice-flow direction known*

Small outcrop

Station location (Brouard et al., 2022)

Dated sample location (*see* Table 1)

Recommended citation
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Geological Survey of Canada
Canadian Geoscience Maps

Canada

Authors: D.E. Kerr

Geology by D.E. Kerr based on airphoto interpretation in 2020 and 2021 of 1:58 000 and 1:60 000 scale photos taken in August and September, 1955 and July, 1956; striations from Wright (1967).

Geological data conforms to Surficial Data Model v. 2.4.0 (Deblonde et al., 2019).

Geomatics and cartography by L. Robertson

Scientific editing by L. Ewert

Initiative of the Geological Survey of Canada, conducted under the auspices of the Supporting Adaptation in Permafrost Regions project as part of Natural Resources Canada's Climate Change Geoscience program

Map projection Universal Transverse Mercator, zone 13
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 454
RECONNAISSANCE SURFICIAL GEOLOGY
TAMMARVI RIVER
Nunavut–Northwest Territories
NTS 66-D
1:125 000

2 0 2 4 6 8 10 km

Mean magnetic declination 2023, 6°50'E, decreasing 0.1' annually. Readings vary from 7°59'E in the SW corner to 5°34'E in the NE corner of the map.

This map is not to be used for navigational purposes.

Title photograph: Northwest-trending streamlined glacial landforms, including mega-scale glacial lineations, Northwest Territories. Photo from the National Air Photo Library. NAPL photo A16835-25

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