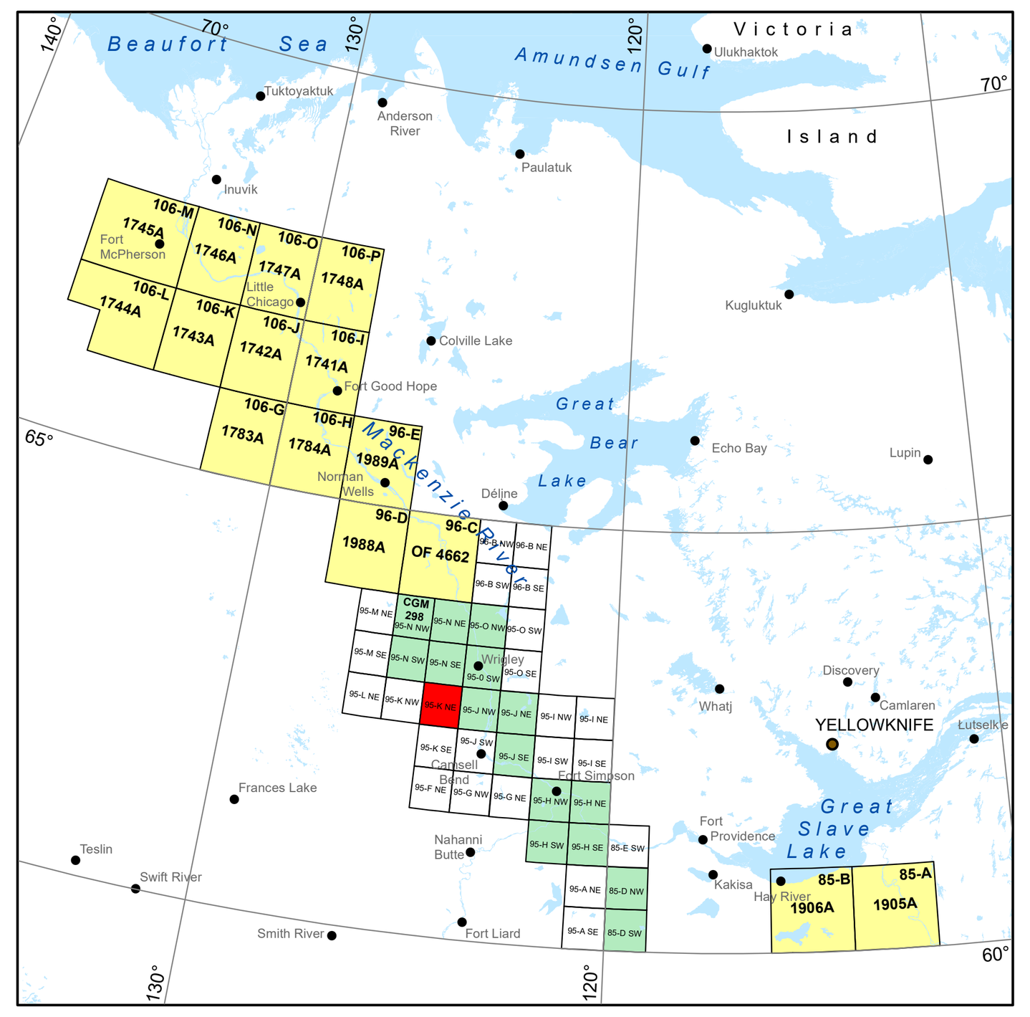


Figure 1. Surficial geology location map, southern Mackenzie corridor.

Descriptive Notes

This map area is located ~40 km west of the Mackenzie River. It is crossed from west to east by Root River in the north, and ~20 km east of the eastern border of the map the river turns 90° south draining into the Mackenzie River. There are two north-south ranges (Iverson and Whittaker) separated by a trench that extends along the western part of the map-area. The trench is developed in Upper Devonian shale and mudstone while the ranges are formed in Middle Devonian limestone, dolomite, Lower Devonian dolomite, breccia and limestone; numerous sinkholes are found in the Iverson Range. The drainage is structurally controlled by synclines and/or faults. The headwaters for the tributaries in this map-area are in these two ranges. Landslide deposits occupy most of the trench area where stream incision occurs on interbedded glaciolacustrine and glaciofluvial deposits overlying Upper Devonian shale and mudstone. Major landslides also occur along English Chief River and its tributaries in similar geological settings. The middle and lower drainage courses east of Iverson Range extend across the Mackenzie Plains. These plains are developed on Upper Devonian sandstone, siltstone, shale and limestone. The plains have a characteristic glacial morphology and sedimentology that has mostly been derived from the Laurentide Ice Sheet. The Laurentide glacier covered this area during the Late Pleistocene Glaciation. As well, the Laurentide glacier carried distinctive pink Canadian Shield granites from a minimum distance of 400 km to the east. These granite erratics are widespread at elevations below 1300–1400 m.

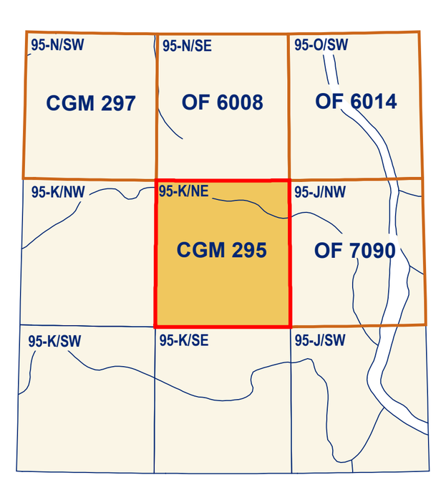
Other glaciers that affected this area were of local montane origin (valley glaciers from the Cordilleran Ice Sheet did not reached this area). Cirque glaciers formed in this area during the Late and pre-Late Pleistocene. The Late Pleistocene cirques formed at elevations between 1300–1800 metres and they are filled with glacial sediment of local provenance. They are considered to have formed a few thousand years after the Laurentide maximum, and their deposits usually truncate those of Laurentide origin. The Laurentide glacier deposited sediments in older cirques carved during a previous glaciation (s). These cirques are of two types: 1 - pre-Late Pleistocene cirques formed in Iverson Range at elevations 1300–1500 m during MIS 6-8 (?), well preserved but filled with glacial deposits of Laurentide origin; 2 – uncorrelated cirques carved at elevations between 970–1060 m along the sides of an unnamed range located between the Mackenzie Plains and Carlson River. These cirques are relatively well preserved and they contain Shield granite erratics up to 100 m above the cirques. Cirques contain limited Laurentide materials. These cirques are carved in Upper Devonian sandstone, siltstone and shale.

Abstract

The surficial geology represented in this map has been prepared at 1:50 000 scale and published at 1:100 000 scale. Surficial deposits cover approximate 95% of the map area. Exposed bedrock covers approximately 5% of the map-area. About 45% of the total surface is covered by till (units Tb, Tv, Tp, Td, Tr, Tm, Tx, Te). Lacustrine (units Lp, Lb, Lv, Lm, Lx) deposits cover 13% of the map-area and are widespread within valleys, but are also heavily colluviated. About 32% of the area is covered by slope deposits (units Cv, Cx and Cz) the main component being landslide deposits (unit Cz). Glaciofluvial sediments (units Gt, Gp, Gd, Gf, Gv and Gx) cover about 3% of the map area, forming terraces along the trench and English Chief River and its tributaries. About 7% of the map area is covered by alluvial deposits (units Ap, Af, Ax). Peat deposits cover ~0.01%.

Résumé

La géologie des formations superficielles représentée sur cette carte a été préparée à l'échelle de 1/50 000 et publiée à l'échelle de 1/100 000. Les dépôts superficiels occupent environ 95 % de la région cartographique. Des affleurements rocheux couvrent approximativement 5 % de la région cartographique. Environ 45 % de la surface totale est couverte de till (unités Tb, Tv, Tp, Td, Tr, Tm, Tx, Te). Des dépôts lacustres (unités Lp, Lb, Lv, Lm, Lx) couvrent 13 % de la région cartographique et sont très répandus dans les vallées, mais présentent un important colluvionnement. Environ 32 % de la région est couverte par des dépôts de pente (unités Cv, Cx, Cz) dont la principale composante correspond à des dépôts de glissement (unité Cz). Des sédiments fluvioglaciaires (unités Gt, Gp, Gd, Gf, Gv, Gx) couvrent environ 3 % de la région cartographique, formant des terrasses le long du sillon et de la rivière English Chief, ainsi que de ses affluents. Environ 7 % de la région cartographique est couverte par des dépôts alluvionnaires (unités Ap, Af, Ax), tandis que des dépôts de tourbe en couvrent ~0,01 %.



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

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Natural Resources Canada / Ressources naturelles du Canada

CANADIAN GEOSCIENCE MAP 295

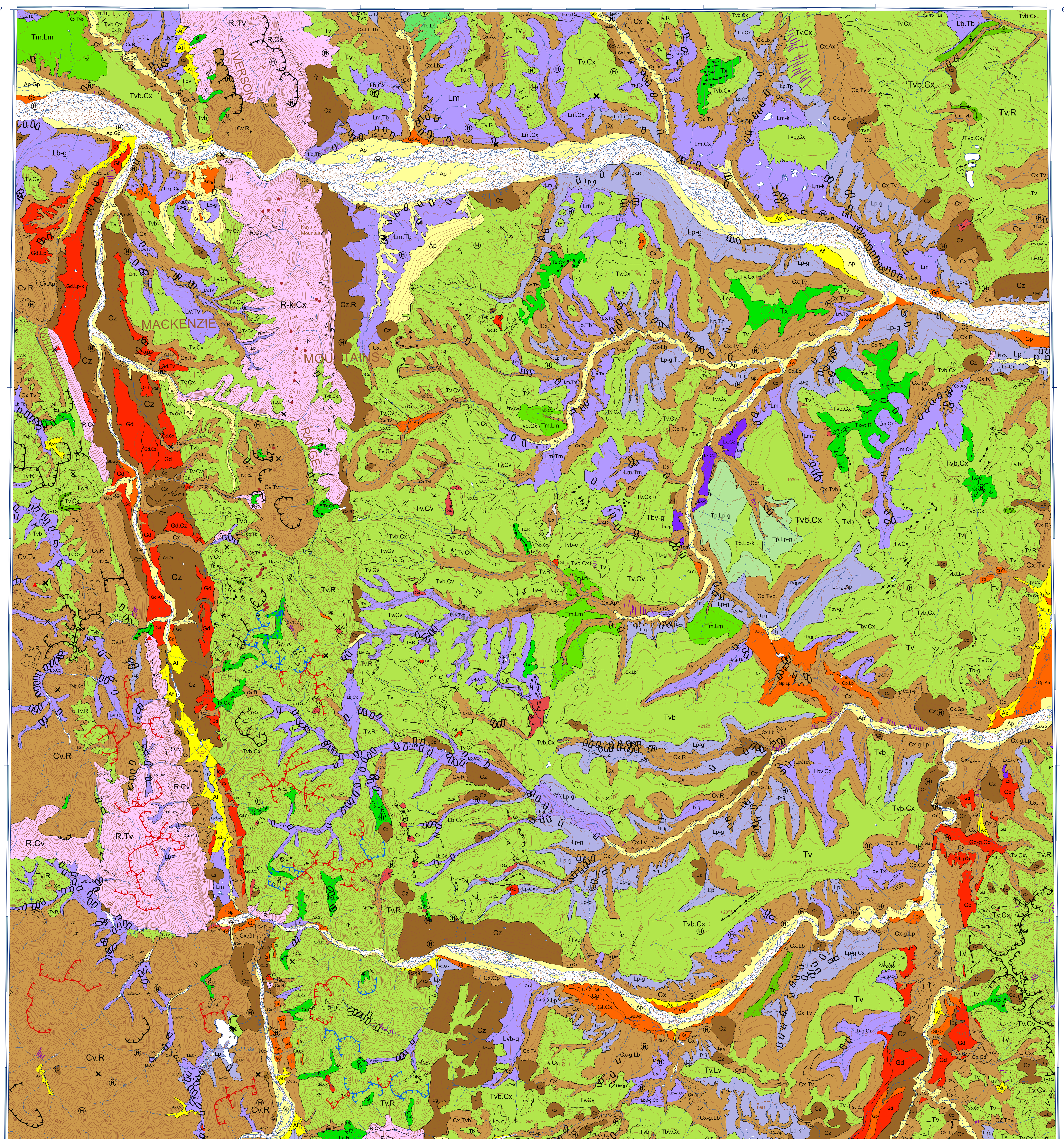
SURFICIAL GEOLOGY

ROOT RIVER

Northwest Territories

NTS 95-K northeast

1:100 000



HOLOCENE

ORGANIC DEPOSITS: peat and muck, occurring as flat to gently sloping plains.

- **pO** — **PEATLAND:** sphagnum peat generally underlain by woody sedge peat; 0.5–2 m thick, (ground observation); 3–5 m thick (shothole data).

ALLUVIAL DEPOSITS: sand, silt and minor gravel in association with modern and post-glacial drainage regime.

- **Ap** — **ALLUVIAL PLAIN:** coarse sand and gravel with silt, fine sand and some organic detritus, occurring as channel and overbank floodplain sediments or in-channel bars; 3–5 m thick.
- **Af** — **ALLUVIAL FAN:** mainly sand and silt with minor gravel and discontinuous layers of peat occurring as fan deposits.
- **Ax** — **ALLUVIAL COMPLEX:** floodplain and fan deposits; may contain small areas of colluvium.

COLLUVIAL AND LANDSLIDE DEPOSITS: diamicton and rubble derived from bedrock and/or surficial material through a variety of colluvial and landslide processes.

- **Cv** — **COLLUVIAL VENEER:** discontinuous veneer of diamicton and rubble that conforms to local topography; <2 m thick.
- **Cg** — **ROCK GLACIER:** a multi-lobate tongue of frozen colluviated debris with interstitial ice, ice lenses and/or massive ice; maybe active or be a relic form.
- **Cx** — **COLLUVIAL COMPLEX:** slope complex consisting of diamicton and rubble; may include minor landslides (Cz) and/or alluvial fan (Af) units; >2 m thick.
- **Cx-g** — **COLLUVIAL COMPLEX, GULLIED:** slope complex consisting of diamicton and rubble; may include minor landslides (Cz) and/or alluvial fan (Af) units, affected by gullying processes.
- **Cz** — **LANDSLIDE:** bedrock, rubble, diamicton and/or other unconsolidated materials occurring as stepped or tongue-shaped deposits; formed by rotational slumping, retrogressive thaw flow, debris flows, rock topple and translational slides in surficial sediments and/or bedrock; they are prominent along former meltwater channels.

LATE PLEISTOCENE

GLACIOLACUSTRINE DEPOSITS: silt and clay with minor sand and diamicton; sediments deposited in a proglacial lake.

- **Lp** — **LACUSTRINE PLAIN:** flat to gently sloping cover; locally overlain by eolian sand; 1–10 m thick; subject to rotational slumping where it is interbedded with gravel units.
- **Lp-k** — **LACUSTRINE PLAIN WITH THERMOKARST DEPRESSIONS:** flat to gently sloping cover; locally overlain by eolian sand; 1–10 m thick.
- **Lp-g** — **LACUSTRINE PLAIN, GULLIED:** flat to gently sloping cover; locally overlain by eolian sand; 1–10 m thick.
- **Lb** — **LACUSTRINE BLANKET:** deposit conforms to local topography up to 8 m of relief; locally overlain by eolian sand; 2–10 m thick.
- **Lb-k** — **LACUSTRINE BLANKET WITH THERMOKARST DEPRESSIONS:** deposit conforms to local topography up to 8 m of relief; locally overlain by eolian sand; 2–10 m thick; secondary unit only.
- **Lb-g** — **LACUSTRINE BLANKET, GULLIED:** deposit conforms to local topography; locally overlain by eolian sand.
- **Lv** — **LACUSTRINE VENEER:** discontinous deposits, conforming to local topography; commonly associated with small lakes following ice retreat; locally overlain by eolian sand; <2 m thick.
- **Lvb** — **LACUSTRINE VENEER TO BLANKET:** locally overlain by eolian sand; <3 m thick.
- **Lvb-g** — **LACUSTRINE VENEER TO BLANKET, GULLIED:** locally overlain by eolian sand; <3 m thick.
- **Lbv** — **LACUSTRINE BLANKET TO VENEER:** locally overlain by eolian sand; <3 m thick.
- **Lbv-g** — **LACUSTRINE BLANKET TO VENEER, GULLIED:** locally overlain by eolian sand; <3 m thick.
- **Ls** — **SHORELINE DEPOSITS:** low, ridged beach deposits of sand and gravel; <5 m thick.
- **Lm** — **LACUSTRINE PLAIN, ROLLING:** rolling, occurring as low ridges; locally overlain by eolian sand; 2–15 m thick.
- **Lm-k** — **LACUSTRINE PLAIN, ROLLING WITH THERMOKARST DEPRESSIONS:** rolling, occurring as low ridges, affected by thermokarst depressions; locally overlain by eolian sand.
- **Lx** — **LACUSTRINE COMPLEX:** deltaic sediments transitional between glaciofluvial and glaciolacustrine deposits with upper 0–5 m consisting of sand; locally re-worked by eolian processes; <20 m thick.
- **Lx-g** — **LACUSTRINE COMPLEX, GULLIED:** deltaic sediments transitional between glaciofluvial and glaciolacustrine deposits with upper 0–5 m consisting of sand; locally re-worked by eolian processes; <20 m thick.
- **Le** — **LACUSTRINE COVER, DISCONTINUOUS:** highly modified by landsliding; secondary unit only.

GLACIOFLUVIAL DEPOSITS, OUTWASH: sand and gravel locally with a veneer of eolian silt and/or sand; deposited as proglacial sediment by glacial meltwater.

- **Gp** — **GLACIOFLUVIAL PLAIN:** flat to gently sloping; 2–20 m thick.
- **Gt** — **GLACIOFLUVIAL TERRACE;** 10–50 m thick.
- **Gt-g** — **GLACIOFLUVIAL TERRACE, GULLIED:** affected by gullying; 10–50 m thick.
- **Gv** — **GLACIOFLUVIAL VENEER:** with slopes conforming to underlying topography; <2 m thick.
- **Gd** — **GLACIOFLUVIAL DELTA:** gently sloping, abrupt scarp, showing sudden change in lake level; deposited in a glacial lake; up to150 m thick.
- **Gd-g** — **GLACIOFLUVIAL DELTA, GULLIED:** gently sloping, abrupt scarp, showing sudden change in lake level; deposited in a glacial lake; up to150 m thick.
- **Gf** — **GLACIOFLUVIAL FAN:** mainly coarse gravel with minor sand, locally with mudflow deposits; commonly deposited in a meltwater channel or glacial lake; 5–7 m thick.

GLACIOFLUVIAL DEPOSITS, ICE CONTACT: sand and gravel locally with a veneer of eolian silt and/or sand; deposited as ice-contact sediment by glacial meltwater.

- **Gx** — **GLACIOFLUVIAL COMPLEX:** includes eskers, kames, and plains, commonly with thermokarst ponds in places; 2–30 m thick.

TILL DEPOSITS: unsorted silt, sand, and clay with clasts (pebbles, cobbles, and some boulders) deposited by glacial ice in a variety of landforms.

- **Tp** — **TILL PLAIN:** flat to gently sloping; 3–5 m thick.
- **Tb** — **TILL BLANKET:** gently to moderately sloping plain conforming to underlying topography; 2–8 m thick.
- **Tb-g** — **TILL BLANKET, GULLIED:** gently to moderately sloping plain conforming to underlying topography, affected by gullying processes.
- **Tbv** — **TILL BLANKET TO VENEER:** conforming to underlying topography; 2–8 m thick.
- **Tbv-g** — **TILL BLANKET TO VENEER, GULLIED:** conforming to underlying topography; 2–8 m thick.
- **Tvb** — **TILL VENEER TO BLANKET:** conforming to underlying topography.
- **Tvb-c** — **TILL VENEER TO BLANKET, CHANNELLED:** conforming to underlying topography, affected by glaciofluvial channelling.
- **Tv** — **TILL VENEER:** with slopes conforming to underlying topography; <2 m thick.
- **Tv-c** — **TILL VENEER, CHANNELLED:** with slopes conforming to underlying topography, incised by glaciofluvial channels.
- **Tr** — **TILL, RIDGED:** surface of generally coarse till (20–50% pebbles) deposited as ridges; commonly lateral and frontal moraines and hummocks; <9 m thick.
- **Tm** — **TILL PLAIN, ROLLING:** till plain with broad hummocks 10–20 m high (5–20% pebbles and larger); typically bouldery till in mountains; <10 m thick.
- **Tx** — **TILL COMPLEX:** largely hummocky, ridged, and/or hilly with patches of gravel; in some places Tx forms veneer over bedrock.
- **Tx-c** — **TILL COMPLEX, CHANNELLED**
- **Te** — **TILL, ERODED:** gently to moderately sloping till plain, highly modified by landsliding.

PALEOZOIC TO MESOZOIC

BEDROCK: primarily prominent ridges, escarpments and hills associated with Devonian rocks.

- **R** — **BEDROCK:** Cretaceous shale (various colours) and limestone mostly in plains area; Paleozoic limestone, dolomite, shale (various colours), siltstone, mudstone and sandstone mostly in mountainous areas.
- **R-k** — **KARSTED:** carbonate rocks affected by solution and collapse. Karst forms expressed as sinkholes and channels commonly developed in Mackenzie and Franklin Mountains; Cretaceous shale (various colours) and limestone mostly in plains area; Paleozoic limestone, dolomite, shale (various colours), siltstone, mudstone and sandstone mostly in mountainous areas.

ORGANIC DEPOSITS: as patterns

This pattern is used when organic deposits appear as a second or third component in a polygon.

- Peatland constituting 10–50% of the map unit.

COLLUVIAL DEPOSITS: as pattern

This pattern is used when colluvial veneer and sheetwash deposits appear as third component in a polygon, e.g. Tv.Lb.Cx.

- Discontinous veneer (<1 m) mainly diamicton and rubble that conforms to local topography.

- Geological boundary (defined)
- Moraine ridge: unconsolidated sediments (till, sand, and gravel) deposited in ridges at terminal, recessional, lateral and medial positions with respect to ice margins
- Moraine ridge: (montane origin - Late Pleistocene):unconsolidated sediments (till, sand and gravel) deposited in ridges at terminal, recessional, lateral, and medial positions with respect to ice margins
- Drumlin, drumlinoid ridge or flute (direction uncertain): streamlined hill or ridge of till with long axis paralleling direction of iceflow
- Cirque (uncorrelated): steep-walled, half bowl-like basins situated high on mountainsides; horseshoe or semi-circular in planform and produced by glacial erosion of valley headwalls
- Cirque (Late Pleistocene): steep-walled, half bowl-like basins situated high on mountainsides; horseshoe or semi-circular in planform and produced by glacial erosion of valley headwalls
- Cirque (Middle Pleistocene): steep-walled, half bowl-like basins situated high on mountainsides; horseshoe or semi-circular in planform and produced by glacial erosion of valley headwalls
- Meltwater channel (minor): erosion and channel formation by meltwater flow along, beneath, or in front of a glacier or ice sheet; range from broad, shallow channels to deeply incised, steep-sided channels, may run across or along slope contours; may be presently dry
- Shoreline of former lake: low, ridged beach deposits of sand and gravel
- Tension cracks
- Debris flow
- Shield erratic
- Landslide
- Sinkhole
- Ground station
- Helicopter observation

UNDERSTANDING THE LEGEND

The genetic category of surficial material is indicated by the first upper case letter, e.g. G (glaciofluvial). The morphologic category is indicated in lower case following the genetic category, e.g. Gp (glaciofluvial plain). The modifying processes are indicated in lower case separated from the morphologic category by a (-) e.g. Gp-k (glaciofluvial plain with thermokarst processes).

Combined units are used where, for reasons of scale, the units cannot be separated. The main unit, covering over 50% of the geologic polygon, is separated by a (.) from the secondary unit, e.g. Gp-k.Lp. In cases where the polygon has a third unit it is represented by a patterened symbol, e.g. eolian sand cover, peatlands or fenlands.

Superscripts "M", "G" and "u" are used to indicate the age for montane glacial deposits: "M" – Mountain River age (MIS 6/8); "G" – Gayna River age (oxygen isotope 18 stage 2) and "u" for deposits of uncertain, uncorrelated or undifferentiated age. Labels with no superscripts are of Late Pleistocene Laurentide age.

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Geology by A. Duk-Rodkin and D. Huntley, 2007

Air photo interpretation by A. Duk-Rodkin

Geomatics and cartography by D.A. Lemay and M. Le

Map projection Universal Transverse Mercator, zone 10
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 295

SURFICIAL GEOLOGY

ROOT RIVER

Northwest Territories

NTS 95-K northeast

1:100 000

2 0 2 4 6 8 km

Mean magnetic declination 2018, 19°53'E, decreasing 22.9' annually
Readings vary from 20°01'E in the NW corner to 19°44'E in the SE corner of the map.

This map is not to be used for navigational purposes.

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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CANADIAN GEOSCIENCE MAP 295
SURFICIAL GEOLOGY
ROOT RIVER
Northwest Territories
NTS 95-K northeast