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Abstract

This new surficial geology map product represents the conversion of Preliminary Map 16-1981 (Rampton and Paradis, 1982) and its legend, using the Geological Survey of Canada's Surficial Data Model (SDM version 2.3.14) (Deblonde et al., 2018). All geoscientific knowledge and information from Preliminary Map 16-1981 that conformed to the current SDM were maintained during the conversion process. Supplementary legacy information (descriptive notes and extended legend) on the original map is not included here. The purpose of converting legacy map data to a common science language and common legend is to enable and facilitate the efficient digital compilation, interpretation, management, and dissemination of geological map information in a structured and consistent manner. This provides an effective knowledge-management tool designed around a geodatabase that can expand, following the type of information to appear on new surficial geology maps.

Résumé

Ce nouveau produit cartographique de la géologie des formations superficielles correspond à la conversion de la Carte préliminaire 16-1981 (Rampton et Paradis, 1982) et de sa légende, en se servant du Modèle de données pour les formations superficielles (MDFS version 2.3.14) de la Commission géologique du Canada (Deblonde et al., 2018). Toutes les connaissances et l'information de nature géoscientifique de la Carte préliminaire 16-1981 qui sont en conformité avec le modèle de données ont été conservées pendant le processus de conversion. De l'information additionnelle (notes descriptives et légende détaillée) présente sur la carte originale n'est pas intégrée ici. Le but de la conversion de cartes publiées antérieurement suivant un langage scientifique commun et une légende commune est de permettre et de faciliter la compilation, l'interprétation, la gestion et la diffusion efficaces de l'information géologique cartographique en mode numérique de façon structurée et cohérente. Cette façon de faire offre un outil efficace de gestion des connaissances élaboré à l'aide d'une géodatabase qui pourra évoluer suivant le type d'information à paraître sur les nouvelles cartes de la géologie des formations superficielles.

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

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CANADIAN GEOSCIENCE MAP 383

SURFICIAL GEOLOGY

PINE LAKE

Yukon

NTS 115-A/11, 12, 13, and 14

1:100 000

HOLOCENE

NEOGLACIAL

ALLUVIAL SEDIMENTS

nAf — **Fan sediments:** sand to larger rock fragments; variable thickness; accumulation of sediments forms a fan-shaped deposit.

nAt — **Terraced sediments:** generally gravel with veneer of sand and silt; veneer commonly has significant organic content and cap of peat; veneer thickest on high terraces; in places, gravel lacks fine-textured peat veneer; in places, fine-textured sediments or interbedded coarse- and fine-textured sediments; gravel coarse on narrow terraces adjacent to alpine streams; generally between 3 m and 15 m thick, but ranges between 1.5 m and 50 m; bordered by active floodplains, low terraces, or stream-cut scarps; flat surface generally 1.5–30 m above streams; variable permafrost and ground-ice content.

GLACIOLACUSTRINE SEDIMENTS

nGLo — **Offshore plain sediments:** primarily silt and silty clay, with some fine sand and lenses of sand and gravel, in places interbedded with clay, silt, sand, or gravel; variable thickness, ranges from 2 m to several metres thick; may cover large areas in valleys; flat to gently sloping plain; usually underlain by other types of drift; ground-ice content variable.

nGLb — **Glaciolacustrine blanket:** primarily silt and silty clay, with some fine sand and lenses of sand and gravel; generally 0.5–3 m thick; found in valleys and usually underlain by drift, but in places, by colluvium and bedrock; gentle to moderately sloping surface; permafrost and ground-ice content variable.

MODERN (POSTGLACIAL)

GLACIAL ICE AND SNOWPACK

Isn — **Snowpacks:** snow and firn; veneer to thin blanket; overlying various map units.

I — **Glacier ice:** glacier ice with veneer or thin blanket of snow and firn, may be debris-covered; valley glaciers 50–150 m thick; cliff glaciers 2–40 m thick; overlain by ice-cored moraines where map units become complex in composition, and include chaotic topography; generally overlies glacially scoured bedrock; extent of ice based on airphotos taken in June and July 1948; glaciers from topographic base are not shown.

ORGANIC DEPOSITS

Ov — **Organic veneer:** peat and organic silt deposits, may contain wood fragments; usually less than 1 m and averaging 0.5 m thick; usually underlain by pond sediments, drift, or less commonly alluvial sediments; common in swales, depressions, and broad, flat valleys.

Ob — **Organic blanket:** peat and organic silts, may contain wood fragments; up to 8 m thick; usually underlain by pond sediments, drift, or less commonly alluvial sediments; common in swales, depressions, and broad, flat valleys.

EOLIAN SEDIMENTS

Er — **Sand dunes:** sand; 2–30 m thick; generally overlies glaciofluvial outwash and glaciolacustrine sediments, and less commonly morainal, colluvial, alluvial sediments, and bedrock; mainly parabolic and linear ridges standing 5–30 m above surrounding terrain; active blowouts occur on dunes; irregular permafrost distribution.

Ev — **Eolian veneer:** mainly sand and silt, may contain thin layers of peat; usually less than 1 m thick, but averaging 0.5 m; generally overlies glaciofluvial, glaciolacustrine, or morainal sediments; occurs on flat to moderate slopes; irregular permafrost distribution; ground-ice presence common in silty facies.

E — **Eolian sediments, undifferentiated:** fine sand and silt; generally 0.5–3.0 m thick; generally overlies glaciofluvial, glaciolacustrine, or morainal sediments; occurs on flat to moderate slopes; irregular permafrost distribution.

COLLUVIAL DEPOSITS

Cf — **Fan sediments:** sand to larger rock fragments; variable thickness; accumulation of sediments form a fan-shaped deposit.

Ca — **Talus apron deposits:** cobbles and boulders, angular, having a relatively narrow size range in any one area; colluvium known or assumed to consist of cobble-sized rubble or blocks; lithology of rock fragments same as adjacent rock cliffs; thickness greater than 6 m, except near edges; rockfalls, slides, and debris flows are common.

Cg — **Rock glacier:** primarily bouldery rubble, rarely substantial content of sand or fines; generally 10–30 m thick; core may contain glacier ice; generally underlain by bedrock, but lower parts may overlie drift, colluvium, or alluvium; permafrost present; moderate to high ground-ice content in frozen sediments.

Cv — **Colluvial veneer:** diamicton with significant proportion of cobbles and boulders; poorly sorted; matrix primarily silt and sand, with little clay; thin lenses and layers of peat and gravel common; a few layers of drift and alluvium; usually less than 1 m thick, but averaging 0.5 m; in places colluvium is composed primarily of cobble-sized rubble or blocks of local bedrock; commonly covers glacially-scoured bedrock; may contain small areas of unmapped bedrock, drift, and alluvial sediments; may be rilled or gullied on steep slopes.

Cb — **Colluvial blanket:** diamicton with a significant proportion of cobbles and boulders; poorly sorted; matrix is primarily silt and sand, with little clay; lenses and layers of peat and gravel common; layers of morainal, glaciofluvial, and glaciolacustrine sediments may be interlayered with material resulting from disintegration of bedrock; nearly continuous cover greater than 1 m thick, generally 0.5–3 m thick; in places colluvium composed primarily of blocks of local bedrock or cobble-sized rubble; ubiquitous on slopes underlain by bedrock in unglaciated terrain; common on moderate to steep slopes in glaciated terrain; may contain solifluction lobes, patterned ground, and nivation terraces; may contain small unmapped areas of drift and alluvial sediments; permafrost may be common.

C — **Colluvial deposits, undifferentiated:** diamicton with rock fragments; variable thickness; may contain small areas of unmapped bedrock, drift, and alluvial sediments; may be rilled or gullied on steep slopes.

ALLUVIAL SEDIMENTS

Ap — **Floodplain sediments:** generally gravel with veneer of sand and silt; veneer commonly has significant organic content and cap of peat or coarse gravel near high-gradient alpine streams; in places lacks fine-textured veneer; probably averages 3–10 m thick near large streams; bordered by active and inactive low terraces and stream-cut scarps; may include channels and bars; floodplains underlain by colluvium, drift, or bedrock; subject to flooding and icings; modern active floodplains indicated by reworked overlay pattern.

Af — **Fan sediments:** generally gravel and sand with veneer of sand and silt; veneer commonly has significant organic content and cap of peat; in places, sand or gravel, gravel, or bouldery gravel without veneer of sand and silt; in places fine-textured sediments or gravel and sand interbedded with fine-textured sediments; fans with steep slopes in alpine areas consist of coarse, bouldery gravel; probably averages 3–35 m thick; may include small unmapped areas of floodplain; active fans have channel and bars; may contain permafrost; may contain moderate to high ice content in peat and fine-textured materials.

At — **Terraced sediments:** generally gravel with veneer of sand and silt; veneer commonly has significant organic content and cap of peat; veneer thickest on high terraces; in places gravel lacks fine-textured peat veneer; in places fine-textured sediments or interbedded coarse- and fine-textured sediments; gravel coarse on narrow terraces adjacent to alpine streams; generally between 3–15 m thick, but ranges between 1.5 m and 50 m; bordered by active floodplains, low terraces, or stream-cut scarps; flat surface generally 1.5–30 m above streams; variable permafrost and ground-ice content.

Ab — **Alluvial blanket:** gravel, sand, and silt, interbedded; generally 0.5–3 m or more thick; commonly capped by peat; may be underlain by drift or coarse alluvial sediments; variable permafrost and ground-ice content.

LATE WISCONSINAN (MACAULEY GLACIATION)

GLACIOLACUSTRINE SEDIMENTS

GLr — **Beach sediments:** sand and gravel; generally 1–4 m thick; strandlines locally present at the margins of former glacial lakes; usually underlain by drift, but in places, by bedrock; narrow, gently sloping benches or low, narrow ridges; permafrost generally absent.

GLd — **Kame delta sediments:** primarily sand and gravel, with veneer or thin blanket of silt and peat; some areas primarily sand; rarely bouldery gravel or boulders; probably averages 6–15 m thick; but varies between 3 m and 60 m; commonly incised into morainal landforms, with stream terraces and floodplains incised within outwash; usually underlain by till, glaciolacustrine, or more rarely bedrock; variable permafrost and ground ice.

GLo — **Plain sediments:** primarily silt and silty clay, with some fine sand and lenses of sand and gravel, in places interbedded with clay, silt, sand, or gravel; variable thickness, ranges from 2 m to several metres thick; may cover large areas in valleys; flat to gently sloping plain; usually underlain by other types of drift; ground-ice content variable.

GLv — **Glaciolacustrine veneer:** primarily silt and silty clay, with some fine sand and lenses of sand and gravel; usually less than 1 m thick, but averages 0.5 m; found in valleys and usually underlain by drift, but in places, by colluvium and bedrock; gentle to moderately sloping surface; permafrost and ground-ice content variable.

GLb — **Glaciolacustrine blanket:** primarily silt and silty clay, with some fine sand and lenses of sand and gravel; generally 0.5–3 m thick; found in valleys and usually underlain by drift, but in places, by colluvium and bedrock; gentle to moderately sloping surface; permafrost and ground-ice content variable.

GLACIOFLUVIAL SEDIMENTS

GFp — **Outwash plain sediments:** primarily sand and gravel with veneer or thin blanket of silt and peat; some areas primarily sand; rarely bouldery gravel or boulders; probably averages 6–15 m thick, but varies between 3 m and 60 m; commonly incised into morainal landforms, with stream terraces and floodplains incised within outwash; occurs primarily in valleys and usually underlain by till, glaciolacustrine sediments, or bedrock; flat to gently sloping, rarely channelled; permafrost rare and little ground ice except in overlying silt and peat.

GFt — **Terraced sediments:** primarily sand and gravel with veneer or thin blanket of silt and peat; some areas primarily sand; rarely bouldery gravel or boulders; probably averages 6–15 m thick, but varies between 3 m and 60 m; forming fans commonly incised into morainal landforms or outwash; occurs primarily in valleys and usually underlain by till, glaciolacustrine sediments, or bedrock; flat to gently sloping, in places terraced, rarely channelled; permafrost rare and little ground ice except in overlying silt and peat.

GFh — **Hummocky sediments:** primarily gravel and sand with few beds of silt, rarely coarse bouldery gravel; generally 13–60 m thick; hummocky topography; depressions commonly have thin covers of silt and peat; commonly underlain by till, glaciolacustrine sediments, or more rarely, bedrock; in places channelled by meltwater; rare permafrost and little ground ice except in overlying silt and peat.

GFk — **Kame terrace sediments:** primarily gravel and sand with few beds of silt, rarely coarse bouldery gravel; generally 13–60 m thick; undulating to rolling topography; depressions commonly have thin covers of silt and peat; commonly underlain by till, glaciolacustrine sediments, or more rarely, bedrock; in places channelled by meltwater; rare permafrost and little ground ice except in overlying silt and peat.

GFr — **Esker sediments:** gravel, little sand, may have thin veneer of silt or peat; usually 10–50 m thick; isolated occurrences throughout glaciated lowlands; commonly underlain by till, more rarely bedrock; individual or parallel ridges standing 10–50 m above surrounding terrain; in places occurs as aligned mounds of gravel or sand; few kettles; permafrost and ground ice generally absent.

GLACIAL SEDIMENTS (TILL)

Tm — **Rolling morainal sediments:** diamicton; high sand, silt, and stone content; till known or assumed to have low stone content; may be crudely sorted and low in fines or contain a high proportion of boulders and cobbles; probably ranges from 3 m to 40 m thick; till plain and disintegration moraine; commonly contains unmapped patches of glaciofluvial and more rarely glaciolacustrine sediments; surface depressions may contain fine-grained pond sediments and peat; surface generally rolling to undulating, with gentle to moderate slopes; in places fluted or drumlinized; permafrost and ground ice generally absent.

Tr — **Moraine ridge sediments:** diamicton; high sand, silt, and stone content; may be crudely sorted and low in fines, in places contains a high proportion of boulders and cobbles; generally 10–50 m thick, rarely to 100 m thick; individual ridges or groups of ridges along the limit of Late Wisconsinan glaciation; underlain by drift, colluvium, and rarely by bedrock; permafrost and ground ice generally absent.

Tp — **Till plain:** diamicton; high sand, silt, and stone contents; texture of basal part reflects underlying material; till known or assumed to have low stone content; in places has high sand and stone content; at high elevations till has high proportion of boulders and cobbles; averages 3–10 m thick, varies between 1 m and 50 m; till plain underlain by drift or alluvium; commonly contains unmapped patches of glaciofluvial and glaciolacustrine sediments; surface generally flat to gently rolling, in places fluted or with low, broad drumlins; permafrost and ground ice generally absent.

Tv — **Till veneer:** diamicton; high sand, silt, and stone contents; locally may be crudely sorted, low in fines, or high in rubble or boulder content; usually less than 1 m thick, but averaging 0.5 m; locally contains unmapped patches of glaciofluvial, colluvial, and alluvial deposits, and bedrock; common on glaciated slopes; usually underlain by bedrock; may be rilled and gullied, with creep and solifluction common on steep slopes; permafrost generally absent.

Tb — **Till blanket:** diamicton; high sand, silt, and stone content; locally may have low stone content or high sand and stone content; at high elevations till has high proportion of boulders and cobbles; generally 0.5–3 m thick; usually underlain by bedrock, rarely by colluvium; locally contains unmapped patches of glaciofluvial, alluvial, and colluvial deposits, and bedrock; may include rare active-layer detachment flows, and nivation terraces and snow patches at high elevations; variable permafrost and ground-ice content.

T — **Till, undifferentiated:** diamicton; silty sandy matrix, variable stone content; variable thickness; may include some glaciofluvial and glaciolacustrine sediments; planar to undulating surface; includes multiple environments of deposition; appears only as secondary unit in stratigraphic relationships within polygons.

U — **Undifferentiated drift:** undifferentiated till, glaciofluvial outwash, and glaciolacustrine sediments; generally has high sand and stone content or boulder and cobble content, especially at high elevations; variable thickness, veneer to blanket; may include discontinuous veneer of silt and peat on surface; contains unmapped patches of colluvium and alluvial sediments, and bedrock; usually underlain by bedrock.

EARLY WISCONSINAN OR ILLINOIAN (MIRROR CREEK GLACIATION)

ewTb — **Till blanket:** diamicton; high sand, silt, and stone content; locally may have low stone content or high sand and stone content; at high elevations till has high proportion of boulders and cobbles; generally 0.5–3 m thick; usually underlain by bedrock, rarely by colluvium; locally contains unmapped patches of glaciofluvial, alluvial, and colluvial deposits, and bedrock; may include rare active-layer detachment flows, and nivation terraces and snow patches at high elevations; variable permafrost and ground-ice content.

PRE-PLEISTOCENE

R — **Bedrock, undifferentiated:** varied bedrock types; mixed igneous, volcanic, metamorphic, and sedimentary rocks; arêtes, horns, and glacially-scoured valleys common in glaciated areas.

Complex units: two map-unit designators separated by a dot (.) are used where the surficial cover forms a complex area and the units are too small to be mapped individually (e.g. Ap.At designates an area of alluvial floodplain sediments with numerous small units of alluvial terraced sediments).

Stratigraphic relationship: two map-unit designators separated by a slash (/) are used where a stratigraphic relationship is observed or confidently inferred (e.g. Ov/GLo indicates organic veneer overlying glaciolacustrine sediments).

Thermokarst depression:
- *Large*
- *Small*

Dune:
- *Active, blowout, paleowind unspecified*
- *Inactive, paleowind specified*

Area gullied or channelled by meltwater

Area of seasonal inundation and reworking by water

Kettle, large

Geological contact:
- *Defined*
- *Approximate*
- *Inferred*

Landslide escarpment, inactive

Altiplanation or nivation terrace

Terrace scarp in unconsolidated material, may include bedrock

Beach crest, strandline, glaciolacustrine:
- *Neoglacial*
- *Late Wisconsinan*

Minor meltwater channel, direction known, Late Wisconsinan

Major moraine ridge, Late Wisconsinan

Kame terrace

Esker, direction known

Fluted till, direction unspecified

Fluted bedrock, direction unspecified

Kame

Small bedrock outcrop, glacially scoured or castled

Recommended citation

Geological Survey of Canada, 2019. Surficial geology, Pine Lake, Yukon, NTS 115-A/11, 12, 13, and 14; Geological Survey of Canada, Canadian Geoscience Map 383 (Surficial Data Model v. 2.3.14 conversion of Map 16-1981), scale 1:100 000. https://doi.org/10.4095/313020

CANADIAN GEOSCIENCE MAP 383

Geological Survey of Canada
Canadian Geoscience Maps

Canada

Author: Geological Survey of Canada

Geology by V.N. Rampton and S. Paradis, 1979

Geology conforms to Surficial Data Model v. 2.3.14 (Deblonde et al., 2018).

Geological data conversion by D.E. Kerr, 2017 and 2018

Geology has been spatially adjusted to fit the updated base.

Geomatics by K. McNeil and C.D. Stevens

Cartography by D. Viner

Scientific editing by E. Inglis

Initiative of the Geological Survey of Canada, conducted under the auspices of Natural Resources Canada's Geo-mapping for Energy and Minerals (GEM) program

Map projection Universal Transverse Mercator, zone 8
North American Datum 1983

SURFICIAL GEOLOGY
PINE LAKE
Yukon
NTS 115-A/11, 12, 13, and 14
1:100 000

2 0 2 4 6 8 km

Base map at the scale of 1:50 000 from Natural Resources Canada, with modifications
Elevations in metres above mean sea level
Contours are masked through the water due to poor data quality

Mean magnetic declination 2019, 18°56'E, decreasing 20.8' annually
Readings vary from 18°48'E in the SW corner to 19°04'E in the NE 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 (https://geoscan.nrcan.gc.ca/).

CANADIAN GEOSCIENCE MAP 383
SURFICIAL GEOLOGY
PINE LAKE
Yukon
NTS 115-A/11, 12, 13, and 14