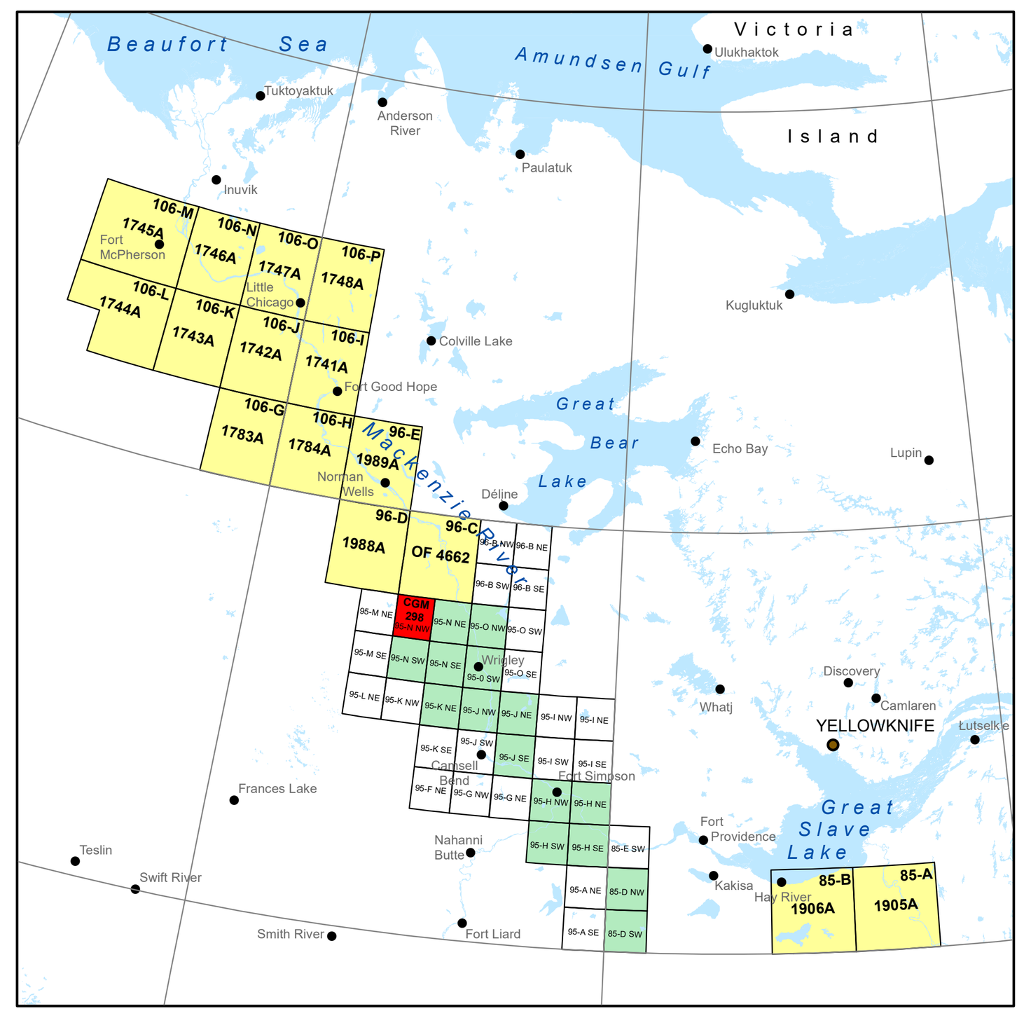


Figure 1. Surficial geology location map, southern Mackenzie corridor.

Descriptive Notes

This map area is located ~50 km west of the Mackenzie River and ~20 km south of Keele River. It is crossed by two main rivers: Redstone River that zigzags diagonally from southwest to northeast and Dahadinni River in the southeast. The two rivers are connected by a wide valley of about 13 km long occupied by two small misfit streams. Before the Late Pleistocene glaciation affected the region, this paleo-valley drained the Redstone River which was then a tributary of Dahadinni River. During deglaciation of the Late Pleistocene Laurentide Ice Sheet the eastward retreating ice remained in the paleo-valley until after 10 ka BP damming the valley to the east. The glacial dam caused the inundation of Redstone Valley and tributaries forming a proglacial lake with a northward outlet. This outlet cut through overlying Laurentide glacial deposits and highly folded and faulted Devonian shale. The resulting meltwater canyon developed a large variety of rotational slides along both sides of the valley affecting almost all of the slopes within it. Debris flows are also common, and mass wasting continues today. The canyon incision has reached 540 metres calculated from the highest glaciofluvial delta. Further, lateral slope erosion due to landslide activity has reached 960 metres.

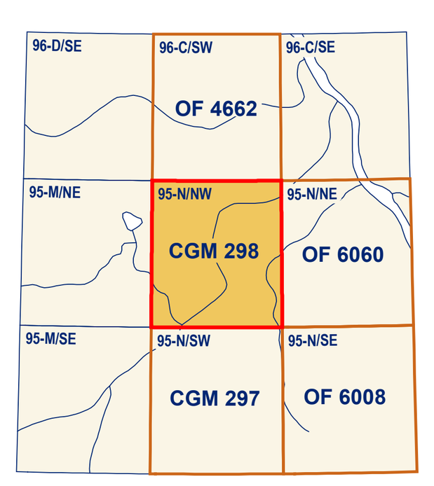
Surficial glacial deposits are of late Pleistocene Laurentide origin and age with the exception of some older (pre-last glaciation) deposits of Cordilleran provenance found in stratigraphic sections. The Laurentide glacier carried distinctive pink Canadian Shield granites from a minimum distance of 400 km to the east. The highest elevations at which these granites are found at 1600 metres a.s.l. 10 km west of the Redstone Range in the southwest part of the map.

Abstract

The surficial geology represented in this map has been prepared at 1:50 000 scale and published at 1:100 000 scale. Surficial glacial deposits occupy approximately 95% of the map area. The other 5% of the map area is covered by exposed bedrock represented mainly by Devonian shale, limestone, sandstone, and minor Ordovician and Silurian dolomite, and Cretaceous sandstone and shale. Till deposits (units Tb, Tv, Tp, Td, Tr, Tm and Tx) represent ~ 60% of the surficial deposits. Lacustrine (units Lp, Lb, Lv, Lm, Lx) sediments represent ~12% of the surficial cover. About 13% of the area is covered by colluvial deposits (units Cv, Cx) most of which constitute landslides (unit Cz). Glaciofluvial sediments (units Gt, Gp, Gd, Gf and Gx) form about 5% of the surficial deposits and include prominent terraces along the Redstone and Dahadinni rivers. Alluvial deposits (units Ap, A f, Ax) cover about 3% of the map area. Peat deposits cover ~2%.

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 glaciaires superficiels occupent environ 95 % de la région cartographique. Les 5 % restants correspondent à des affleurements rocheux constitués surtout de shale, de calcaire et de grès du Dévonien, mais aussi, en faibles quantités, de dolomie de l'Ordovicien et du Silurien ainsi que de grès et de shale du Crétacé. Les dépôts de till (unités Tb, Tv, Tp, Td, Tr, Tm, Tx) représentent ~60 % des dépôts superficiels. Les sédiments lacustres (unités Lp, Lb, Lv, Lm, Lx) constituent ~12 % de la couverture superficielle. Environ 13 % de la région est couverte par des dépôts colluviaux (unités Cv, Cx) liés pour la plupart à des glissements de terrain (unité Cz). Les sédiments fluvioglaciaires (unités Gt, Gp, Gd, Gf, Gx) constituent environ 5 % des dépôts superficiels et forment des terrasses marquées le long des rivières Redstone et Dahadinni. Des dépôts alluvionnaires (unités Ap, Af, Ax) couvrent environ 3 % de la région cartographique, tandis que des dépôts de tourbe en couvrent ~2 %.

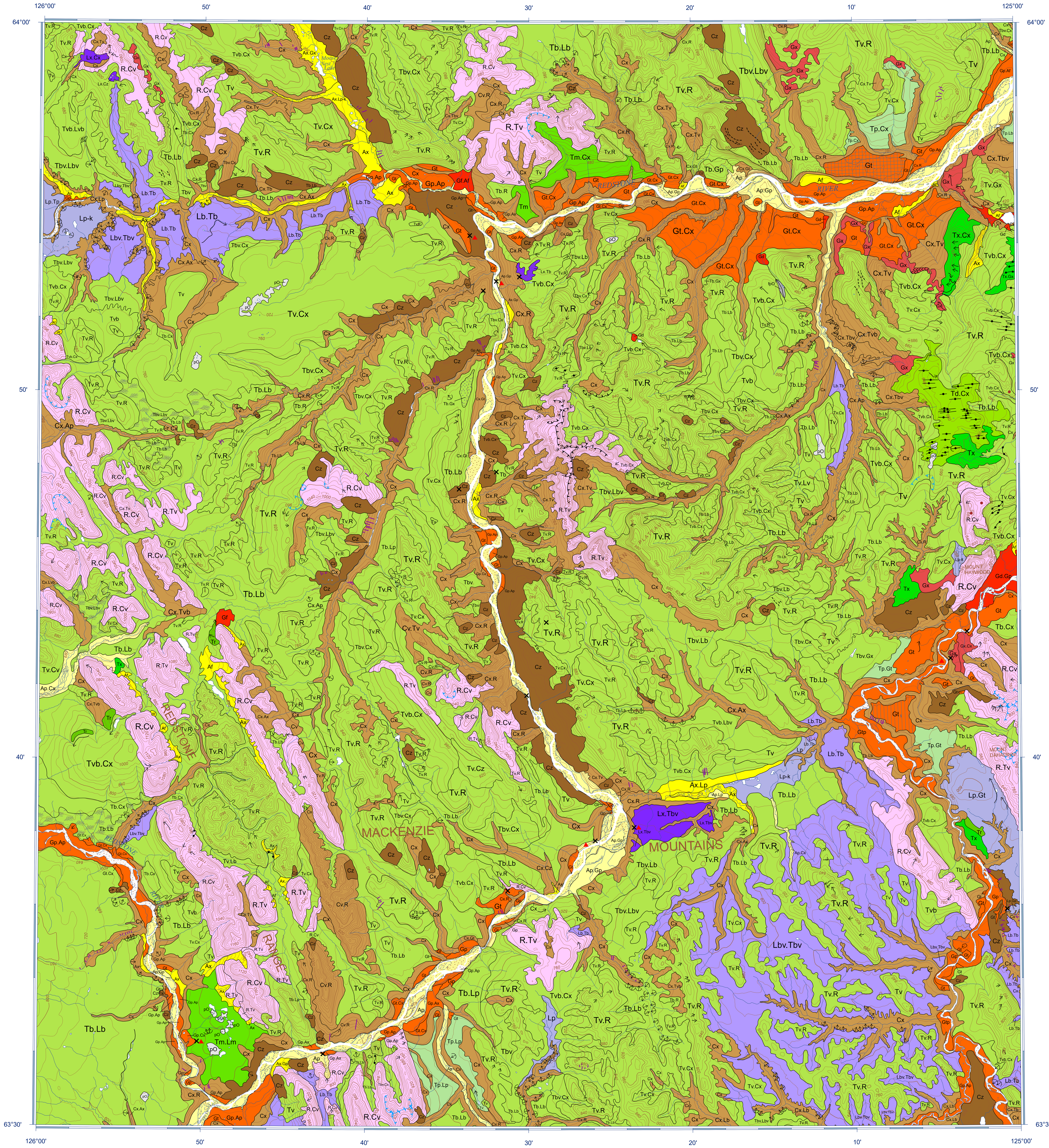


National Topographic System reference and index to adjoining published Geological Survey of Canada maps

Catalogue No. M183-1/298-2016E-PDF
ISBN 978-0-660-06628-8
https://doi.org/10.4095/299113

Natural Resources Canada / Ressources naturelles Canada

CANADIAN GEOSCIENCE MAP 298
SURFICIAL GEOLOGY
DAHADINNI RIVER
Northwest Territories
NTS 95-N northwest
1:100 000



HOLOCENE

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

- pO — **PEATLAND:** saturated sphagnum peat generally underlain by woody sedge peat; 0.5–2 m thick.
- fpO — FENLAND (>50%) AND PEATLAND

ALLUVIAL DEPOSITS: sand, silt and minor gravel in association with modern 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 organic detritus 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.
- Cx — **COLLUVIAL COMPLEX:** slope complex (veneer to blanket) consisting of diamicton and rubble; may include minor landslides (Cz) and/or alluvial fan (Af) units; >2 m thick.
- Cz — **LANDSLIDE:** bedrock, rubble and/or diamicton occurring as stepped or tongue-shaped deposits; formed by rotational slumping, retrogressive thaw flow, debris flows, affecting surficial sediments and/or bedrock; they are prominent along former meltwater channels; large areas of debris/mud-flow slides are located in low angle slopes north of Willowlake River; maximum area 17.5 km^2.

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 sliding 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.
- Lb — **LACUSTRINE BLANKET:** deposit conforms to local topography up to 8 m of relief; locally overlain by eolian sand; 2–10 m thick.
- Lv — **LACUSTRINE VENEER:** discontinous deposits, conforming to local topography; commonly associated with small lakes following ice retreat; locally overlain by eolian sand.
- Lvb — **LACUSTRINE VENEER TO BLANKET:** locally overlain by eolian sand; <3 m thick.
- Lbv — **LACUSTRINE BLANKET TO VENEER:** locally overlain by eolian sand; <3 m thick.
- Lm — **LACUSTRINE PLAIN, ROLLING:** rolling, occurring as low ridges; locally overlain by eolian sand; 2–15 m thick.
- Lx — **LACUSTRINE COMPLEX:** deltaic sediments transitional between glaciofluvial and glaciolacustrine deposits with upper 0–5 m consisting of sand; locally overlain by eolian sand; subject to active layer detachment slides, retrogressive thaw flow slides and debris flows; may contain thermokarst depressions; up to 20 m thick.

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; Willowlake River areas of Gp have been affected by Jökulhaups that left sand ripples or sand veneer over the surface.
- Gtp — **GLACIOFLUVIAL TERRACE TO PLAIN:** glaciofluvial terrace dominant; flat to gently sloping, with no visible boundaries between them; these units occur only along major rivers or interbedded with other drift types; 3–50 m thick.
- Gt — **GLACIOFLUVIAL TERRACE:** 10–50 m thick; along Willowlake River the areas of Gt have been affected by Jökulhaups that left sand ripples or sand veneer over the surface.
- Gd — **GLACIOFLUVIAL DELTA:** gently sloping, abrupt scarp, showing sudden change in lake level; deposited in a glacial lake; 5–15 m thick.
- Gf — **GLACIOFLUVIAL FAN:** mainly coarse gravel with minor sand, locally with mudflow deposits; commonly deposited in a meltwater channel or 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; 2–50 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; >20 m thick; most commonly kames discontinuosly cover the plains surrounding Greasy and Highland lakes.
- Tb — **TILL BLANKET:** gently to moderately sloping plain conforming to underlying topography; 2–8 m thick; most commonly kames discontinuosly cover the plains surrounding Greasy and Highland lakes.
- Tbv — **TILL BLANKET TO VENEER:** conforming to underlying topography; <8 m thick.
- Tvb — **TILL VENEER TO BLANKET:** conforming to underlying topography; 1–8 m thick.
- Tv — **TILL VENEER:** with relief conforming to underlying topography; <1 m thick.
- Td — **TILL, DRUMLINOID:** hilly till plain with individual drumlins or extensive flutes; 3–15 m thick.
- Tr — **TILL, RIDGED:** surface of generally coarse till (20–50% pebbles) deposited as ridges; commonly lateral and frontal moraines and hummocks.
- Tm — **TILL PLAIN, ROLLING:** till plain with broad hummocks 10–20 m high (5–20% pebbles and larger); typically bouldery till in mountains.
- Tx — **TILL COMPLEX:** largely hummocky, ridged, and/or hilly with patches of gravel; in some places Tx forms a veneer over bedrock; up to 25 m thick.

PALEOZOIC TO MESOZOIC

BEDROCK: primarily plains of Upper Devonian and Cretaceous rocks; two prominent ridges on the northwest part of the map consist of limestone and dolomite of Middle Devonian age.

- R — **BEDROCK:** upper Devonian limestone, dolomite, shale, siltstone, mudstone and sandstone and Cretaceous shale and limestone mostly in plains area; Upper and middle Devonian limestone, dolomite, shale, 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.
- Peatlands and fenlands undivided constituting 10–50% of the map unit.

EOLIAN DEPOSITS: as pattern

This pattern is used when eolian sand veneer appears as a third component in a polygon, e.g. Tp.Gx.Ev

- Discontinous veneer (<1 m) mainly fine sand and silt covering other surficial units and bedrock.

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
- Drumlin, drumlinoid ridge or flute (direction uncertain): streamlined hill or ridge of till with long axis parallel to direction of iceflow
- Drumlin, drumlinoid ridge or flute (direction certain): streamlined hill or ridge of till with long axis parallel to direction of iceflow; elliptical base and arched profile with long gentle slope pointing in downstream direction
- 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
- 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
- >>>>>>>>>>>> Esker (direction certain): sinuous, low ridge composed of sand and gravel; formed by deposition from meltwater running through a channel beneath or within glacier ice
- Tension cracks
- Debris flow
- Shield erratic
- Landslide
- Sinkhole
- Ground 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.

Recommended citation
Duk-Rodkin, A., 2018. Surficial geology, Dahadinni River, Northwest Territories, NTS 95-N northwest; Geological Survey of Canada, Canadian Geoscience Map 298 (preliminary), scale 1:100 000. https://doi.org/10.4095/299113

Celebrating 175 yrs

Geological Survey of Canada
Canadian Geoscience Maps

Author: A. Duk-Rodkin

Geology by A. Duk-Rodkin, 2006–2007
Air photo interpretation by A. Duk-Rodkin
Geomatics by D.A. Lemay and M. Le
Cartography by the Geological Survey of Canada

SURFICIAL GEOLOGY
DAHADINNI RIVER
Northwest Territories
NTS 95-N northwest
1:100 000

2 0 2 4 6 8 km

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

Mean magnetic declination 2018, 20°25'E, decreasing 24.7' annually. Readings vary from 20°32'E in the NW corner to 20°16'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.

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

This publication has been scientifically reviewed, but it has not undergone a formal edit.

CANADIAN GEOSCIENCE MAP 298
SURFICIAL GEOLOGY
DAHADINNI RIVER
Northwest Territories
NTS 95-N northwest

Canada